ALL INDIA MOCK TEST

Sample Paper - 6

DURATION : 180 Minutes **MARKS : 720**

Topic Covered

Physics	**: FULL SYLLABUS : 45 Questions**
Chemistry	**: FULL SYLLABUS : 45 Questions**
Biology	**: FULL SYLLABUS : 90 Questions**

Please read the instructions carefully :

1. The test is of **3 hours** duration and Test Booklet contains **180** questions. Each question carries 4 marks. For each correct response, the candidate will get **4 marks**. For each incorrect response, **one mark** will be deducted. The maximum marks are **720**.
2. Use **Blue/Black Ball Point Pen** only for writing particulars on this page/marking responses.
3. Rough work is to be done on the space provided in the Test Booklet only.
4. **On completion of the test, the candidate must handover the Answer Sheet to the invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
5. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your roll no. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
6. Before attempting the question paper ensure that it contains all the pages and no question is missing.
7. Each candidate must show on demand his/her Admission Card to the Invigilator.
8. If any student is found to have occupied the seat of another student, both the students shall be removed from the examination and shall have to accept any other penalty imposed upon them.
9. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
10. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice.
11. Use of Electronic/Manual Calculator is prohibited.
12. The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
13. The candidates will write the Correct Test ID Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

Name of the Student (In CAPITALS) : _____

Candidate ID : _____

Candidate Signature : _____ **Invigilator's Signature :** _____

[PHYSICS]

1. A Ge specimen is doped with Al. The concentration of acceptor atoms is $\simeq 10^{21}\text{atoms}/\text{m}^3$. Given that the intrinsic concentration of electron-hole pairs is $\simeq 10^{19}/\text{m}^3$, the concentration of electrons in the specimen is-

(1) $10^{17}/\text{m}^3$

(2) $10^{15}/\text{m}^3$

(3) $10^{4}/\text{m}^3$

(4) $10^{2}/\text{m}^3$

1. एक Ge अर्द्धचालक में Al मिलाया गया है। ग्राही परमाणुओं की संख्या $\simeq 10^{21}\text{atoms}/\text{m}^3$ है। नैंज अर्द्धचालक में इलेक्ट्रॉन-होल युग्म की सान्द्रता $\simeq 10^{19}/\text{m}^3$ तो अब पदार्थ में इलेक्ट्रॉन की सान्द्रता ज्ञात करिए-

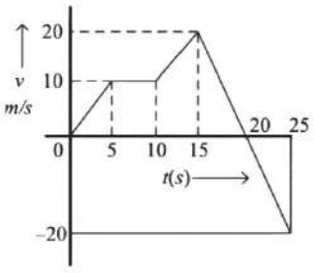
(1) $10^{17}/\text{m}^3$

(2) $10^{15}/\text{m}^3$

(3) $10^{4}/\text{m}^3$

(4) $10^{2}/\text{m}^3$

2. From the v – t graph shown, the ratio of distance to displacement in 25 s of motion is :



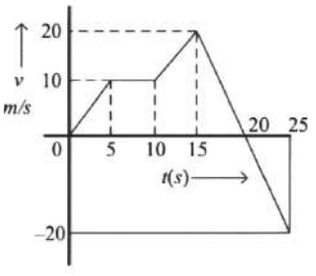
(1) $\frac{3}{5}$

(2) $\frac{1}{2}$

(3) $\frac{5}{3}$

(4) 1

2. दर्शाये गए v – t ग्राफ में, 25 सेकण्ड की गति के दौरान तय की गई दूरी एवं विस्थापन का अनुपात है:



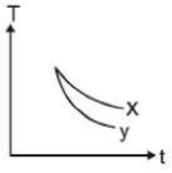
(1) $\frac{3}{5}$

(2) $\frac{1}{2}$

(3) $\frac{5}{3}$

(4) 1

3. If emissivity of bodies X and Y are e_x and e_y and absorptive powers are A_x and A_y then



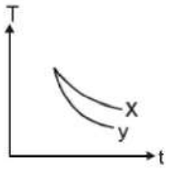
(1) $e_y > e_x$; $A_y > A_x$

(2) $e_x > e_y$; $A_x > A_y$

(3) $e_x < e_y$; $A_x > A_y$

(4) $e_x > e_y$; $A_y > A_x$

3. यदि पिंडों X और Y की उत्सर्जकताऐं क्रमशः e_x तथा e_y हो और अवशोषण क्षमताएं A_x तथा A_y हो तो



(1) $e_y > e_x$; $A_y > A_x$

(2) $e_x > e_y$; $A_x > A_y$

(3) $e_x < e_y$; $A_x > A_y$

(4) $e_x > e_y$; $A_y > A_x$

4. A string is rightly tied at two ends and its equation of vibration is given by $y = \cos 2\pi t \sin 2\pi x$. The minimum length of the string is-

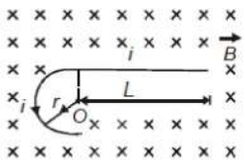
(1) 1m

(2) $\frac{1}{2}$m

(3) 5m

(4) 2πm

5. A wire of J-shape carries a current i and r is the radius of circular shape and is placed in uniform magnetic field as shown in figure. The total force on the wire



(1) iLB

(2) $i(L + \pi r)B$

(3) $iB\sqrt{L^2 + 4r^2}$

(4) $i(L + 2r)B$

6. A metal block is experiencing an atmospheric pressure of $1 \times 10^5 \frac{N}{m^2}$, when the same block is placed in a vacuum chamber, the fractional change in its volume is (the bulk modulus of metal is $1.25 \times 10^{11} \frac{N}{m^2}$)

(1) 4×10^{-7}

(2) 2×10^{-7}

(3) 8×10^{-7}

(4) 1×10^{-7}

7. A satellite of time period 24 h is orbiting the earth at a height 6R above the surface of earth, where R is radius of earth. What will be the time period of another satellite at a height 2.5 R from the surface of earth?

(1) $6\sqrt{2}$h

(2) $4\sqrt{2}$h

(3) $2\sqrt{2}$h

(4) $2\sqrt{4}$h

4. एक डोरी दोनों सिरों से ठीक पूर्वक बँधी हुई है तथा इसके कंपन का समीकरण $y = \cos 2\pi t \sin 2\pi x$ द्वारा दिया गया है। डोरी की न्यूनतम लम्बाई है-

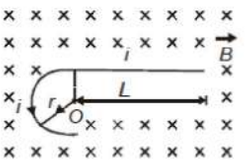
(1) 1 m

(2) $\frac{1}{2}$m

(3) 5 m

(4) 2πm

5. J-आकार के तार में i धारा प्रवाहित होती है और r वृत्तीय आकृति की त्रिज्या है और इसे चित्र में दिखाए अनुसार समान चुंबकीय क्षेत्र में रखा गया है। तार पर कुल बल है-



(1) iLB

(2) $i(L + \pi r)B$

(3) $iB\sqrt{L^2 + 4r^2}$

(4) $i(L + 2r)B$

6. धातु के एक ब्लॉक पर $1 \times 10^5 \frac{N}{m^2}$ का वायुमंडलीय दाब लगता है, जब उसी ब्लॉक को एक निर्वात कक्ष में रखा जाता है तो उसके आयतन में आंशिक परिवर्तन होगा (धातु का आयतन गुणांक $1.25 \times 10^{11} \frac{N}{m^2}$)

(1) 4×10^{-7}

(2) 2×10^{-7}

(3) 8×10^{-7}

(4) 1×10^{-7}

7. 24 घंटे के आवर्तकाल वाला एक उपग्रह पृथ्वी की सतह से 6R ऊँचाई पर पृथ्वी की परिक्रमा कर रहा है, जहाँ R पृथ्वी की त्रिज्या है। पृथ्वी की सतह से 2.5 R ऊँचाई पर स्थित दूसरे उपग्रह का आवर्तकाल क्या होगा ?

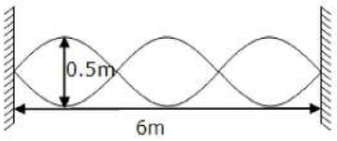
(1) $6\sqrt{2}$h

(2) $4\sqrt{2}$h

(3) $2\sqrt{2}$h

(4) $2\sqrt{4}$h

8. A standing wave pattern is established in a string as shown. The wavelength of one of the component traveling waves is:



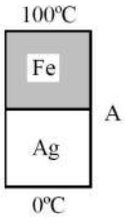
(1) 0.25m

(2) 0.5m

(3) 1m

(4) 4m

9. Two cylinders of the same diameter, one of iron and other of silver are placed in close contact as shown in figure. If the thermal conductivity of silver is 11 times that of iron the temperature of interface A is approximately



(1) 91.7 °C

(2) 80°C

(3) 50°C

(4) 8.3°C

10. A passenger sitting in a train A moving at 90 km/h observes another train B moving in the opposite direction for 8 s. if the velocity of the train B is 54 km/h, then length of train B is :

(1) 120 m

(2) 200 m

(3) 320 m

(4) 80 m

11. Two capillaries of the same material but of different diameter are dipped in a liquid. In one of the capillary the liquid rises to a height of 22mm and in the other to 66mm, Then the ratio of their diameters is-

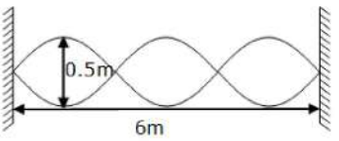
(1) 1: 3

(2) 3 : 1

(3) 1 : 9

(4) 9 : 1

8. एक डोरी में एक अप्रगामी तरंग प्रारूप स्थापित किया गया है जैसा कि दिखाया गया है। प्रगामी घटक तरंगों में से एक की तरंगदैर्ध्य है:



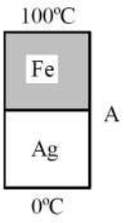
(1) 0.25m

(2) 0.5m

(3) 1m

(4) 4m

9. चित्र में दर्शाया गया है कि लोहे तथा चाँदी के दो समान व्यास वाले बेलन सम्पर्क में रखे गए हैं। यदि चाँदी का चालकता गुणांक, लोहे का 11 गुना हो तो अन्तरापृष्ठ A का ताप लगभग होगा-



(1) 91.7 °C

(2) 80°C

(3) 50°C

(4) 8.3°C

10. 90 km/h से चलती हुई रेलगाड़ी A के अन्दर बैठा एक यात्री विपरीत दिशा में गतिमान दूसरी रेलगाड़ी B को 8s तक देखता है। यदि रेलगाड़ी B का वेग 54 km/h हो, तो रेलगाड़ी B की लम्बाई है:

(1) 120 m

(2) 200 m

(3) 320 m

(4) 80 m

11. भिन्न-भिन्न व्यास तथा समान पदार्थ की दो केशिकाओं को एक द्रव में डूबोया जाता है। इनमें से एक केशनली में द्रव 22 mm ऊँचाई तक ऊपर उठता है तथा अन्य में 66 mm तक ऊपर उठता है। तब इनके व्यास का अनुपात है-

(1) 1: 3

(2) 3 : 1

(3) 1 : 9

(4) 9 : 1

12. A particle of charge q and mass m starts moving from the origin under the action of an electric field $\vec{E} = E_0\hat{i}$ and $\vec{B} = B_0\hat{i}$ with velocity $\vec{v} = v_0\hat{j}$. The speed of the particle will become $2v_0$ after a time

(1) $t = \frac{2mv_0}{qE}$

(2) $t = \frac{2Bq}{mv_0}$

(3) $t = \frac{\sqrt{3}Bq}{mv_0}$

(4) $t = \frac{\sqrt{3}mv_0}{qE}$

13. The depth d at which the value of acceleration due to gravity becomes $\frac{1}{n}$times the value at the surface, is [R = Radius of earth] -

(1) $\frac{R}{n}$

(2) $R\left\{\frac{n-1}{n}\right\}$

(3) $\frac{R}{n^2}$

(4) $R\left\{\frac{n}{n+1}\right\}$

14. If two waves, each of intensity I_0, have the same frequency but differ by a constant phase angle 60°, superpose at a certain point in space, then the intensity of the resultant wave is -

(1) $2I_o$

(2) $\sqrt{3}I_o$

(3) $3I_o$

(4) $4I_o$

15. The position vector of a particle related to time t is given by $\vec{r} = \left(10t\hat{i} + 15t^2\hat{j} + 7\hat{k}\right)m$

The direction of net force experienced by the particle is :

(1) Positive z-axis

(2) In x – y plane

(3) Positive y – axis

(4) Positive x – axis

12. q आवेश तथा m द्रव्यमान का एक कण $\vec{E} = E_0\hat{i}$ तथा $\vec{B} = B_0\hat{i}$ वैद्युत क्षेत्र की क्रिया के अन्तर्गत वेग $\vec{v} = v_0\hat{j}$ के साथ मूल बिन्दु से प्रारम्भ होकर गति करता है। कितने समय पश्चात कण की चाल $2v_0$ हो जायेगी

(1) $t = \frac{2mv_0}{qE}$

(2) $t = \frac{2Bq}{mv_0}$

(3) $t = \frac{\sqrt{3}Bq}{mv_0}$

(4) $t = \frac{\sqrt{3}mv_0}{qE}$

13. वह गहराई d जिस पर गुरुत्वाकर्षण के कारण त्वरण का मान सतह पर मान का $\frac{1}{n}$ गुना हो जाता है, वह है [R = पृथ्वी की त्रिज्या]-

(1) $\frac{R}{n}$

(2) $R\left\{\frac{n-1}{n}\right\}$

(3) $\frac{R}{n^2}$

(4) $R\left\{\frac{n}{n+1}\right\}$

14. यदि दो तरंगें, जिनमें से प्रत्येक की तीव्रता I_0 है, जिनकी आवृत्ति समान है, लेकिन एक स्थिर कला कोण 60° का अंतर है, अंतरिक्ष में एक निश्चित बिंदु पर अध्यारोपित होती हैं, तो परिणामी तरंग की तीव्रता है -

(1) $2I_0$

(2) $\sqrt{3}I_o$

(3) $3I_0$

(4) $4I_o$

15. किसी कण का समय t के साथ स्थिति सदिश निम्नवत हैं

$\vec{r} = \left(10t\hat{i} + 15t^2\hat{j} + 7\hat{k}\right)m$

कण पर आरोपित परिणामी बल की दिशा है :

(1) धनात्मक z-अक्ष

(2) x – y तल में

(3)धनात्मक y-अक्ष

(4)धनात्मक x-अक्ष

16. A box containing N molecules of a perfect gas at temperature T_1 and pressure P_1. The number of molecules in the box is doubled keeping the total KE of the gas same as before. If the new pressure is P_2 and temperature T_2 then-

(1) $P_2 = P_1, T_2 = T_1$

(2) $P_2 = P_1, T_2 = T_1/2$

(3) $P_2 = 2P_1, T_2 = T_1$

(4) $P_2 = 2P_1, T_2 = T_1/2$

17. When current changes from 3 A to 2 A in one millisecond, it produces 5 V in a coil, then self inductance of coil will be

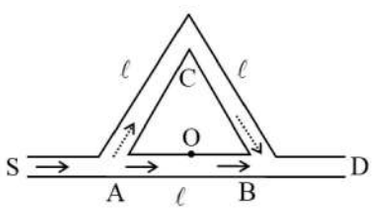
(1) 5000 H

(2) 5 mH

(3) 50 H

(4) 5 H

18. A sound wave starting from source S, follows two paths AOB and ACB to reach the detector D. If ABC is an equilateral triangle, of side ℓ and there is silence at point D, the maximum wavelength (λ) of sound wave must be-



(1) ℓ

(2) 2ℓ

(3) 3ℓ

(4) 4ℓ

19. A particle of mass 1.96×10^{-15} kg is kept in equilibrium between two horizontal metal plates having potential difference of 400 V separated apart by 0.02 m. Then, the charge on the particle is (e = electronic charge)

(1) 2e

(2) 4e

(3) 6e

(4) 3e

16. एक बॉक्स जिसमें तापमान T_1 और दाब P_1 पर एक आदर्श गैस के N अणु हैं। गैस के कुल गतिज ऊर्जा को पहले की तरह ही रखते हुए बॉक्स में अणुओं की संख्या दोगुनी कर दी जाती है। यदि नया दाब P_2 और तापमान T_2 है तो-

(1) $P_2 = P_1, T_2 = T_1$

(2) $P_2 = P_1, T_2 = T_1/2$

(3) $P_2 = 2P_1, T_2 = T_1$

(4) $P_2 = 2P_1, T_2 = T_1/2$

17. जब धारा एक मिलीसेकंड में 3 A से 2 A तक परिवर्तित होती है, तो यह एक कुंडली में 5 V उत्पन्न करती है, तो कुंडली का स्वप्रेरकत्व होगा

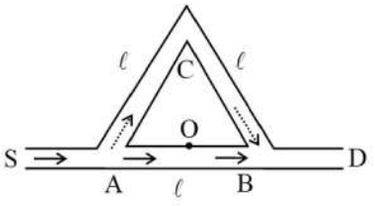
(1) 5000 H

(2) 5 mH

(3) 50 H

(4) 5 H

18. स्त्रोत S से प्रारंभ होने वाली एक ध्वनि तरंग संसूचक D पर पहुचने के लिए दो पथों AOB और ACB का अनुसरण करती है। यदि ABC भुजा ℓ का एक समबाहु त्रिभुज है तथा यहां बिन्दु D पर नीरवता (silence) है, तब ध्वनि तरंग की अधिकतम तरंगदैर्ध्य (λ) होनी चाहिए:-



(1) ℓ

(2) 2ℓ

(3) 3ℓ

(4) 4ℓ

19. 1.96×10^{-15} kg द्रव्यमान का एक कण 0.02 m की दूरी पर स्थित 400 V के विभवांतर वाली दो क्षैतिज धातु प्लेटों के बीच संतुलन में रखा गया है। तब, कण पर आवेश (e = वैद्युत आवेश) है

(1) 2e

(2) 4e

(3) 6e

(4) 3e

20. A block of mass 40 kg slides over a surface, when a mass of 4 kg is suspended through an inextensible massless string passing over frictionless pulley as shown below. The coefficient of kinetic friction between the surface and block is 0.02. The acceleration of block is $\left(\text{Given } g = 10\ ms^{-2}\right)$.

(1) $1\ ms^{-2}$

(2) $1/5\ ms^{-2}$

(3) $4/5\ ms^{-2}$

(4) $8/11\ ms^{-2}$

21. During the adiabatic expansion of two moles of a gas the internal energy of a gas is found to decrease by 2 joule. The work done during the process on gas will be equal to-

(1) – 2 J

(2) 3 J

(3) 1 J

(4) 2 J

22. A resistance of 40 ohm and an inductance of 95.5 millihenry are connected in series in a 50 cycles/second ac circuit. The impedance of this combination is very nearly

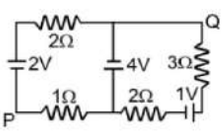
(1) 30 ohm

(2) 40 ohm

(3) 50 ohm

(4) 60 ohm

23. In the circuit shown, what is the potential difference V_{PQ}?



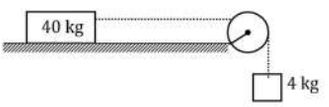
(1) +3V

(2) +2V

(3) -2V

(4) none

20. चित्र में दर्शाये अनुसार, जब एक 4kg द्रव्यमान की कोई वस्तु, एक अप्रत्यावस्था एवं भारहीन रस्सी के सिरे से इस प्रकार लटकाई जाती है कि रस्सी एक घर्षण रहित एवं भारहीन घिरनी के ऊपर से गुजर रही है, तो क्षैतिज समतल पट पर रखा एवं रस्सी के दूसरे सिरे से बंधा एक 40 kg का गुटका फिसलता है । समतल पट एवं गुटके के बीच गतिज घर्षण गुणांक का मान 0.02 है । गुटके के त्वरण का मान है। (दिया है $g = 10\ ms^{-2}$).



(1) $1\ ms^{-2}$

(2) $1/5\ ms^{-2}$

(3) $4/5\ ms^{-2}$

(4) $8/11\ ms^{-2}$

21. किसी गैस के दो मोलों के रुद्धोष्म प्रसार के दौरान गैस की आंतरिक ऊर्जा में 2 जूल की कमी पाई जाती है। इस प्रक्रिया के दौरान गैस पर किया गया कार्य होगा-

(1) – 2 J

(2) 3 J

(3) 1 J

(4) 2 J

22. 40 ओम का प्रतिरोध और 95.5 मिलीहेनरी का प्रेरकत्व 50 चक्र /सेकंड आवृत्ति वाले ac परिपथ में श्रेणीक्रम में जुड़े हुए हैं। इस संयोजन की प्रतिबाधा लगभग है

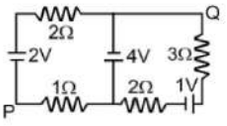
(1) 30 ओम

(2) 40 ओम

(3) 50 ओम

(4) 60 ओम

23. दिखाए गए परिपथ में, विभवान्तर V_{PQ} ज्ञात करो ?



(1) +3V

(2) +2V

(3) -2V

(4) कोई नहीं

24. The velocity of sound in dry air is V_d, and in moist air it is V_m. The velocities are measured under the same conditions of temperature and pressure. Which of the following statements is fully correct ?

(1) $V_d > V_m$ because dry air has lower density than moist air

(2) $V_d < V_m$ because moist air has lower density than dry air

(3) $V_d > V_m$ because the bulk modulus of dry air is greater than that of moist air

(4) $V_d < V_m$ because the bulk modulus of moist air is greater than that of dry air

25. A particle is moving with constant speed in a circular path. When the particle turns by an angle $90°$, the ratio of instantaneous velocity to its average velocity is $\pi : x\sqrt{2}$. The value of x will be -

(1) 7

(2) 2

(3) 1

(4) 5

26. A Carnot refrigerator has freezer at temperature $-8°C$. The coefficient of performance of refrigerator is 5. The temperature of surrounding in which heat is rejected, will be

(1) $65°C$

(2) $45°C$

(3) $300°C$

(4) $320°C$

27. In a photoelectric effect, electrons are emitted

(1) at a rate that is proportional to the square of the amplitude of the incident radiation

(2) with a maximum velocity proportional to the frequency of the incident radiation

(3) at a rate that is independent of the emitter

(4) only if the frequency of the incident radiation is above a certain threshold value

28. In an hydrogen atom, the electron revolves around the nucleus in an orbit of radius 0.53×10^{-10} m. Then, the electrical potential produced by the nucleus at the position of the electron is

(1) –13.6 V

(2) –27.2 V

(3) 27.2 V

(4) 13.6 V

24. शुष्क वायु में ध्वनि का वेग V_d है, तथा नम वायु में यह V_m है। वेगों को तापमान और दाब की समान स्थितियों में मापा जाता है। निम्नलिखित में से कौन सा कथन पूर्णतः सही है?

(1) $V_d > V_m$ क्योंकि शुष्क वायु का घनत्व नम वायु से कम होता है

(2) $V_d < V_m$ क्योंकि नम वायु का घनत्व शुष्क वायु से कम होता है

(3) $V_d > V_m$ क्योंकि शुष्क वायु का आयतन प्रत्यास्थता गुणांक नम वायु से अधिक होता है

(4) $V_d < V_m$ क्योंकि नम वायु का आयतन प्रत्यास्थता गुणांक शुष्क वायु से अधिक होता है

25. एक कण किसी वृत्ताकार पथ पर नियत चाल से गति कर रहा है। जब कण $90°$ के कोण से घूमता है, तो इसके क्षणिक वेग तथा औसत वेग का अनुपात $\pi : x\sqrt{2}$ है। का मान होगा:

(1) 7

(2) 2

(3) 1

(4) 5

26. एक कार्नोट रेफ्रिजरेटर में फ्रीजर का तापमान $-8°C$ है। रेफ्रिजरेटर का निष्पादन गुणांक 5 है। परिवेश का तापमान जिसमें ऊष्मा त्यागी जाती है , होगा

(1) $65°C$

(2) $45°C$

(3) $300°C$

(4) $320°C$

27. एक प्रकाश वैद्युत प्रभाव में इलेक्ट्रॉन उत्सर्जित होते है

(1) आपतित विकिरण के आयाम के वर्ग के समानुपाती की दर से

(2) आपतित विकिरण की आवृत्ति के सानुपातिक अधिकतम वेग के साथ

(3) उस दर से जो उत्सर्जक पर निर्भर नही करती

(4) केवल यदि आपतित विकिरण की आवृति, एक निश्चित देहली मान से उपर हो

28. हाइड्रोजन परमाणु में इलेक्ट्रॉन नाभिक के चारों ओर 0.53×10^{-10} m त्रिज्या की कक्षा में घूमता है। तब इलेक्ट्रॉन की स्थिति पर नाभिक द्वारा उत्पादित विद्युत विभव होता है

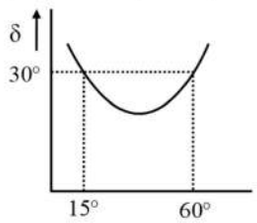
(1) –13.6 V

(2) –27.2 V

(3) 27.2 V

(4) 13.6 V

29. Figure shows graph of deviation δ versus angle of incidence i for a light ray striking a prism. Angle of prism is :



(1) 30°

(2) 45°

(3) 60°

(4) 75°

30. A particle executes linear simple harmonic motion with an amplitude of 3 cm. When the particle is at 2 cm from the mean position, the magnitude of its velocity is equal to that of its acceleration. Then its time period in seconds is:

(1) $\frac{\sqrt{5}}{\pi}$

(2) $\frac{\sqrt{5}}{2\pi}$

(3) $\frac{4\pi}{\sqrt{5}}$

(4) $\frac{2\pi}{\sqrt{3}}$

31. If the energy required to eject an electron from an atom is E_e and the energy required to eject a nucleon from a nucleus is E_n, then -

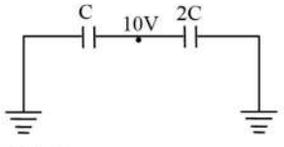
(1) $E_n < E_e$

(2) $E_e < E_n$

(3) $E_e = E_n$

(4) nothing can be stated

32. In the circuit shown in figure C = 6 μF. The charge stored in the capacitor of capacity C is



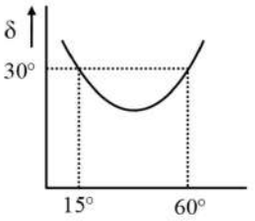
(1) Zero

(2) 90 μC

(3) 40 μC

(4) 60 μC

29. चित्र में एक प्रिज्म से टकरा रही एक प्रकाश किरण के लिए विचलन δ तथा आपतन कोण i के मध्य ग्राफ दर्शाया गया है। प्रिज्म कोण है



(1) 30°

(2) 45°

(3) 60°

(4) 75°

30. एक कण 3 cm के आयाम के साथ रैखिक सरल आवर्त गति करता है। जब कण औसत स्थिति से 2 cm की दूरी पर होता है, तो इसके वेग का परिमाण इसके त्वरण के बराबर होता है। तब सेकंड में इसका आवर्तकाल है:

(1) $\frac{\sqrt{5}}{\pi}$

(2) $\frac{\sqrt{5}}{2\pi}$

(3) $\frac{4\pi}{\sqrt{5}}$

(4) $\frac{2\pi}{\sqrt{3}}$

31. यदि एक परमाणु से एक इलेक्ट्रॉन को बाहर निकालने के लिए आवश्यक ऊर्जा E_e है और एक नाभिक से एक न्यूक्लियॉन को बाहर निकालने के लिए आवश्यक ऊर्जा E_n है, तो

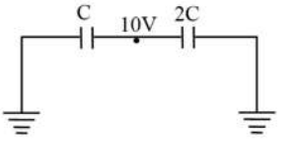
(1) $E_n < E_e$

(2) $E_e < E_n$

(3) $E_e = E_n$

(4) कुछ कह नही सकते

32. चित्र में दिखाए गए परिपथ में C = 6 μF है। धारिता C वाले संधारित्र में संग्रहित आवेश है



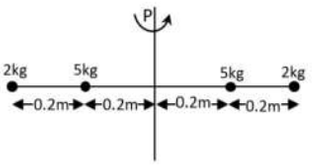
(1) शून्य

(2) 90 μC

(3) 40 μC

(4) 60 μC

33. Four masses are fixed on a massless rod as shown in fig. The moment of inertia about the axis P is about



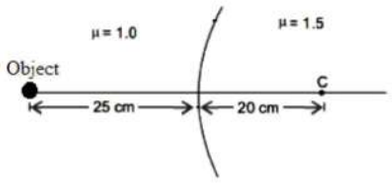
(1) 2kg m^2

(2) 1kg m^2

(3) $0.5\ \text{kgm}^2$

(4) 0.3kg m^2

34. Locate the image formed by refraction in the situation shown in figure. The point C is the centre of curvature.



(1) 100 cm , Left of separating surface

(2) 110 cm , Left of separating surface

(3) 80 cm , Right of separating surface

(4) 115 cm , Right of separating surface

35. The magnetic field of an E.M. wave is given by $\vec{B} = \left(\frac{\sqrt{3}}{2}\hat{i} + \frac{1}{2}\hat{j}\right)30\ \sin\left[\omega\left(t - \frac{z}{c}\right)\right]$ (SI. Units). The corresponding electric field in SI units is :

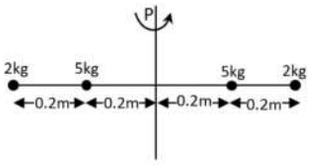
(1) $\vec{E} = \left(\frac{\sqrt{3}}{2}\hat{i} - \frac{1}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t + \frac{z}{c}\right)\right]$

(2) $\vec{E} = \left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t - \frac{z}{c}\right)\right]$

(3) $\vec{E} = \left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t + \frac{z}{c}\right)\right]$

(4) $\vec{E} = \left(\frac{3}{4}\hat{i} + \frac{1}{4}\hat{j}\right)30\text{ccos}\left[\omega\left(t - \frac{z}{c}\right)\right]$

33. चित्रानुसार चार द्रव्यमान एक द्रव्यमानरहित छड़ पर स्थिर है। Pअक्ष के चारों ओर जड़त्व आघूर्ण है -



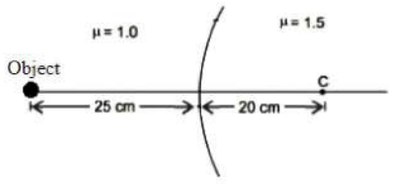
(1) 2kg m^2

(2) 1kg m^2

(3) $0.5\ \text{kgm}^2$

(4) 0.3kg m^2

34. चित्र में दिखाई गई स्थिति में अपवर्तन द्वारा निर्मित प्रतिबिम्ब का पता लगाएँ। बिंदु C वक्रता का केंद्र है।



(1) 100 cm , विभक्त सतह के बाईं ओर

(2) 110 cm, विभक्त सतह के बाईं ओर

(3) 80 cm, विभक्त सतह के दाईं ओर

(4) 115 cm , विभक्त सतह के दाईं ओर

35. एक विद्युत-चुम्बकीय तरंग का चुम्बकीय क्षेत्र $\vec{B} = \left(\frac{\sqrt{3}}{2}\hat{i} + \frac{1}{2}\hat{j}\right)30\ \sin\left[\omega\left(t - \frac{z}{c}\right)\right]$ (SI मात्रक) द्वारा दिया गया है। तब SI मात्रक में संगत विद्युत क्षेत्र है :

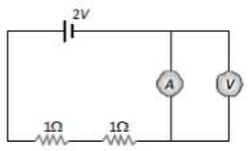
(1) $\vec{E} = \left(\frac{\sqrt{3}}{2}\hat{i} - \frac{1}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t + \frac{z}{c}\right)\right]$

(2) $\vec{E} = \left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t - \frac{z}{c}\right)\right]$

(3) $\vec{E} = \left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right)30\text{csin}\left[\omega\left(t + \frac{z}{c}\right)\right]$

(4) $\vec{E} = \left(\frac{3}{4}\hat{i} + \frac{1}{4}\hat{j}\right)30\text{ccos}\left[\omega\left(t - \frac{z}{c}\right)\right]$

36. In the circuit shown, A and V are ideal ammeter and voltmeter respectively. Reading of the voltmeter will be



(1) 2V

(2) 1V

(3) 0. 5V

(4) Zero

37. A spherical solid ball of 1 kg mass and radius 3 cm is rotating about an axis passing through its centre with an angular velocity of 50 radian/sec. The kinetic energy of rotation is -

(1) 4500 J

(2) 90 J

(3) (9/20) J

(4) (9/10) J

38. When wave of wavelength 0.2 cm is made incident normally on a slit of width 0.004m, then the semi-angular width of central maximum of diffraction pattern will be-

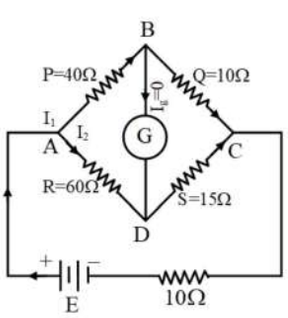
(1) 60°

(2) 30°

(3) 90°

(4) 0°

39. Consider the given Wheatstone bridge, let current in branch AD is I_2.



Which of the following pair is incorrect ?

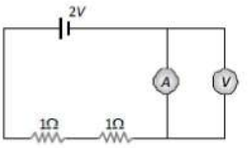
(1) Heat produced in t sec in branch AB →
(i) $90I_2^2t$

(2) Heat produced in t sec in branch BC→
(ii) $30I_2^2t$

(3) Heat produced in t sec in branch AD →
(iii) $60I_2^2t$

(4) Heat produced in t sec in branch DC →
(iv) $15I_2^2t$

36. दिखाए गए परिपथ में A और V क्रमशः आदर्श अमीटर और वोल्टमीटर हैं। वोल्टमीटर का पठन होगा



(1) 2V

(2) 1V

(3) 0. 5V

(4) शून्य

37. 1 kg द्रव्यमान तथा 3 cm त्रिज्या की एक गोलीय ठोस गेंद इनके केन्द्र से गुजरते हुए अक्ष पर कोणीय वेग 50 radian/sec से घूर्णन करती है। घूर्णन की गतिज ऊर्जा होगी-

(1) 4500 J

(2) 90 J

(3) (9/20) J

(4) (9/10) J

38. जब तरंगदैर्ध्य 0.2cm की तरंग, चौड़ाई 0.004m की एक झिरी पर अभिलम्बवत आपतित होती है तो विवर्तन पैटर्न की केंद्रीय उच्चिष्ठ की अर्ध कोणीय चौड़ाई होगी-

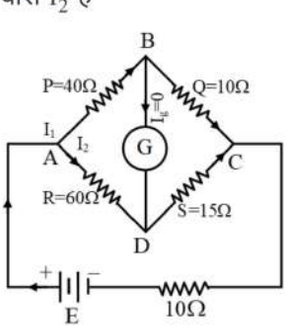
(1) 60°

(2) 30°

(3) 90°

(4) 0°

39. दिए गए व्हीटस्टोन ब्रिज पर विचार करें, माना शाखा AD में धारा I_2 है



निम्नलिखित में से कौन सा युग्म गलत है?

(1)शाखा AB में t सेकण्ड में उत्पादित ऊष्मा → (i)
$90I_2^2t$

(2)शाखा BC में t सेकण्ड में उत्पादित ऊष्मा → (ii)
$30I_2^2t$

(3) शाखा AD में t सेकण्ड में उत्पादित ऊष्मा → (iii)
$60I_2^2t$

(4) शाखा DC में t सेकण्ड में उत्पादित ऊष्मा → (iv)
$15I_2^2t$

40. A bomb of mass 9 kg explodes into two pieces of masses 3 kg and 6 kg. The velocity of mass 3 kg is 16 m/s. The KE of mass 6 kg in joule is -

(1) 96

(2) 384

(3) 192

(4) 768

41. In Young's double slit experiment, the fringe width is 1×10^{-4} m if the distance between the slit and screen is doubled and the distance between the two slit is reduced to half and wavelength is changed from 6.4×10^{7}m to 4.0×10^{-7} m , the value of new fringe width will be

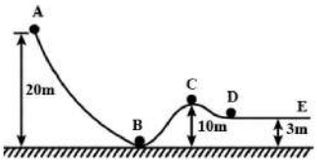
(1) 0.15×10^{-4} m

(2) 2.0×10^{-4}m

(3) 1.25×10^{-4}m

(4) 2.5×10^{-4} m

42. A smooth sphere (mass 10 kg) rolls on a smooth curved surface from the point A with a speed of 10 m/s as shown in figure. The sphere reaches the point D passing through point B. If the ground is taken as reference, Then [Take g = 10 m/s^2]



The total energy of the sphere at the point A

(1) 2500 J

(2) zero

(3) 1500 J

(4) 2000 J

43. To get an OR Gate from a NAND gate we need :

(1) Only 3 NAND gate

(2) Two NOT obtained from NAND and one NAND gate

(3) 4 NAND gates and 2 AND gates obtained from NAND gate

(4) None of these

40. 9 kg द्रव्यमान का एक बम 3 kg और 6 kg द्रव्यमान के दो टुकड़ों में फट जाता है। 3 kg द्रव्यमान का वेग 16 m/s है। 6 kg द्रव्यमान की गतिज ऊर्जा जूल में है -

(1) 96

(2) 384

(3) 192

(4) 768

41. यंग के द्वि -झिरी प्रयोग में, फ्रिंज की चौड़ाई 1×10^{-4} m है यदि झिरी और पर्दे के बीच की दूरी दोगुनी कर दी जाए तथा दो झिरी के बीच की दूरी आधी कर दी जाए तथा तरंगदैर्घ्य 6.4×10^{7}m से बदलकर 4.0×10^{-7} m कर दिया जाए, तो नई फ्रिंज की चौड़ाई का मान होगा

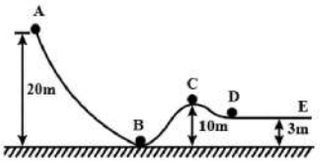
(1) 0.15×10^{-4} m

(2) 2.0×10^{-4}m

(3) 1.25×10^{-4}m

(4) 2.5×10^{-4} m

42. एक चिकना गोला (द्रव्यमान 10 kg) एक चिकनी वक्रीय सतह पर बिंदु A से 10 m/s की चाल से लुढ़कता है जैसा कि चित्र में दिखाया गया है। गोला बिंदु B से होते हुए बिंदु D तक पहुँचता है। यदि भूमि को संदर्भ के रूप में लिया जाए, तो [g = 10 m/s^2 लें]



बिंदु A पर गोले की कुल ऊर्जा

(1) 2500 J

(2) शून्य

(3) 1500 J

(4) 2000 J

43. NAND द्वार से OR द्वार प्राप्त करने के लिए हमें चाहिए :

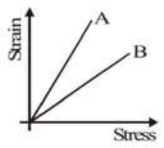
(1) केवल 3 NAND द्वार

(2) NAND से प्राप्त दो NOT और एक NAND द्वार

(3) 4 NAND द्वार और 2 AND द्वार जो NAND द्वार से प्राप्त होते हैं

(4) इनमें से कोई नहीं

44. The strain-stress graphs of two wires A and B of different materials are shown in figure. Which of the following is more elastic :



(1) A

(2) B

(3) both are equally elastic

(4) none of the above

45. $\left[M^1L^1T^{-2}\right]$ is the dimensional formula for :

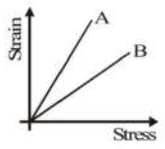
(1) velocity

(2) acceleration

(3) force

(4) work

44. भिन्न पदार्थों के दो तारों A तथा B के विकृति प्रतिबल ग्राफ चित्र में दर्शाये गये हैं। निम्न में से कौन अधिक प्रत्यास्थ है :



(1) A

(2) B

(3) दोनों समान रूप से प्रत्यास्थ है

(4) उपरोक्त में से कोई नहीं

45. $\left[M^1L^1T^{-2}\right]$ किसका विमीय सूत्र है:

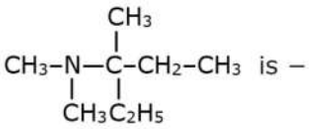
(1) वेग

(2) त्वरण

(3) बल

(4) कार्य

46. The IUPAC name of the following compound



(1) 3-Dimethylamino-3-methyl pentane

(2) 3-(N, N-trimethyl)-3-aminopentane

(3) 3,N, N-trimethyl pentan-3-amine

(4) 3,(N,N-dimethyl) amino-3-methylpentane

47. 5 mole of an ideal gas expand reversibly from a volume of 8 dm^3 to 80 dm^3 at a temperature of 27°C. The change in entropy is -

(1) 41.57 JK^{-1}

(2) – 95.73 JK^{-1}

(3) 95.73 JK^{-1}

(4) – 41.57 JK^{-1}

48. An organic compound contains 80% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is: [Atomic wt. of C is 12, H is 1]

(1) CH_4

(2) CH

(3) CH_2

(4) CH_3

49. Benzene and toluene forms an ideal solution. Vapour pressure of pure benzene is 100 torr while that of pure toluene is 50 torr. If mole faction of benzene in liquid phase is $\frac{1}{3}$. Then calculate the mole fraction of benzene in vapour phase.

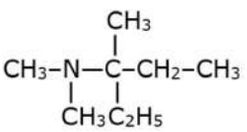
(1) $\frac{2}{3}$

(2) $\frac{1}{2}$

(3) $\frac{2}{5}$

(4) $\frac{1}{3}$

46. निम्न यौगिक का IUPAC नाम है



(1) 3-डाईमेथिलएमीनो -3- मेथिल पेन्टेन

(2) 3-(N,N - ट्राईमेथिल)-3-एमीनो पेन्टेन

(3) 3, N,N-ट्राईमेथिल पेन्टेन -3- एमीन

(4) 3, (N,N- डाईमेथिल)एमीनो -3- मेथिल पेन्टेन

47. 5 मोल आदर्श गैस 27°C पर उत्क्रमणीयरूप से 8 dm^3 आयतन से 80 dm^3 आयतन तक प्रसारित होती है। एन्ट्रोपी में परिवर्तन है -

(1) 41.57 JK^{-1}

(2) – 95.73 JK^{-1}

(3) 95.73 JK^{-1}

(4) – 41.57 JK^{-1}

48. एक कार्बनिक यौगिक में 80% (भार के अनुसार) कार्बन एवं शेष प्रतिशत हाइड्रोजन की मात्रा हैं। इस यौगिक के मूलानुपाती सूत्र का सही विकल्प हैं [परमाणु भार C = 12, H = 1]

(1) CH_4

(2) CH

(3) CH_2

(4) CH_3

49. बेन्जीन एवं टॉलुइन एक आदर्श विलयन बनाते है शुद्ध बेन्जीन का वाष्पदाब 100 टॉर जबकी शुद्ध टॉलुइन का वाष्प दाब 50 टॉर है यदि बेन्जीन की मोल भिन्न/मोलप्रभाज द्रव प्रावस्था में $\frac{1}{3}$ है तब वाष्प प्रावस्था में बेन्जीन का मोल भिन्न ज्ञात कीजिए

(1) $\frac{2}{3}$

(2) $\frac{1}{2}$

(3) $\frac{2}{5}$

(4) $\frac{1}{3}$

50. Which of the following salts are composed of isoelectronic cation and anion :-

(a) NaCl (b) $BeCl_2$
(c) MgF_2 (d) CaS

(1) a and b

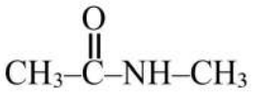
(2) b and c

(3) c and d

(4) None

51. Given compounds are :

&



(1) Position isomers

(2) Metamers

(3) Geometrical isomers

(4) Functional group isomers

52. Calculate P-Cl bond enthalpy

Given : $\Delta_f H\left(PCl_3,\ g\right) = 306\ kJ/mol;$

$\Delta H_{atomization}\left(P,\ s\right) = 314\ kJ/mol;$

$\Delta_f H\left(Cl,\ g\right) = 121\ kJ/mol$

(1) 123. 66 kJ/mol

(2) 371 kJ/mol

(3) 19 kJ/mol

(4) 213 kJ/mol

53. If there are 2 nodal surfaces in third excited state then the value of orbital angular momentum will be

(1) $\sqrt{3}h$

(2) $\sqrt{2}h$

(3) $4h$

(4) $\frac{1}{\sqrt{2}}h$

54. Which of the following solutions has highest osmotic pressure

(1) 1M NaCl

(2) 1 M urea

(3) 1 M sucrose

(4) 1 M glucose

50. निम्न में कौनसे लवण समइलेक्ट्रानीय धनायन व ऋणायन के बने है :-

(a) NaCl (b) $BeCl_2$
(c) MgF_2 (d) CaS

(1) a तथा b

(2) b तथा c

(3) c तथा d

(4) कोई नहीं

51. दिये गये यौगिक है :

तथा

(1) स्थिति समावयवी

(2) मध्यावयवी

(3) ज्यामितीय समावयवी

(4) क्रियात्मक समूह समावयवी

52. P-Cl बन्ध एन्थैल्पी की गणना कीजिये

दिया गया है $\Delta_f H\left(PCl_3,\ g\right) = 306\ kJ/mol;$

$\Delta H_{atomization}\left(P,\ s\right) = 314\ kJ/mol;$

$\Delta_f H\left(Cl,\ g\right) = 121\ kJ/mol$

(1) 123. 66 kJ/mol

(2) 371 kJ/mol

(3) 19 kJ/mol

(4) 213 kJ/mol

53. यदि किसी परमाणु की तृतीय उत्तेजित अवस्था मे 2 नोडीय सतह उपस्थित है तो कक्षक कोणीय संवेग का मान होगा

(1) $\sqrt{3}h$

(2) $\sqrt{2}h$

(3) $4h$

(4) $\frac{1}{\sqrt{2}}h$

54. निम्न में से कौनसा विलयन उच्चतम परासरण दाब रखता है

(1) 1M NaCl

(2) 1 M urea

(3) 1 M sucrose

(4) 1 M glucose

55. Iodine is a solid and sublimes at ordinary temperature. This is because of:

(1) weak I-I bonds

(2) strong I-I bonds

(3) lone pair-bond pair repulsions

(4) weak van der Waals forces between I_2 molecules

56. HCO_3^- is a conjugate acid of -

(1) H_2CO_3

(2) HCOOH

(3) CO_3^{2-}

(4) CO_2

57. The rates of most reaction double when their temperature is raised from 298K to 308K. Calculate their activation energy.

(1) 52.903 kJ

(2) -52.903 kJ

(3) 28.63 kJ

(4) 65.781 kJ

58. Which of the following reactions is the metal displacement reaction ? Choose the right option.

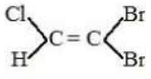
(1) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2 \uparrow$

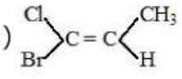
(2) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

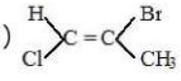
(3) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

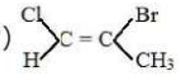
(4) $Fe + 2HCl \rightarrow FeCl_2 + H_2 \uparrow$

59. Which is a pair of geometrical isomerism ?

(i) 

(ii) 

(iii) 

(iv) 

(1) (i) and (iii)

(2) (iii) and (iv)

(3) (ii) and (iv)

(4) (ii) and (iii)

55. आयोडीन एक ठोस है तथा सामान्य ताप पर उर्ध्वपातित हो जाता है इसका कारण है :

(1) दुर्बल I-I बन्ध

(2) प्रबल I-I बन्ध

(3) एकाकी युग्म-बन्धयुग्म प्रतिकर्षण

(4) I_2 अणुओं के मध्य दुर्बल वान्डरवाल बल

56. HCO_3^- निम्न का एक संयुग्मी अम्ल है

(1) H_2CO_3

(2) HCOOH

(3) CO_3^{2-}

(4) CO_2

57. जब ताप को 298 K से बढ़ाकर 308 K पर लाया जाता है तो अधिकतर अभिक्रियाओं के वेग दुगुना हो जाते है। उनकी सक्रियण ऊर्जा की गणना कीजिए।

(1) 52.903 kJ

(2) -52.903 kJ

(3) 28.63 kJ

(4) 65.781 kJ

58. निम्न अभिक्रियाओं में से कौन धातु विस्थापन अभिक्रिया हैं ? सही विकल्प चुनें।

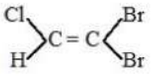
(1) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2 \uparrow$

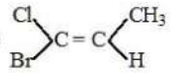
(2) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

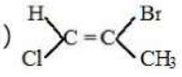
(3) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

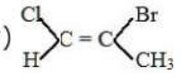
(4) $Fe + 2HCl \rightarrow FeCl_2 + H_2 \uparrow$

59. कौन ज्यामितिये समावयवीयो का एक युग्म है

(i) 

(ii) 

(iii) 

(iv) 

(1) (i) तथा (iii)

(2) (iii) तथा (iv)

(3) (ii) तथा (iv)

(4) (ii) तथा (iii)

60. Which of the following is pink colored solid?

(1) HgS

(2) NiS

(3) CoS

(4) MnS

61. For the reaction

$A(g) + 2B(g) \rightarrow C(g) + D(g)$ $\frac{dx}{dt} = k[A][B]^2$

Initial pressure of A and B are respectively 0.60 atm and 0.80 atm. At a time when pressure of C is 0.20 atm, rate of the reaction, relative to the initial value is :

(1) $\frac{1}{6}$

(2) $\frac{1}{48}$

(3) $\frac{1}{4}$

(4) $\frac{1}{24}$

62. K_a of CH_3COOH is 1.8×10^{-5} and K_b of NH_4OH is 1.8×10^{-5}. The pH of ammonium acetate is?

(1) 7.005

(2) 4.75

(3) 7

(4) Between 6 and 7

63. $\underset{(i)}{CH_3COOH}$, $\underset{(ii)}{HCOOH}$

$\underset{(iii)}{CH_2ClCOOH}$, $\underset{(iv)}{PhCOOH}$

The order of acidity in the given series of compounds is

(1) (iv) < (ii) < (i) < (iii)

(2) (i) < (ii) < (iii) < (iv)

(3) (i) < (ii) < (iv) < (iii)

(4) (i) < (iv) < (ii) < (iii)

64. **Statement-I :** Although PF_5, PCl_5 and PBr_5 are known, the pentahalides of nitrogen have not been observed.

Statement-II : Phosphorus has higher electronegativity than nitrogen.

(1) Both Statement I and Statement II are false

(2) Both Statement I and Statement II are true

(3) Statement I is true but Statement II is false

(4) Statement I is false but Statement II is true

60. निम्न में से कौनसा गुलाबी रंग का ठोस है

(1) HgS

(2) NiS

(3) CoS

(4) MnS

61. अभिक्रिया

$A(g) + 2B(g) \rightarrow C(g) + D(g)$ के लिए $\frac{dx}{dt} = k[A][B]^2$

A और B का प्रारंभिक दाब क्रमशः 0.60 atm और 0.80 atm है। जब C का दाब 0.20 atm है, उस समय अभिक्रिया की दर, प्रारंभिक मान के सापेक्ष होती है

(1) $\frac{1}{6}$

(2) $\frac{1}{48}$

(3) $\frac{1}{4}$

(4) $\frac{1}{24}$

62. CH_3COOH का $K_a = 1.8 \times 10^{-5}$ तथा NH_4OH का $K_b = 1.8 \times 10^{-5}$ है। अमोनियम एसिटेट का pH मान है ?

(1) 7.005

(2) 4.75

(3) 7

(4) 6 तथा 7 के मध्य

63. $\underset{(i)}{CH_3COOH}$, $\underset{(ii)}{HCOOH}$

$\underset{(iii)}{CH_2ClCOOH}$, $\underset{(iv)}{PhCOOH}$

उपरोक्त यौगिको की दि गई श्रृंखला में अम्लीयता का क्रम है

(1) (iv) < (ii) < (i) < (iii)

(2) (i) < (ii) < (iii) < (iv)

(3) (i) < (ii) < (iv) < (iii)

(4) (i) < (iv) < (ii) < (iii)

64. **कथन-I :** यद्यपि PF_5, PCl_5 तथा PBr_5 ज्ञात है नाइट्रोजन का पेन्टाहेलाइड्स प्रेक्षित नही किया गया है

कथन -II : फॉस्फोरस की विद्युतऋणता नाइट्रोजन से उच्च होती है

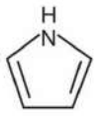
(1) दोनों कथन I तथा कथन II गलत है

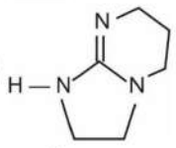
(2) दोनों कथन I तथा कथन II सही है

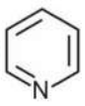
(3) कथन I सही है परन्तु कथन II गलत है

(4) कथन I गलत है परन्तु कथन II सही है

65. The correct decreasing order of basicity $\left(k_b\right)$ of the following compounds is

(I) 

(II) 

(III) 

(1) II > III > I

(2) I > III > II

(3) II > I > III

(4) III > II > I

66. Which of the following mixtures can act as a buffer if equal amount of both species is mixed?

(1) HCN + NaCN

(2) HCOOH + NaOH

(3) $NH_4OH + \left(NH_4\right)_2SO_4$

(4) (1) and (3) above.

67. In SO_2 molecule, there are two σ and two π-bonds present. The two π-bonds are formed by :

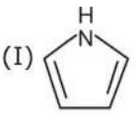
(1) Pπ– Pπ between S and O atoms over overlap

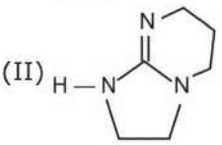
(2) SP^2 – P between S and O atoms over overlap

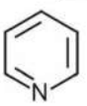
(3) A Pπ– Pπ overlapping and another by Pπ – dπ over overlap

(4) Both Pπ – dπ over overlap

65. निम्न यौगिको की क्षारीयता $\left(k_b\right)$ का सही घटता क्रम है

(I) 

(II) 

(III) 

(1) II > III > I

(2) I > III > II

(3) II > I > III

(4) III > II > I

66. निम्न मे से कौनसा मिश्रण एक बफर के रूप में कार्य कर सकता है यदि दोनो प्रजातियो की समान मात्रा मिश्रित की जाती है

(1) HCN + NaCN

(2) HCOOH + NaOH

(3) $NH_4OH + \left(NH_4\right)_2SO_4$

(4) उपरोक्त (1) तथा (3) दोनो

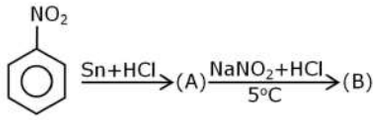
67. SO_2 अणु में दो σ-बंध तथा दो π-बंध होते है। दो π-बंध बनते है :

(1) S तथा O परमाणुओं के मध्य Pπ– Pπ अतिव्यापन से

(2) S तथा O परमाणुओं के मध्य SP^2 – P अतिव्यापन से

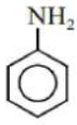
(3) एक Pπ– Pπ अतिव्यापन से तथा दूसरा Pπ – dπ अतिव्यापन से

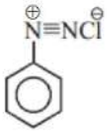
(4) दोनों Pπ – dπ अतिव्यापन से

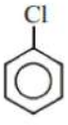
68. 

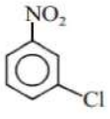
$\xrightarrow{CuCl/HCl}$ (C)

Final product C is :

(1) 

(2) 

(3) 

(4) 

69. If the Zn^{2+} / Zn electrode is diluted to 100 times, the change in emf is :

(1) increase of 59 mV

(2) decrease by 59 mV

(3) increase of 29.5 mV

(4) decrease by 29.5 mV

70. **Assertion :** In trigonal bipyramidal geometry the multiple bonds get positioned preferably in the equitorial plane.

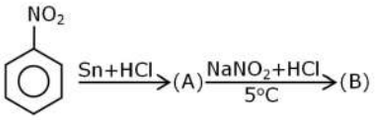
Reason : Equitorial position minimise the overall repulsion of π-bond because π -bond require more space compared to the π-bond pair.

(1) Both Assertion and Reason are correct and Reason is correct for the Assertion.

(2) Both Assertion and Reason are correct but Reason is not correct for Assertion

(3) Assertion is correct but Reason is incorrect.

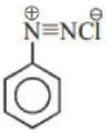
(4) Assertion is incorrect but Reason is correct.

68. 

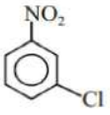
$\xrightarrow{CuCl/HCl}$ (C)

अन्तिम उत्पाद C है -

(1) 

(2) 

(3) 

(4) 

69. यदि Zn^{2+} / Zn इलेक्ट्रॉड को 100 गुना तनु किया जाये तो emf में होने वाला परिवर्तन है :

(1) 59 mV की वृद्धि

(2) 59 mV तक कमी

(3) 29.5 mV की वृद्धि

(4) 29.5 mV तक कमी

70. **कथन :** त्रिकोणीय द्विपिरामीडीय ज्यामिति में बहुबन्ध निरक्षीय तल में स्थित होते है

कारण : निरक्षीय स्थिति π-बन्ध के सम्पूर्ण प्रतिकर्षण को कम कर देती है क्योंकि π-बन्ध को π-बन्ध युग्म की तुलना में अधिक स्थान आवश्यक होता है

(1) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या है

(2) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या नही है

(3) कथन सही है परन्तू कारण गलत है

(4) कथन गलत है परन्तू कारण सही है

71. The chemical reaction $2AgCl(s) + H_2(g) \rightarrow 2HCl(aq) + 2Ag(s)$ taking place in a galvanic cell is represented by the notation.

(1) $Pt(s) \mid H_2(g)$, 1 bar | 1 M KCl (aq) | AgCl(s) | Ag (s)

(2) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | 1 M Ag^+ (aq) | Ag (s)

(3) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | AgCl (s) | Ag (s)

(4) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | Ag (s) | AgCl (s)

71. गैल्वेनिक सेल में हो रही रासायनिक अभिक्रिया $2AgCl(s) + H_2(g) \rightarrow 2HCl(aq) + 2Ag(s)$ को कौनसे प्रतीकांकन द्वारा प्रदर्शित किया जाता है

(1) $Pt(s) \mid H_2(g)$, 1 bar | 1 M KCl (aq) | AgCl(s) | Ag (s)

(2) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | 1 M Ag^+ (aq) | Ag (s)

(3) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | AgCl (s) | Ag (s)

(4) $Pt(s) \mid H_2(g)$, 1 bar | 1 M HCl (aq) | Ag (s) | AgCl (s)

72. When sulphanilic acid ($p\text{-}H_2NC_6H_4SO_3H$) is treated with excess of bromine water the product is:

(1) tribromo product

(2) dibromo product

(3) monobromo product

(4) tetrabromo product

72. जब सल्फेनिलिक अम्ल ($p\text{-}H_2NC_6H_4SO_3H$) ब्रोमीन जल की अधिकता से क्रिया करता है तो उत्पाद बनता है।

(1) ट्राइ ब्रोमो उत्पाद

(2) डाई ब्रोमो उत्पाद

(3) मोनोब्रोमो उत्पाद

(4) टेट्रा ब्रोमो उत्पाद

73. Anhydrous chlorides fumes in air due to the :

(1) condensation of moisture on them

(2) formation of dry HCl gas

(3) formation of fumes of HCl with moisture

(4) sublimation of compound

73. वायु में निर्जल क्लोराइड के धुयें का कारण है।

(1) इन पर नमी का संघनन

(2) शुष्क HCl गैस का निर्माण

(3) नमी के साथ HCl के धुंए का निर्माण

(4) यौगिक का उर्ध्वपातन

74. Following limiting molar conductivities are given as :

$\Lambda_m^\circ(H_2SO_4) = x\ S\ cm^2\ mol^{-1}$ $\Lambda_m^\circ(K_2SO_4) = y\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(H_2SO_4) = x\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(K_2SO_4) = y\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(CH_3COOK) = z\ S\ cm^2\ mol^{-1}$

Λ_m° (in $S\ cm^2\ mol^{-1}$) for CH_3COOH will be :

(1) $x - y + 2z$

(2) $x + y - z$

(3) $x - y + z$

(4) $\frac{(x-y)}{2} + z$

74. निम्न सीमान्त मोलर चालकताये निम्न रूप में दि गई है

$\Lambda_m^\circ(H_2SO_4) = x\ S\ cm^2\ mol^{-1}$ $\Lambda_m^\circ(K_2SO_4) = y\ S\ cm^2$ mc

$\Lambda_m^\circ(H_2SO_4) = x\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(K_2SO_4) = y\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(CH_3COOK) = z\ S\ cm^2\ mol^{-1}$

CH_3COOH के लिये Λ_m° ($S\ cm^2\ mol^{-1}$ में) होगा

(1) $x - y + 2z$

(2) $x + y - z$

(3) $x - y + z$

(4) $\frac{(x-y)}{2} + z$

75. Which of following carbonyl compounds gives two products when reacted with NH_2OH?

(1) Benzophenone

(2) Benzaldehyde

(3) Acetone

(4) 3-pentanone

75. निम्न मे से कौनसा कार्बोनिल यौगिक दो उत्पाद देता है जब NH_2OH के साथ क्रिया करता है

(1) बेन्जोफिनॉन

(2) बैन्जेल्डिहाइड

(3) ऐसिटोन

(4) 3-पेन्टेनॉन

76. Order of stability of N_2, N_2^+ and N_2^- is -

(1) $N_2 > N_2^+ > N_2^-$

(2) $N_2^+ > N_2 > N_2^-$

(3) $N_2^- > N_2 > N_2^+$

(4) $N_2^- = N_2^+ > N_2$

77. For the reaction : $PCl_5(g) \rightleftharpoons PCl_3(g)+Cl_2(g)$. The forward reaction at constant temperature is favoured by

(1) Introducing an inert gas at constant volume

(2) Introducing chlorine gas at constant volume

(3) Introducing an inert gas at constant pressure

(4) None of these

78. Which gives a ketone on treating with a Grignard's reagent -

(1) Formaldehyde

(2) Ethyl alcohol

(3) Methyl cyanide

(4) Methyl iodide

79. The bonds present in $[Cu(NH_3)_4]SO_4$ are:

(1) Ionic

(2) Co-ordinate

(3) Covalent

(4) All of these

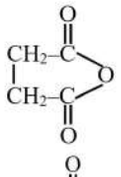
80. In the given reaction,

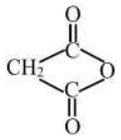
$$CH_3COOH \xrightarrow[(ii)\ NaCN]{(i)\ Br_2/P} \xrightarrow{(iii)\ H_2O/H^+/\Delta} [X],$$

[X] will be;

(1) $CH_3 - COOH$

(2) $HOOC - CH_2 - CH_2 - COOH$

(3) 

(4) 

76. N_2, N_2^+ और N_2^- की स्थायित्व का क्रम है -

(1) $N_2 > N_2^+ > N_2^-$

(2) $N_2^+ > N_2 > N_2^-$

(3) $N_2^- > N_2 > N_2^+$

(4) $N_2^- = N_2^+ > N_2$

77. $PCl_5(g) \rightleftharpoons PCl_3(g)+Cl_2(g)$ अभिक्रिया के लिये, नियत ताप पर अग्र अभिक्रिया प्रेरित होती है

(1) नियत आयतन पर एक अक्रिय गैस मिलाने से

(2) नियत आयतन पर क्लोरीन गैस मिलाने से

(3) नियत दाब पर एक अक्रिय गैस मिलाने से

(4) इनमे से कोई नही

78. निम्न में से कौन ग्रिन्यार अभिकर्मक के साथ गर्म करने पर कीटोन देते हैं

(1) फॉर्मेल्डिहाइड

(2) एथिल एल्कोहॉल

(3) मेथिल सायनाइड

(4) मेथिल आयोडाइड

79. $[Cu(NH_3)_4]SO_4$ में उपस्थित बन्ध है:

(1) आयनिक

(2) उपसहसंयोजक

(3) सहसंयोजक

(4) उपरोक्त सभी

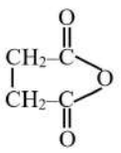
80. दी गई अभिक्रिया में

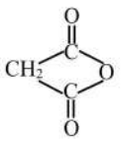
$$CH_3COOH \xrightarrow[(ii)\ NaCN]{(i)\ Br_2/P} \xrightarrow{(iii)\ H_2O/H^+/\Delta} [X],$$

[X] होगा

(1) $CH_3 - COOH$

(2) $HOOC - CH_2 - CH_2 - COOH$

(3) 

(4) 

81. **Assertion :** Square planar complex Ma_2b_2 has two optical isomers
Reason : Mirror image of Ma_2b_2 is non-super imposable.

(1) Both Assertion and Reason are correct and Reason is correct for the Assertion.

(2) Both Assertion and Reason are correct but Reason is not correct for Assertion.

(3) Assertion is correct but Reason is incorrect.

(4) Assertion is incorrect but Reason is correct.

82. Which of following is essential amino acid ?

(1) Glycine

(2) Alanine

(3) Valine

(4) None

83. **Assertion :** tetrahedral complexes are mainly high spin and the low spin configurations are rarely observed.

Reason : Δ_t is always much smaller even with stronger field ligands and it is never energetically favourable to pair up the electrons.

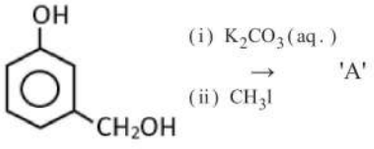
(1) Both Assertion and Reason are correct and Reason is correct for the Assertion.

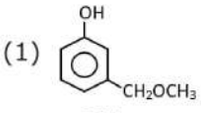
(2) Both Assertion and Reason are correct but Reason is not correct for Assertion.

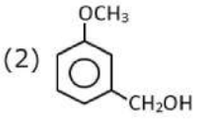
(3) Assertion is correct but Reason is incorrect.

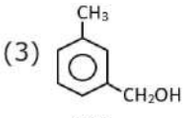
(4) Assertion is incorrect but Reason is correct.

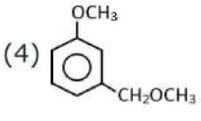
84. The product 'A' is :



(1) 

(2) 

(3) 

(4) 

81. **कथन:** वर्गाकार समतलीय संकुल Ma_2b_2 दो प्रकाशिक समावयवी रखता है।
कारण: Ma_2b_2 के दर्पण प्रतिबिम्ब अध्यारोपित नहीं होते।

(1) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या है

(2) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या नही है

(3) कथन सही है परन्तू कारण गलत है

(4) कथन गलत है परन्तू कारण सही है

82. निम्न मे से कौनसा आवश्यक ऐमीनो अम्ल है

(1) ग्लाईसीन

(2) एलानिन

(3) वेलीन

(4) कोई नही

83. **कथन:** चतुष्फलकीय संकुल मुख्यतया उच्च चक्रण वाले होते है, तथा निम्न चक्रण विन्यास वाले संकुल बहुत कम पाये जाते है।
कारण: Δ_t प्रबल क्षेत्र लिगेण्डो के साथ भी हमेशा काफी कम होता है तथा यह कभी भी ऊर्जीय रूप से इलेक्ट्रॉनो के युग्मन के लिए अनुकूल नहीं होता है।

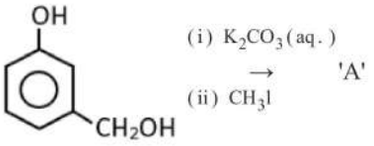
(1) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या है

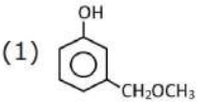
(2) दोनो कथन तथा कारण सही है तथा कारण, कथन की सही व्याख्या नही है

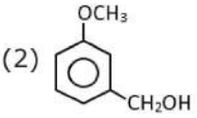
(3) कथन सही है परन्तू कारण गलत है

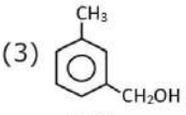
(4) कथन गलत है परन्तू कारण सही है

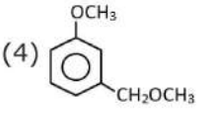
84. उत्पाद 'A' है



(1) 

(2) 

(3) 

(4) 

85. The following equation represents a method of purification of nickel by,

$$\underset{\text{impure}}{Ni} + 2CO \xrightarrow{320K} Ni(CO)_4 \xrightarrow{420K} \underset{\text{pure}}{Ni} + 4CO$$

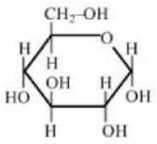
(1) Cupellation

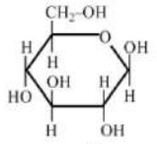
(2) Mond's process

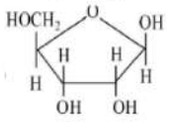
(3) van Arkel method

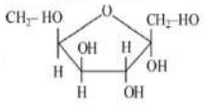
(4) Zone refining

86. Which of the following is structure of β-D-Glucopyranose ?

(1) 

(2) 

(3) 

(4) 

87. Select the incorrect statement about lanthanides.

(1) They form oxides of the type M_2O_3

(2) Oxides are basic in nature

(3) All the lanthanides are paramagnetic in +3 oxidation state

(4) Lanthanides show +2, +3 and +4 oxidation states but general oxidation state is +3

88. Ferric ion forms a Prussian blue colored ppt. due to :-

(1) $K_4Fe(CN)_6$

(2) $Fe_4\ [Fe(CN)_6]_3$

(3) $KMnO_4$

(4) $Fe(OH)_3$

89. The ion which can be precipitated using dil HCl

(1) Zn^{2+}

(2) Cu^{2+}

(3) Ag^{+}

(4) Fe^{3+}

85. निम्न अभिक्रिया में निकल का परिशोधन किस विधि से होता है

$$\underset{\text{impure}}{Ni} + 2CO \xrightarrow{320K} Ni(CO)_4 \xrightarrow{420K} \underset{\text{pure}}{Ni} +$$

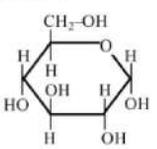
(1) खर्परण

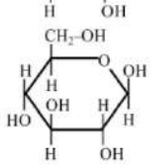
(2) मॉण्ड विधि

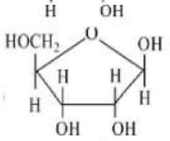
(3) वेन आर्केल विधि

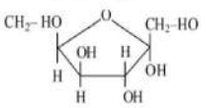
(4) क्षेत्र परशोधन

86. निम्न में से कौनसी संरचना β-D-ग्लुकोपायरेनोस की संरचना है ?

(1) 

(2) 

(3) 

(4) 

87. लेन्थैनाइडो के विषय मे गलत कथन का चयन कीजिये

(1) ये M_2O_3 प्रकार के ऑक्साइड्स बनाते है

(2) ऑक्साइड प्रकृति मे क्षारीय होते है

(3) सभी लेन्थैनाइड्स +3 ऑक्सीकरण अवस्था मे अनुचुम्बकीय होते है

(4) लेन्थैनाइड्स +2, +3 तथा +4 ऑक्सीकरण अवस्थायें दर्शाते है परन्तू सामान्य ऑक्सीकरण अवस्था +3 है

88. निम्न के कारण फेरिक आयन एक प्रुसियन नीला रंग का अवक्षेप बनाते है।

(1) $K_4Fe(CN)_6$

(2) $Fe_4\ [Fe(CN)_6]_3$

(3) $KMnO_4$

(4) $Fe(OH)_3$

89. कौनसा आयन तनु HCl का उपयोग करके अवक्षेपित किया जा सकता है

(1) Zn^{2+}

(2) Cu^{2+}

(3) Ag^{+}

(4) Fe^{3+}

90. Aqueous solution of $CuSO_4$ gives tests for both cu^{2+} and SO_4^{2-} but after addition of excess of KCN, solution ceases test for Cu^{2+}. This is due to the formation of :

(1) the double salt $CuSO_4.2KCN.6H_2O$

(2) $Cu(CN)_2$

(3) the complex ion $\left[Cu(CN)_4\right]^{4-}$

(4) the complex ion $\left[Cu(CN)_4\right]^{3-}$

90. $CuSO_4$ का जलीय विलयन cu^{2+} और SO_4^{2-} दोनों के लिए परीक्षण देता है , लेकिन KCN के आधिक्य के योग के पश्चात विलयन Cu^{2+} के लिये परीक्षण देना बन्द कर देता हे | ऐसा किसके निर्माण के कारण होता है |

(1) द्विक लवण $CuSO_4.2KCN.6H_2O$

(2) $Cu(CN)_2$

(3) संकुल आयन $\left[Cu(CN)_4\right]^{4-}$

(4) संकुल आयन $\left[Cu(CN)_4\right]^{3-}$

91. Which of the following is not the part of Axial skeleton?

(1) Skull

(2) Ribs

(3) Pectorial girdle

(4) Vertebral column

91. निम्न में से कौनसा अक्षीय कंकाल का भाग नहीं है?

(1) कपाल

(2) पसलियाँ

(3) अंसमेखला

(4) कशेरूक दण्ड

92. The perianth is the term used when-

(1) Androecium and gynoecium are similar

(2) Androecium and calyx are similar

(3) Corolla and gynoecium are similar

(4) Calyx and corolla are similar

92. परिदलपुंज वह शब्द है जिसका प्रयोग तब किया जाता है जब-

(1) पुमंग और जायांग समान होते हैं

(2) पुमंग और कैलिक्स समान होते हैं

(3) कोरोला और जायांग समान होते हैं

(4) कैलिक्स और कोरोला समान होते हैं

93. Ecological study at organismic level is essentially-

(1) Morphological ecology

(2) Behavioural ecology

(3) Anatomical ecology

(4) Physiological ecology

93. जीव स्तर पर पारिस्थितिक अध्ययन अनिवार्य रूप से है-

(1) आकरिकी पारिस्थितिकी

(2) व्यवहारिक पारिस्थितिकी

(3) शारीरिक पारिस्थितिकी

(4) कार्यकीय पारिस्थितिकी

94. **Assertion** :- Presence of accessory pigments enhances rate of photosynthesis.

Reason :- They enable a wider range of wavelength of incoming light to be utilised for photosynthesis.

(1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) If Assertion is True but the Reason is False.

(4) If both Assertion & Reason are false.

94. **अभिकथन -** सहायक वर्णक की उपस्थिति प्रकाशसंश्लेषण की दर को बढ़ाती है।

कारण - वे प्रकाश संश्लेषण को प्रेरित करनें वाली उपयोगी आपतित प्रकाश की तरंगदैर्ध्य के परास को बढ़ाती हैं।

(1) यदि अभिकथन और कारण दोनों सत्य हैं और कारण कथन की सही व्याख्या करता है।

(2) यदि अभिकथन और कारण दोनों सत्य हैं लेकिन कारण अभिकथन की सही व्याख्या नहीं है।

(3) यदि अभिकथन सत्य है परन्तु कारण असत्य है।

(4) यदि अभिकथन और कारण दोनों असत्य हैं।

95. Fill in the blanks (A), (B) and (C) in the given question.

The male accessary glands inculude paired ___(A)_____ , a _____(B)_____ and paired ___(C)___ glands.

(1) (A) Seminal Vesicle, (B) Prostate, (C) Bulbourethral

(2) (A) Prostate, (B) Bulbourethral, (C) Seminal Vesicle

(3) (A) Bulbourethral, (B) Seminal vesicle, (C) Prostate

(4) (A) Prostate, (B) Seminal Vesicle, (C) Bulbourethral

95. नीचे दिये गये प्रश्न में रिक्त स्थानो (A), (B) और (C) की पूर्ति करे।

नर सहायक जनन ग्रंथियों में सम्मिलित है एक जोड़ी ___(A)_____, एक _____(B)_____ और एक जोड़ी ___(C)___ ग्रंथियां।

(1) (A) शुक्राशय, (B) प्रोस्टेट ग्रंथि, (C) बल्बोयूरेथ्रल

(2) (A) प्रोस्टेट ग्रंथि, (B) बल्बोयूरेथ्रल, (C) शुक्राशय

(3) (A) बल्बोयूरेथ्रल, (B) शुक्राशय, (C) प्रोस्टेट ग्रंथि

(4) (A) प्रोस्टेट ग्रंथि, (B) शुक्राशय, (C) बल्बोयूरेथ्रल

96. Match the following columns.

	Column-I		Column-II
(a)	Making multiple copies of any template DNA	(i)	Biotechnology
(b)	Technique to alter the chemistry of genetic material	(ii)	Elution
(c)	Technique of using live organisms or enzymes to produce products	(iii)	Cloning
(d)	Separate bands of DNA are cut from agarose gel	(iv)	Genetic engineering

(1) a-i, b-iv, c-ii, d-iii

(2) a-iv, b-i, c-iii, d-ii

(3) a-ii, b-i, c-iv, d-iii

(4) a-iii, b-iv, c-i, d-ii

97. Mark the **true** statement among the following with reference to **normal breathing** :

(1) Inspiration is a passive process where as expiration is active process

(2) Inspiration is an active process where as expiration is passive process

(3) Inspiration and expiration both are active processes

(4) Inspiration and expiration both are passive processes

96. निम्नलिखित कॉलमों का मिलान करें।

	कॉलम-I		कॉलम-II
(a)	किसी टेम्पलेट डीएनए की कई प्रतियों का निर्माण करना हैं।	(i)	जैव प्रौद्योगिकी
(b)	आनुवंशिक पदार्थो की रसायनिकी में परिवर्तन की तकनीक	(ii)	निक्षालन
(c)	उत्पाद बनाने के लिए जीवित जीवों या एंजाइमों का उपयोग करने की तकनीक	(iii)	क्लोनिंग
(d)	एगारोज जेल से DNA के अलग-अलग बैंड काटे जाते हैं	(iv)	आनुवांशिक अभियांत्रिकी

(1) a-i, b-iv, c-ii, d-iii

(2) a-iv, b-i, c-iii, d-ii

(3) a-ii, b-i, c-iv, d-iii

(4) a-iii, b-iv, c-i, d-ii

97. **सामान्य श्वसन** के संदर्भ में निम्नलिखित में से सही कथन चिन्हित कीजिए-

(1) अंतःश्वसन एक सक्रिय प्रक्रिया है जबकि निःश्वसन एक निष्क्रिय प्रक्रिया है

(2) अंतःश्वसन एक सक्रिय प्रक्रिया है जबकि निःश्वसन एक सक्रिय प्रक्रिया है

(3) अंतःश्वसन और निःश्वसन दोनों ही सक्रिय प्रक्रियाएँ हैं

(4) अंतःश्वसन और निःश्वसन दोनों ही निष्क्रिय प्रक्रियाएँ हैं

98. Match the columns and find out the **correct** combination-

A.	Family	1.	nigrum
B.	Kingdom	2.	Polymoniales
C.	Order	3.	Solanum
D.	Species	4.	Plantae
		5.	Solanaceae

(1) A - 5 ; B - 4 ; C - 2 ; D - 1

(2) A - 4 ; B - 5 ; C - 3 ; D - 2

(3) A - 1 ; B - 2 ; C - 3 ; D - 4

(4) A - 3 ; B - 2 ; C - 4 ; D - 5

99. Fifth cranial nerve of frog is called

(1) Optic nerve

(2) Vagus nerve

(3) Trigeminal nerve

(4) Opthalmic nerve

100. Swollen placenta and oblique septum found in:-

(1) Cruciferae

(2) Solanaceae

(3) Malvaceae

(4) Poaceae

101. Two different species cannot share:

(1) metapopulation

(2) same ecosystem

(3) same community

(4) same ecological niche

102. Consider the following statements :

(A) The portion of the spectrum between 500 nm and 800 nm is also referred to as photosynthetically active radiation (PAR).

(B) Stroma lamellae lack PS-I and NADP reductase enzyme

(C) In cyclic photophosphorylation, oxygen is not released (as there is no photolysis of water) and NADPH is also not produced.

Of these statements given above, choose the correct option from the following.

(1) A is true but B and C are false

(2) A and B are false but C is true

(3) B is true but A and C are false

(4) A is false but B and C are true

98. स्तंभों का मिलान करें और **सही** संयोजन का पता लगाएं:

A.	कुल	1.	नाइग्रम
B.	जगत	2.	पॉलीमोनिएल्स
C.	गण	3.	सोलेनम
D.	प्रजाति	4.	प्लांटी
		5.	सोलेनेसी

(1) A - 5 ; B - 4 ; C - 2 ; D - 1

(2) A - 4 ; B - 5 ; C - 3 ; D - 2

(3) A - 1 ; B - 2 ; C - 3 ; D - 4

(4) A - 3 ; B - 2 ; C - 4 ; D - 5

99. मेंढक की पाँचवीं कपाल तंत्रिका कहलाती है

(1) दृक्-तंत्रिका

(2) वेगस तंत्रिका

(3) ट्राइजेमिनल तंत्रिका (त्रिधारा तंत्रिका)

(4) ऑपथेल्मिक तंत्रिका (नेत्र तंत्रिका)

100. फूला हुआ बीजाण्डासन व तिरछा पट पाया जाता है-

(1) क्रुसीफेरी में

(2) सोलेनेसी में

(3) माल्वेसी में

(4) पोएसी में

101. दो विभिन्न प्रजातियाँ साझा नहीं कर सकती-

(1) मेटापॉपुलेशन

(2) समान पारिस्थितिकी तंत्र

(3) समान समुदाय

(4) समान पारिस्थितिकी निकेत

102. निम्नलिखित कथनों पर विचार करें:

(A) 500 nm तथा 800 nm के बीच स्पेक्ट्रम का भाग जो फोटोसिंथेटिकली एक्टिव रेडिएशन/प्रकाश संश्लेषणी सक्रिय विकिरण (PAR) के रूप में जाना जाता है।

(B) स्ट्रोमा लैमिली PS-I व NADP रिडक्टेज रहित होता है।

(C) चक्रीय फॉस्फोरिलीकरण में ऑक्सीजन मुक्त नहीं होती (क्योंकि जल का प्रकाशअपघटन नहीं होता) और NADPH का भी उत्पादन नहीं होता।

उपरोक्त दिये गए कथनों में से निम्नलिखित सही विकल्प चुनें-

(1) A सत्य है, लेकिन B और C असत्य हैं

(2) A और B असत्य हैं, लेकिन C सत्य है

(3) B सत्य है, लेकिन A और C असत्य हैं

(4) A असत्य है, लेकिन B और C सत्य हैं

103. Which of the following secretes the hormone relaxin, during the later phase of pregnancy-

(1) Uterus

(2) Graafian follicle

(3) Corpus luteum

(4) Foetus

104. Which of the following is the most accepted definition of biotechnology by European Federation of Biotechnology?

(1) Maintenance of sterile ambience for enabling growth of desired microbe/euykaryotic cell in large quantities

(2) Technique of using live organism or enzyme from organisms to produce products and processes useful to animals

(3) Process which use genetically engineered animals only on a large scale for benefit of mankind

(4) The integration of natural science and organisms, cells, parts thereof, and molecular analogues for products and services

105. CO_2 dissociates from carbamino haemoglobin when:-

(1) pCO_2 is high & pO_2 is low

(2) pO_2 is high & pCO_2 is low

(3) pCO_2 & pO_2 are equal

(4) None of the above

106. 'X' and 'Y' are the components of binomial nomenclature. This naming system was proposed by 'Z' ?

(1) X-Generic name, Y-Specific epithet, Z-Carolus Linnaeus

(2) X-Specific epithet, Y-Generic name, Z-R.H. Whittaker

(3) X-Specific epithet, Y-Generic name, Z-Carolus Linnaeus

(4) X-Generic name, Y-Specific epithet, Z-R.H. Whittaker

107. Floral formula of Malvaceae is :-

(1) Br % ♀ $Epi_{3-7}\ K_{(5)}\ \overset{(5)}{C}\ \overset{(\infty)}{A}\ \underline{G}_{(B)}$

(2) Br ⊕ ♀ $K_{(5)}\ \overset{(5)}{C}\ \overset{(\infty)}{A}\ \underline{G}_{(5-\infty)}$

(3) Br ⊕ ♀ $Epi_{3-7}\ K_{(5)}\ C_5\ A_{(\infty)}\ \underline{G}_{(5-\infty)}$

(4) Br ⊕ $K_{(5)}\ C_4\ A_{2+2}\ \underline{G}_{(B)}$

103. निम्नलिखित में से कौनसी संरचना गर्भावस्था के पश्च चरण के दौरान रिलैक्सिन हार्मोन का मोचन/स्रावण करती है-

(1) गर्भाशय

(2) ग्राफ़ियन पुटिका

(3) कार्पस ल्यूटियम (पीत पिण्ड़)

(4) भ्रूण

104. निम्नांकित में से कौनसी यूरोपियन जैव प्रौद्योगिकी संघ द्वारा प्रदत्त, जैव प्रौद्योगिकी की सर्वाधिक स्वीकार्य परिभाषा है ?

(1) वांछित सूक्ष्मजीवों/यूकैरियोटिक (सुकेन्द्रकी) कोशिकाओं की विशाल मात्राओं में वृद्धि को सक्षम बनाने के लिए जीवाणुविहीन परिवेश बनाए रखना

(2) जन्तुओं के लिए उपयोगी उत्पादों एवं प्रक्रमों के उत्पादन के लिए जीवों या जीवों से प्राप्त एंजाइमों का प्रयोग करने की तकनीक

(3) एक प्रक्रम जो मानवजाति के हित के लिए केवल बड़े पैमाने पर आनुवांशिकतः अभियांत्रित जन्तुओं का उपयोग करता है।

(4) उत्पादों एवं सेवाओं के लिए प्राकृतिक विज्ञान, जीव कोशिकाओं, उनके भागों एवं आण्विक अनुरूपों का समेकन।

105. CO_2 कार्बामीनोहीमोग्लोबिन से अलग हो जाती है, जब-

(1) pCO_2 अधिक व pO_2 कम हो

(2) pO_2 अधिक व pCO_2 कम हो

(3) pCO_2 व pO_2 बराबर हो

(4) उपरोक्त में से कोई नहीं

106. 'X' और Y' द्विनाम पद्धति के घटक हैं। यह नामकरण प्रणाली 'Z' द्वारा प्रस्तावित की गई थी

(1) X-वंश नाम, Y-जाति संकेत पद, Z-कैरोलस लिनिअस

(2) X-जाति संकेत पद, Y-वंश नाम, Z-R.H. व्हिटेकर

(3) X-जाति संकेत पद, Y-वंश नाम, Z-कैरोलस लिनिअस

(4) X-वंश नाम, Y-जाति संकेत पद, Z-R.H. व्हिटेकर

107. मालवेसी का पुष्प सूत्र है :-

(1) Br % ♀ $Epi_{3-7}\ K_{(5)}\ \overset{(5)}{C}\ \overset{(\infty)}{A}\ \underline{G}_{(B)}$

(2) Br ⊕ ♀ $K_{(5)}\ \overset{(5)}{C}\ \overset{(\infty)}{A}\ \underline{G}_{(5-\infty)}$

(3) Br ⊕ ♀ $Epi_{3-7}\ K_{(5)}\ C_5\ A_{(\infty)}\ \underline{G}_{(5-\infty)}$

(4) Br ⊕ $K_{(5)}\ C_4\ A_{2+2}\ \underline{G}_{(B)}$

108. Where do the sensory nervous structures found:-

(1) Epidermis

(2) Internal ear

(3) Both (1) and (2)

(4) None of the above

109. Who defined ecology as the study of structure and function of nature ?

(1) Haeckel

(2) E.P. Odum

(3) R. Misra

(4) Taylor

110. Which one of the following statements correctly describes Cyclic photophosphorylation -

(1) Cyclic photophosphorylation has both PSI and PSII

(2) Cyclic photophosphorylation produces neither ATP nor $NADPH + H^+$

(3) Water is the ultimate source of e^- in cyclic phosphorylation

(4) Electrons are cycled in cyclic photophosphorylation

111. Arrange the following events of parturition in correct sequence:–

(I) Foetal ejection reflex

(II) Signals originate from fully developed foetus & placenta

(III) Expulsion of baby out of the uterus

(IV) Release of oxytocin from maternal pituitary

(V) Stronger uterine contractions

(1) II → I → IV → V → III

(2) I → II → IV → V → III

(3) II → IV → I → V → III

(4) II → V → I → IV → III

108. संवेदी तंत्रिका संरचनाएँ कहाँ पाई जाती हैं?

(1) एपिडर्मिस

(2) अंतः कर्ण

(3) दोनों (1) और (2)

(4) इनमें से कोई नहीं

109. पारिस्थितिकी को प्रकृति की संरचना और कार्य का अध्ययन के रूप में किसने परिभाषित किया?

(1) हीकल

(2) ई.पी. ओडम

(3) आर. मिश्रा

(4) टेलर

110. निम्नलिखित में से कौनसा कथन चक्रीय प्रकाशफॉस्फोरिलीकरण को सही रूप में वर्णित करता है:

(1) चक्रीय प्रकाशफॉस्फोरिलीकरण में दोनों PSI और PSII होते हैं

(2) चक्रीय प्रकाशफॉस्फोरिलीकरण में ATP और NADPH निर्मित नहीं होते हैं।

(3) जल चक्रीय प्रकाशफॉस्फोरिलीकरण में e^- का अंतिम स्रोत होता है

(4) चक्रीय प्रकाशफॉस्फोरिलीकरण में इलेक्ट्रॉन चक्रिक होते है

111. प्रसव की निम्नलिखित घटनाओं को सही क्रम में व्यवस्थित करें:

(I) गर्भ उत्क्षेपन प्रतिवर्त

(II) पूर्ण विकसित भ्रूण और अपरा से संकेतों का उत्पन्न होना

(III) बच्चे का गर्भाशय से बाहर निकलना

(IV) मातृ पीयूष ग्रंथि से ऑक्सीटोसिन का स्राव

(V) गर्भाशय में प्रबल संकुचन

(1) II → I → IV → V → III

(2) I → II → IV → V → III

(3) II → IV → I → V → III

(4) II → V → I → IV → III

112. Identify the correct set of statements:
(a) Origin of replication is responsible for initiating replication.
(b) DNA ligase acts on cut DNA molecules and joins their ends.
(c) Plasmid is autonomously replicating circular extra chromosomal DNA.
(d) More than 900 restriction enzymes that have been isolated from over 230 strains of bacteria.
Choose the correct answer from options given below:

(1) a and c only

(2) b, c and d only

(3) a, c and d only

(4) a, b, c and d all

113. Cardiac output signifies:-

(1) The amount of blood entering the heart per unit time

(2) The amount of blood entering the lung per unit time

(3) The amount of blood leaving the heart per unit time

(4) The amount of blood leaving the lung per unit time

114. Mucor and Rhizopus are included in class:-

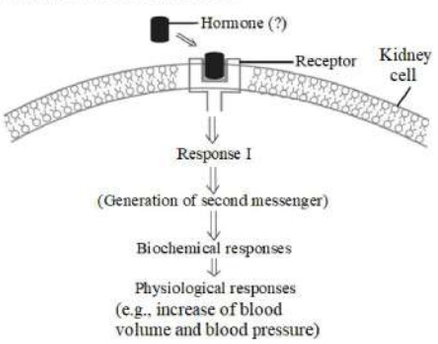
(1) Ascomycetes

(2) Phycomycetes

(3) Basidiomycetes

(4) Deuteromycetes

115. In following hormonal mechanism, the hormone could be:-



(1) Aldosterone

(2) Thyroxin

(3) ADH

(4) Glucagon

112. कथनों के सही समूह को पहचानें
(a) प्रतिकृतियन की उत्पत्ति (ori) प्रतिकृति आरंभ करने के लिए उत्तरदायी है।
(b) DNA लाइगेज कटे हुए DNA अणुओं पर कार्य करता है और उनके सिरों को जोड़ता है।
(c) प्लास्मिड स्वायत्त रूप से प्रतिकृत होने वाला वृत्ताकार अतिरिक्त गुणसूत्री DNA है।
(d) 900 से अधिक प्रतिबंधन एंजाइम जिन्हें जीवाणु के 230 से अधिक प्रभेदों से अलग किया गया है।
नीचे दिए गए विकल्पों में से सही उत्तर चुने

(1) केवल a और c

(2) केवल b, c और d

(3) केवल a, c और d

(4) a, b, c और d सभी

113. कार्डियक आउटपुट से तात्पर्य है-

(1) हृदय में प्रति इकाई समय में प्रवेश करने वाले रक्त की मात्रा

(2) फेंफड़े में प्रति इकाई समय में प्रवेश करने वाले रक्त की मात्रा

(3) हृदय से प्रति इकाई समय में निकलने वाले रक्त की मात्रा

(4) फेंफड़े से प्रति इकाई समय में निकलने वाले रक्त की मात्रा

114. म्यूकर और राइजोपस को किस वर्ग में शामिल किया गया है-

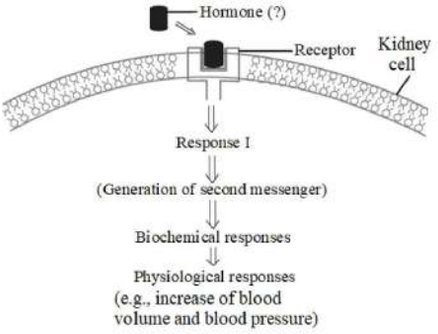
(1) एस्कोमाइसिटिज

(2) फाइकोमाइसिटिज

(3) बेसिडियोमाइसिटिज

(4) ड्यूटेरोमाइसिटिज

115. दिये गये हार्मोनल तंत्र में, हार्मोन हो सकता है-



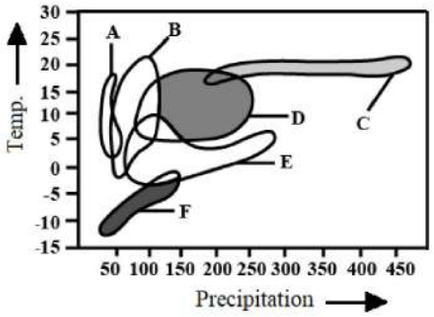
(1) एल्डोस्टेरोन

(2) थायरॉक्सिन

(3) ADH

(4) ग्लूकागॉन

116. In the given figure identify the grassland and coniferous forest respectively from the marking A-F and select the **correct** option-



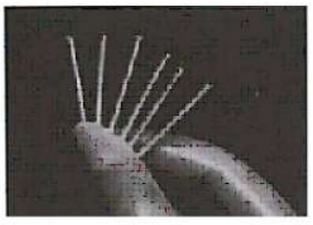
(1) A and B

(2) B and E

(3) B and D

(4) D and E

117. Which of the following statement is correct w.r.t. **contraceptive device** shown?



(1) Hormone containing devices inserted in Uterus for providing long term contraception

(2) These are implants, used by females under the skin.

(3) These are implants, containing non-steroidal preparation effective for three years

(4) Chemical contraceptives which kill the sperms by disrupting the sperm membrane in vagina

118. When all vascular bundles are arrange in a ring, is the character of:-

(1) Monocot stem

(2) Monocot Root

(3) Dicot Root

(4) Dicot stem

119. Incomplete breakdown of sugar in anaerobic respiration forms :

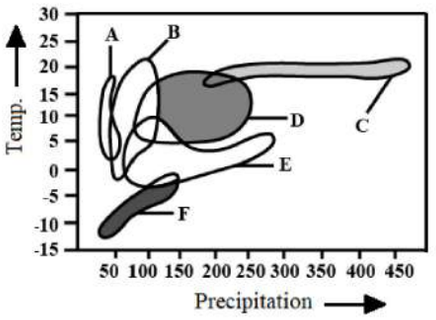
(1) Glucose and CO_2

(2) Alcohol and CO_2

(3) Water and CO_2

(4) Fructose and water

116. दिये गये चित्र में A-F चिन्हों से क्रमशः घासमैदान और शंकुधारी वनों की पहचान करें और **सही** विकल्प का चयन करें-



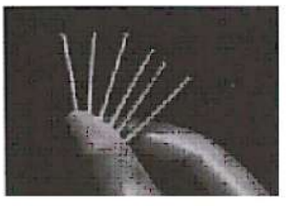
(1) A तथा B

(2) B तथा E

(3) B तथा D

(4) D तथा E

117. दर्शाये गये "गर्भनिरोधक युक्ति" के संदर्भ में निम्न में से सही कथन कौनसा है?



(1) गर्भाशय में हॉर्मोन युक्त युक्तियों को प्रविष्ट कराया जाता है ताकि लम्बे समय तक गर्भनिरोध की अवस्था बनी रहें।

(2) ये अंतर्रोप है, जो महिलाओं के द्वारा त्वचा के नीचे उपयोग में लिया जाता है।

(3) यह अंतर्रोप युक्त नॉन स्टीरॉयडल युक्ति होती है तथा इनका प्रभाव तीन वर्ष तक के लिए होता है।

(4) रासायनिक गर्भनिरोधक जो कि योनि में शुक्राणु झिल्ली को विघटित करके शुक्राणु को समाप्त करते है।

118. जब सभी सवंहन पूल एक वलय में व्यवस्थित होते हैं, तो यह किसका लक्षण है-

(1) एकबीजपत्री तना

(2) एकबीजपत्री जड़

(3) द्विबीजपत्री जड़

(4) द्विबीजपत्री तना

119. शर्करा के अवायवीय श्वसन में अपूर्ण ऑक्सीकरण से क्या बनता है :

(1) ग्लूकोज तथा CO_2

(2) एल्कोहल तथा CO_2

(3) जल तथा CO_2

(4) फ्रक्टोज तथा जल

120. The X-gal will be converted into a coloured product when-

(1) When lactose is available

(2) Gene coding for β- galactosidase is cleaved

(3) When gene of interest is inserted in the vector at the site coding for β-galactosidase

(4) β–galactosidase acts on it

121. Mark the absolute period between the closure of semilunar valve and atrioventricular valve.

(1) 0.1 sec

(2) 0.5 sec

(3) 0.4 sec

(4) 0.3 sec

122. Which organism behaves like plants in the presence of light and absence of organic food, but in reverse conditions behaves like animals:-

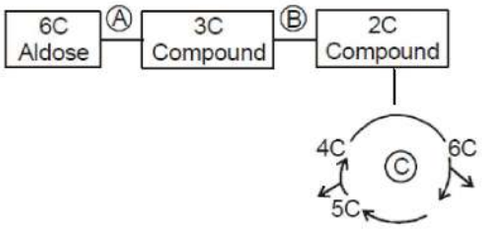
(1) Archaebacteria

(2) Euglena

(3) Nostoc

(4) Paramecium

123. With respect to the following pathway



(1) B – Takes place in cytoplasm of eukaryotic cell

(2) C – Generates ATP through substrate level phosphorylation

(3) A – Requires oxygen

(4) B – Does not form any reduced coenzyme

124. The adrenal cortex secretes all the following hormones except:-

(1) epinephrine

(2) cortisol

(3) aldosterone

(4) corticosterone

120. X-gal रंगीन उत्पाद में कब परिवर्तित होगा?

(1) जब लैक्टोज उपलब्ध होता है

(2) जब β–गेलेक्टोसाइडेज़ के लिए कूटलेखन करने वाला जीन विदलित होता है

(3) जब वांछित जीन को β–गेलेक्टोसाइडेज़ के लिए कूटलेखन करने वाले स्थल पर वाहक में निवेशित किया जाता है

(4) β–गेलेक्टोसाइडेज़ इस पर कार्य करता है

121. अर्द्धचंद्राकार कपाट और आलिन्द-निलय कपाट के बंद होने के बीच की पूर्ण अवधि को चिह्नित करें-

(1) 0.1 sec

(2) 0.5 sec

(3) 0.4 sec

(4) 0.3 sec

122. निम्न में से कौन सा जीव प्रकाश की उपस्थिति तथा कार्बनिक भोजन की अनुपस्थिति में पादप की तरह व्यवहार करता है परन्तु विपरीत स्थितियो में जन्तु के समान व्यवहार करते है।

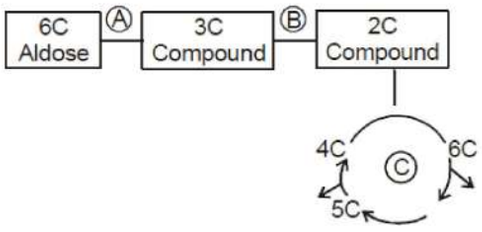
(1) आर्कीबैक्टीरिया (आद्य जीवाणु)

(2) यूग्लीना

(3) नॉस्टोक

(4) पैरामीशियम

123. दिये गये पथ के संदर्भ में निम्नलिखित कथनों पर विचार करें



(1) B - यह यूकैरियोटिक कोशिका के कोशिकाद्रव्य में पाया जाता है

(2) C - यह क्रियाधार स्तर फॉस्फोरिलीकरण के माध्यम से ATP उत्पन्न करता है

(3) A - इसे ऑक्सीजन की आवश्यकता होती है

(4) B - यह कोई भी अपचयित कोएंजाइम उत्पन्न नहीं करता

124. अधिवृक्क वल्कुट निम्नलिखित सभी हार्मोन का स्राव करता है, सिवाय-

(1) एपिनेफ्रीन

(2) कोर्टिसोल

(3) एल्डोस्टेरोन

(4) कॉर्टिकोस्टेरोन

125. Which of the following is true for monocot stem?

(1) Scattered vascular bundles surrounded by collenchymatous bundle sheath is present

(2) A large and conspicuous parenchymatous ground tissue is present

(3) Peripheral vascular bundles are generally larger than the centrally located ones

(4) Phloem parenchyma and water containing cavities are present within the vascular bundles

126. Most of the tree dwellers are found, in which of the forests-

(1) Northern conifer forest

(2) Deciduous forest

(3) Mediterranean scrub forest

(4) Tropical rain forest

127. Darwinian variation are:-

(1) Small and directional

(2) Random and directionless

(3) Single step large mutation

(4) Multiple step minor mutation

128. Golden rice has higher nutritional content of:

(1) Vitamin-A

(2) Vitamin –D

(3) Vitamin -E

(4) Vitamin –K

129. Which of the following statement is correct :

(1) ADH → It facilitates NaCl and Urea reabsorption from the latter parts of the tubule.

(2) Renin → It plays a complex regulatory role of kidney function and rise in glomerular blood flow/glomerular blood pressure / GFR can activate the JG cells to release it.

(3) ANF → Decreased blood flow can cause its releases and It acts as a check on the renin angiotensin mechanism.

(4) Aldosterone → Released by Adrenal cortex when Angiotensin II activates and increases in blood pressure and GFR

125. निम्नलिखित में से कौनसा एकबीजपत्री तने के लिए सत्य है?

(1) बिखरे हुए संवहन बंडल उपस्थित होते हैं, जो स्थूलकोणोतकीय बंडल आच्छद द्वारा घिरे हुए होते है।

(2) बड़े और विशिष्ट मृदुतकीय भरण ऊतक उपस्थित होते है।

(3) परिधीय संवहन बंडल सामान्यतः केन्द्र में स्थित संवहन बंडल से बड़े होते है।

(4) सवंहन बंडल में पाये जाने वाली गुहिकाओं में फ्लोएम मृदुत्तक और जल पाया जाता है

126. वृक्षों पर रहने वाले अधिकांश प्राणी निम्नलिखित में से किस वन में पाए जाते हैं?

(1) उत्तरी शंकुधारी वन

(2) पर्णपाती वन

(3) भूमध्यरेखीय झाड़ी वन

(4) उष्णकटिबंधीय वर्षा वन

127. डार्विन की विविधताऐं है-

(1) छोटी और दिशागत

(2) यादृच्छिक और दिशाहीन

(3) एकलपद विशाल उत्परिवर्तन

(4) बहुपद छोटे उत्परिवर्तन

128. सुनहरे चावल में उच्च पोषक अवयव है-

(1) विटामिन-A

(2) विटामिन-D

(3) विटामिन-E

(4) विटामिन-K

129. निम्न में से कौनसा कथन सत्य है :

(1) ADH → ये नलिका के अंतिम भाग से NaCl तथा यूरिया के पुनरावशोषण (reabsorption) को सुगम बनाता है।

(2) रेनिन → यह वृक्क क्रियाओं की एक जटिल नियमनकारी भूमिका निभाता है तथा गुच्छीय रक्त प्रवाह/ गुच्छीय रक्त दाब/ GFR में बढ़ोतरी से JG कोशिकाएँ सक्रिय होकर इसको मुक्त करती है।

(3) ANF → जब रक्त प्रवाह घटता है, जिसके कारण यह स्त्रावित होता है तथा यह रेनिन एंजियोटेन्सिन क्रियाविधि पर नियंत्रक का काम करता है।

(4) एल्डोस्टीरोन → जब एंजियोटेन्सिन - II सक्रिय होता है, तभी यह अधिवृक्क वल्कुट (Adrenal cortex) के द्वारा स्त्रावित होता है तथा रक्तदाब (BP) तथा GFR में वृद्धि करता है।

130. Heterocysts present in Nostoc is specialised for-

(1) Fragmentation

(2) Nitrogen-fixation

(3) Symbiotic relation

(4) Food storage

131. LH and FSH are collectively called :

(1) Somatotropins

(2) Oxytocin

(3) Gonadotropins

(4) Luteotropic

132. Which one is correct about bulliform ?

(1) It is seen in grasses

(2) It is large-sized, thin-walled, colourless, vacoulate cells on the adaxial surface

(3) It helps in rolling of leaf to minimise water loss when it is flaccid

(4) All

133. Savanna biome is characterised by :

(1) Only grasses

(2) Grasses with scattered trees

(3) Broad leaf trees

(4) All of the above

134. Which among the following is the role of O_2 in the whole respiration process?
i) Act as a means of removing hydrogen from the system.
ii) Act as the final hydrogen acceptor.
iii) It bonded with the carbon atom and released CO_2, one of the byproducts of respiration.

(1) ii and iii

(2) iii only

(3) Both i and ii

(4) All of the above

135. Natural selection is a process in which

(1) Heritable variations which enable better survival are enabled to reproduce and leave greater number of progeny

(2) Allelic frequency is supposed to remain fixed and even remain same through generations

(3) Evolution is through anthropogenic action only

(4) Large differences arise suddenly in a population

130. नोस्टॉक में उपस्थित हेटेरोसिस्ट किस के लिए विशेष है-

(1) विखंडन

(2) नाइट्रोजन-स्थिरीकरण

(3) सहजीवी संबंध

(4) भोजन संचयन

131. LH तथा FSH को सामूहिक रूप से कहते है :

(1) सोमेटोट्रोपिन

(2) ऑक्सीटोसीन

(3) गोनेडोट्रॉपिन

(4) ल्युटियोट्रॉपिक

132. बुलीफॉर्म के बारे में कौन-सा सही है?

(1) यह घासों में पायी जाती है।

(2) यह बड़े आकार, पतली भित्ति युक्त, रंगहीन, रिक्तिकामय कोशिकाएँ होती हैं, जो अभ्यक्ष सतह पर होती हैं।

(3) यह पर्ण को वलन में सहायता करती है ताकि जब यह श्लथ/शुष्क हो, पानी की हानि को कम किया जा सके।

(4) सभी

133. सवाना बायोम की विशेषता है-

(1) केवल घास

(2) घास के साथ बिखरे हुए वृक्ष

(3) चौड़े पत्तों वाले वृक्ष

(4) उपरोक्त सभी

134. सम्पूर्ण श्वसन प्रक्रिया में O_2 की निम्नलिखित मे से कौनसी भूमिका है।
i) तंत्र से हाइड्रोजन के निष्कासन के साधन के रूप में कार्य करती है।
ii) अंतिम हाइड्रोजन ग्राही के रूप में कार्य करती है।
iii) यह कार्बन परमाणु के साथ बंधित हो जाती है तथा CO_2 का विमोचन करती है, जो श्वसन के उपउत्पादों में से एक है।

(1) ii तथा iii

(2) केवल iii

(3) i तथा ii दोनों

(4) उपरोक्त सभी

135. प्राकृतिक चयन एक प्रक्रिया है जिसमें-

(1) अधिक जीवन सम वंशानुगत विविधता को जनन के अधिक अवसर मिलते है और संताने अधिक संख्या में उत्पन्न होती है।

(2) एलील आवृत्ति सुस्थिर होती है जो एक पीढ़ी से दूसरी पीढ़ी तक निरंतर रहते है।

(3) विकास केवल मानवोद्भवी क्रियाओं (एन्थ्रोप्रोजैनिक) के माध्यम से होता है।

(4) एक जनसंख्या में अचानक बड़े अंतर उत्पन्न होते हैं।

136. A researcher prepared two DNA sequences corresponding to A & B, chain of insulin & introduced them in plasmid of E. Coli to produce insulin chains. He produced A & B chain separately, Extracted them but forget to combined them by creating disulphide bond. Now this genetically engineered formed insulin was taken by a diabetic patient :
(i) This genetically engineered insulin would not work in successful manner.
(ii) Patient would not cope up with diabetes via use of this type of insulin.
(iii) That type of insulin work in a better way & patient recover sooner.
(iv) It might caused reactions in the body.

Choose the incorrect option :

(1) (i), (ii) and (iii)

(2) Only (iv)

(3) (ii), (iii) and (iv)

(4) Only (iii)

136. एक शोधकर्ता ने इन्सुलिन की A व B दो श्रृंखला के समरूप दो DNA के अनुक्रम तैयार किये और उनको E. Coli के प्लाज्मिड में इन्सुलिन श्रृंखलाओं के निर्माण के लिए स्थानान्तरित कर दिया। वह A व B श्रृंखला का उत्पादन अलग-अलग करता है, और उन्हे बाहर निकाल लेता है, लेकिन वह A व B श्रृंखला को डाइ सल्फाइड बन्ध के द्वारा जोड़ना भूल जाता है अब इस आनुवांशिक अभियांत्रित इंसुलिन को एक मधुमेह रोगी द्वारा ग्रहण किया जाता है:
(i) यह आनुवांशिक अभियांत्रित इंसुलिन एक सफल तरीके में काम नही करेगा।
(ii) रोगी इस तरह के इंसुलिन से अपनी diabetes को नियंत्रित नहीं कर पायेगा।
(iii) इस तरह का इंसुलिन अधिक अच्छे तरीके से काम करता है, और रोगी जल्द ही ठीक हो जाता है।
(iv) यह शरीर में प्रतिक्रिया उत्पन्न कर सकता है।

असत्य विकल्प को चुनिये:

(1) (i),(ii) तथा (iii)

(2) केवल (iv)

(3) (ii),(iii) तथा (iv)

(4) केवल (iii)

137. Which statement is not true with regarding of reabsorption ?

(1) Nearly 99 percent of the filtrate has to be reabosrbed by the renal tubules

(2) Nearly all of the essential nutrients are reabsorbed by PCT.

(3) DCT is also capable of reabsorption of HCO_3^-

(4) Reabsorption of hydrogen and potassium ions occur in DCT.

137. पुनः अवशोषण (reabsorption) के संदर्भ में कौन सा कथन सत्य नहीं है?

(1) 99 प्रतिशत निस्यंद को वृक्क नलिकाओं द्वारा पुनः अवशोषित किया जाता है

(2) लगभग सभी आवश्यक पोषक तत्व का पुनः अवशोषण समीपस्थ संवलित नलिका द्वारा होता है।

(3) दूरस्थ संवलित नलिका भी HCO_3^- का पुनः अवशोषण करने में सक्षम होती है

(4) हाइड्रोजन और पोटेशियम आयनों का पुनः अवशोषण दूरस्थ संवलित नलिका में होता है

138. Pyrenoids are characteristically found in the chloroplast of:-

(1) Fungi

(2) Algae

(3) Pteridophytes

(4) Angiosperms

138. पाइरीनॉयड किस वर्ग के हरितलवक में पाये जाने वाली विशेषता है-

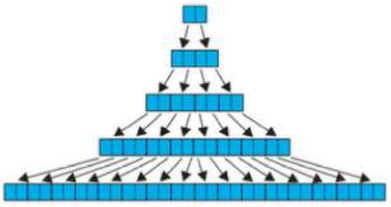
(1) कवक (Fungi)

(2) शैवाल (Algae)

(3) टेरिडोफाइटा

(4) आवृत्तबीजी (Angiosperms)

139. Identify the given figure:



(1) Figure shows geometric growth with formula $L_t = L_o + rt$

(2) Figure shows geometric growth with formula $W_1 = W_o\, e^{rt}$

(3) Figure shows arithmetic growth with formula $L_t = L_o + rt$

(4) Figure shows arithmetic growth with formula $W_1 = W_o\, e^{rt}$

140. How many genotypes are represented only once in Mendelian dihybrid F_2 population ?

(1) 2

(2) 3

(3) 6

(4) 4

141. Marine biomes are affected very less by-

(1) temperature

(2) salinity

(3) geographical location

(4) type of sea floor

142. Which of the following is false for Bt plant?

(1) Insect resistance

(2) Prepared by *Bacillus thuringiensis gene*

(3) It is Transgenic plant

(4) Prepared by RNAi Technique

143. Identify the option with correct statements:-
(i) Renal vein has least amount of urea among all blood vessels.
(ii) Podocytes occur in the outer wall of Bowman's capsule.
(iii) Loop of Henle helps in water conservation.
(iv) Glomerular filtrate is plasma minus proteins.

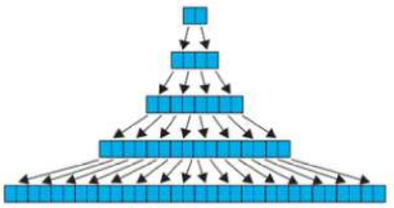
(1) (i), (iii) & (iv)

(2) (i), (ii) & (iii)

(3) (ii), (iii) & (iv)

(4) (i), (ii), (iii) & (iv)

139. दिए गए चित्र को पहचानें:



(1) चित्र सूत्र $L_t = L_o + rt$ के साथ, ज्यामितीय वृद्धि दर्शाता है

(2) चित्र, सूत्र $W_1 = W_o\, e^{rt}$ के साथ ज्यामितीय वृद्धि को दर्शाता है

(3) चित्र, सूत्र $L_t = L_o + rt$ के साथ अंकगणितीय वृद्धि दर्शाता है

(4) चित्र, सूत्र $W_1 = W_o\, e^{rt}$ के साथ अंकगणितीय वृद्धि दर्शाता है

140. मेंडेल के द्विसंकर F_2 पीढ़ी में कितने जीनोटाइप केवल एक बार प्रदर्शित होते हैं?

(1) 2

(2) 3

(3) 6

(4) 4

141. समुद्री बायोम पर निम्नलिखित में से किसका बहुत कम प्रभाव पड़ता है-

(1) तापमान

(2) लवणता

(3) भौगोलिक स्थिति

(4) समुद्र तल का प्रकार

142. निम्नलिखित में से Bt पादप के लिए असत्य है?

(1) कीट प्रतिरोधी

(2) *बैसीलस थुरिंजिएंसिस* जीन द्वारा तैयार किया गया

(3) यह एक ट्रांसजेनिक (पारजीनी) पादप है।

(4) RNAi तकनीक द्वारा तैयार किया गया

143. सही कथनों वाले विकल्प की पहचान करें
(i) वृक्क शिरा में सभी रक्त वाहिकाओं में यूरिया की मात्रा सबसे कम होती है।
(ii) पोडोसाइट्स बॉमेन संपुट की बाहरी भित्ति में पाए जाते हैं।
(iii) हेनले का लूप जल संरक्षण में सहायता करता है।
(iv) ग्लोमेरुलर निस्यंद, प्रोटीन रहित प्लाज्मा होता है।

(1) (i), (iii) व (iv)

(2) (i), (ii) व (iii)

(3) (ii), (iii) व (iv)

(4) (i), (ii), (iii) व (iv)

144. In gymnosperm endosperm is -

(1) Triploid

(2) Diploid

(3) Haploid

(4) Tetraploid

145. Mother and father of a person with 'O' blood group have 'A' and 'B' blood group respectively. What would be the genotype of both mother and father?

(1) Mother is homozygous for 'A' blood group and father is heterozygous for 'B'

(2) Mother is heterozygous for 'A' blood group and father is homozygous for 'B'

(3) Both mother and father are heterozygous for 'A' and 'B' blood group respectively

(4) Both mother and father are homozygous for 'A' and 'B' blood group respectively

146. Physico-chemical (abiotic) components alone do not characterise the habitat of an organism completely, the habitat includes biotic components also–

(1) Pathogens, parasites, predators and competitors

(2) Producer, Carnivores, Bacteria

(3) Parasite, Fungi

(4) None of these

147. **Assertion :-** Cytokinins helps in the delay of leaf senescence.
Reason:- Cytokinin leads to mobilisation of nutrients.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If assertion is true but reason is false.

(4) If both assertion and reason are false.

148. Which of the following transgenic protein product has been used to treat emphysema ?

(1) α-1-antitrypsin

(2) α- Lactalbumin

(3) Cry protein

(4) C-peptide

144. जिम्नोस्पर्म (अनावर्त्तवीजियों) में भ्रूणपोष होता है -

(1) त्रिगुणित

(2) द्विगुणित

(3) अगुणित

(4) चर्तुगुणित

145. 'O' रक्त समूह वाले व्यक्ति के माता और पिता का रक्त समूह क्रमशः 'A' और 'B' है। माता और पिता दोनों का जीनोटाइप क्या होगा?

(1) 'A' रक्त समूह के लिए माता समयुग्मजी है और 'B' के लिए पिता विषमयुग्मजी है।

(2) 'A' रक्त समूह के लिए माता विषमयुग्मजी है और 'B' के लिए पिता समयुग्मजी है।

(3) माता और पिता दोनों क्रमशः 'A' और 'B' रक्त समूह के लिए विषमयुग्मजी हैं

(4) माता और पिता दोनों क्रमशः 'A' और 'B' रक्त समूह के लिए समयुग्मजी हैं

146. भौतिक रासायनिक (अजीवीय) घटक अपने आप में पूरी तरह से किसी जीव के आवास की विशेषता नहीं बताते, आवास में जीवीय घटक भी शामिल है-

(1) रोगजनक, परजीवी, परभक्षी और स्पर्धी

(2) उत्पादक, मांसाहारी, जीवाणु

(3) परजीवी, कवक

(4) इनमें से कोई नहीं

147. **कथन :-** साइटोकाइनिन पत्तियों में जीर्णता को विलम्बित करता है।
कारण :- साइटोकाइनिन पोषकों के संचरण को बढ़ाता है।

(1) यदि कथन एवं कारण दोनों सत्य हैं तथा कारण कथन का सही स्पष्टीकरण है।

(2) यदि कथन एवं कारण दोनों सत्य हैं, लेकिन कारण, कथन का सही स्पष्टीकरण नहीं है।

(3) यदि कथन सत्य है, लेकिन कारण असत्य है।

(4) यदि कथन व कारण दोनों असत्य हैं।

148. निम्नलिखित में से किस ट्रांसजेनिक (पारजीनी) प्रोटीन उत्पाद का उपयोग वातस्फीति के उपचार के लिए किया गया है?

(1) α-1-एन्टीट्रिप्सिन

(2) α- लैक्टएल्बूमिन

(3) क्राई प्रोटीन

(4) C-पेप्टाइड

149. __A__ is based on cytological information and __B__ uses the chemical constituents of the plant. A and B respectively, are:-

(1) Cytotaxonomy, Chemotaxonomy

(2) Chemotaxonomy, Numberical taxonomy

(3) Cytotaxonomy, Numerical taxonomy

(4) Artificial system, Natural system

150. A human female homozygous for a recessive X-linked mutation is mated to a male with wild type phenotype. The phenotypes of the F_1 progeny will be:-

(1) All wild type

(2) 50% mutants irrespective of sex

(3) All females wild type and all males mutant

(4) All males wild type and all females mutant

151. Number of biosphere reserves, national parks and wild life sanctuaries in India are respectively:-

(1) 90, 14, 448

(2) 14, 90, 448

(3) 90,448, 14

(4) 14,448, 19

152. **Statement-I:** Ethylene promotes internode/petiole elongation in deep water rice plants
Statement-II: Ethylene helps upper part of shoot to remain above water.
Choose the appropriate option –

(1) Statement-I is correct and Statement-II is incorrect

(2) Statement-I is incorrect and Statement-II is correct

(3) Statement-I and Statement-II are correct

(4) Statement-I and Statement-II are incorrect

153. **Assertion :-** Walls of blood vessels and air sacs of lungs is made up of a simple squamous epithelium.
Reason :- Squamous epithelium involved in functions like secretion and absorption.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If assertion is true but reason is false.

(4) If both assertion and reason are false.

149. __A__ कोशिकीय जानकारी पर आधारित है तथा __B__ पादप के रसायनिक संघटकों का उपयोग करता है। A तथा B क्रमशः है-

(1) कोशिकीय वर्गिकी तथा रासायनिक वर्गिकी

(2) रासायनिक वर्गिकी तथा संख्यात्मक टेक्सोनोमी

(3) कोशिकीय वर्गिकी तथा (संख्यात्मक) टेक्सोनोमी

(4) कृत्रिम तंत्र तथा प्राकृतिक तंत्र

150. एक अप्रभावी X-सहलग्न उत्परिवर्तन के लिए एक समयुग्मी महिला का संगम, वन्य प्रकार के लक्षण प्रारूप वाले एक पुरूष के साथ कराया जाता है। F_1 संतति का लक्षण प्रारूप क्या होगा :

(1) सभी वन्य प्रकार के होंगे

(2) लिंग पर निर्भर नहीं करते हुए, 50% उत्परिवर्ती

(3) सभी मादाएँ, वन्य प्रकार की ओर सभी नर उत्परिवर्ती

(4) सभी नर वन्य प्रकार के और सभी मादाएँ उत्परिवर्ती

151. भारत में जैव मण्डल आरक्षित क्षेत्र, राष्ट्रीय उद्यान तथा वन्य जीव अभ्यारण की संख्या क्रमशः हैं-

(1) 90, 14, 448

(2) 14, 90, 448

(3) 90,448, 14

(4) 14,448, 19

152. **कथन-I :** एथिलीन गहरे जल के चावल के पौधों में पर्व/वृंत दीर्घिकरण को प्रेरित कर देता है
कथन-II : एथिलीन प्ररोह के ऊपरी भाग को जल के ऊपर रहने में सहायता करता है।
उचित विकल्प चुनें -

(1) कथन-I सही है और कथन-II गलत है

(2) कथन-I गलत है और कथन-II सही है

(3) कथन-I और कथन-II सही हैं

(4) कथन-I और कथन-II गलत हैं

153. **कथन :-** रक्त वाहिकाओं की भित्ति और फेफड़ों के वायुकोशों की भित्ति सरल शल्की उपकला से बनी होती हैं।
कारण :- शल्की उपकला स्त्रवण और अवशोषण जैसे कार्यों में सम्मिलित होती है।

(1) यदि कथन एवं कारण दोनों सत्य हैं तथा कारण कथन का सही स्पष्टीकरण है।

(2) यदि कथन एवं कारण दोनों सत्य हैं, लेकिन कारण, कथन का सही स्पष्टीकरण नहीं है।

(3) यदि कथन सत्य है, लेकिन कारण असत्य है।

(4) यदि कथन व कारण दोनों असत्य हैं।

154. Dragonflies insects have proved very useful for the control of-

(1) Eicchornia

(2) mosquito

(3) Aphids

(4) Parathenium

155. If there is complete linkage in F_2 generation:-

(1) There will be only parental types

(2) Parental type and recombinants appear in equal ratio

(3) Recombinants are less than parental type

(4) Recombinants are more than parental type

156. Highest number of species are existing in which of the following taxa of vertebrates?

(1) Fishes

(2) Birds

(3) Amphibians

(4) Reptiles

157. If there are 21MMC in an anther, what will be the number of male gametes produced from them-

(1) 21

(2) 84

(3) 168

(4) None of these

158. **Statement-I :** Frog's body is divisible into head, neck and trunk.
Statement-II : Limbs of frog help in swimming, walking, leaping and burrowing.

(1) Both statements I and II are correct.

(2) Both statements I and II are incorrect.

(3) Only statement I is correct.

(4) Only statement II is correct.

159. When are lysosomes extra active

(1) Seed maturation

(2) Seed germination

(3) Flowering

(4) Fruiting

154. किसके नियंत्रण के लिए ड्रेगनफ्लाई कीट बहुत उपयोगी सिद्ध हुआ-

(1) ऑइकोर्निया

(2) मच्छर

(3) एफिड

(4) पारथेनियम

155. यदि F_2 पीढ़ी में पूर्ण सहलग्नता है तो-

(1) केवल जनकीय प्रकार होंगे

(2) जनकीय प्रकार और पुनर्योगज समान अनुपात में दिखाई देते हैं

(3) पुनर्योगज जनकीय प्रकार से कम होते हैं

(4) पुनर्योगज जनकीय प्रकार से अधिक होते हैं

156. निम्नलिखित में से कौनसे कशेरुकी वर्गक में सबसे अधिक संख्या में जातियाँ पाई जाती हैं?

(1) मत्स्य

(2) पक्षी

(3) उभयचर

(4) सरीसृप

157. यदि एक परागकोष में 21 MMC (लघुबीजाणुमातृ कोशिका) होते हैं, तो उनसे उत्पन्न होने वाले नर युग्मकों की संख्या होगी-

(1) 21

(2) 84

(3) 168

(4) इनमें से कोई नहीं

158. **कथन-I :** मेंढक का शरीर सिर, ग्रीवा तथा धड़ में विभाजित होता हैं।
कथन-II : मेंढक के पाद तैरने, चलने, उछलने और बिल खोदने में सहायता करते हैं।

(1) कथन I और II दोनों सही हैं।

(2) दोनों कथन I और II गलत हैं।

(3) केवल कथन I सही है।

(4) केवल कथन II सही है।

159. लाइसोसोम कब अतिसक्रिय होते हैं

(1) परिपक्व बीज

(2) बीज अंकुरण

(3) पुष्पन

(4) फल लगना

160. Which is incorrect about DNA polymorphism?

(1) The two alleles of a chromosome contain different copy numbers of VNTR.

(2) Different chromosomes contains different copy of VNTR.

(3) Polymorphisms are inheritable from parents to children.

(4) DNA from different tissue from an individual shows the different degree of polymorphism.

161. Select right statement applicable in all angiosperm plants:

(1) 2 celled pollen grain at pollination

(2) Presence of pollinium

(3) Siphonogamy and internal fertilisation

(4) Division in generative cell before pollination

162. Select the option which is not correct with respect to Co-factor-

(1) Catalytic activity is lost when the co-factor is removed from the enzyme

(2) Cofactor play a crucial role in the catalytic activity of the enzyme.

(3) Three kinds of cofactors may be identified : prosthetic groups, apoenzymes and metal ions.

(4) Three kinds of cofactors may be identified : prosthetic groups, Co-enzymes and metal ions.

163. The term spliceosome is applied to

(1) Complex of rRNA and protein

(2) Complex of SnRNA and protein

(3) Complex of tRNA and protein

(4) Complex of DNA and protein

164. Which of the following cell organelles is non-membrane bound and found in both prokaryotes and eukaryotes?

(1) Lysosomes

(2) Ribosomes

(3) Centrioles

(4) Mitochondria

160. DNA बहुरूपता (पॉलीमोरफिज्म) के बारे में क्या असत्य है?

(1) एक गुणसूत्र के दो एलील्स VNTR की भिन्न कॉपी नम्बर युक्त होते हैं।

(2) भिन्न-भिन्न गुणसूत्र VNTR की भिन्न कॉपी रखते हैं।

(3) बहुरूपता पैत्रक से बच्चों में वंशानुगत होती हैं।

(4) एक व्यक्ति के भिन्न-भिन्न ऊत्तकों से DNA, बहुरूपता की भिन्न डिग्री को दर्शाता है।

161. सभी आवृतबीजी पौधों से सम्बन्धित सही कथन चुनें

(1) परागण में दो कोशिकीय परागकण

(2) पोलिनियम की उपस्थिति

(3) नालयुग्मन और आंतरिक निषेचन

(4) परागण से पहले जनन कोशिका में विभाजन

162. निम्नलिखित में कौनसा विकल्प कोफैक्टर (सहकारक) के लिए सत्य नही है-

(1) एजांइम से कोफैक्टर (सहकारक) को हटाने पर एंजाइम की कैटालिटिक एक्टिविटी समाप्त हो जाती है

(2) एंजाइम की एक्टिविटी में कोफैक्टर (सहकारक) का एक महत्वपूर्ण योगदान है

(3) कोफैक्टर (सहकारक) तीन प्रकार के पहचाने गये है जो कि है प्रोस्थैटिक समूह, एपोएंजाइम, धात्वीय आयन

(4) काफैक्टर (सहकारक) तीन प्रकार के पहचाने गये है जो कि हैं प्रोस्थैटिक समूह, कोएंजाइम, धात्वीय आयन

163. संबंधनकाय (spliceosome) शब्द किसके लिए प्रयुक्त किया जाता है :

(1) rRNA एवं प्रोटीन का कॉम्प्लेक्स

(2) SnRNA एवं प्रोटीन का कॉम्प्लेक्स

(3) tRNA एवं प्रोटीन का कॉम्प्लेक्स

(4) DNA एवं प्रोटीन का कॉम्प्लेक्स

164. निम्न में से कौन सा कोशिकांग झिल्ली रहित है तथा (प्राक्केन्द्रकी) व (सूकेन्द्रकी) दोनों में पाया जाता है?

(1) लाइसोसोम

(2) राइबोसोम

(3) तारककेन्द्र

(4) माइटोकॉण्ड्रिया

165. Hybrid seeds have to be produced every year because:-

(1) Hybrid plants become sterile in coming years

(2) They show more hybrid vigour in coming years

(3) Hybrid vigour is not maintained beyond one generation as segregation of genes begins in the second generation

(4) Hybrid seed industry tends to increase cost of the seeds

166. Match List-I with List-II-

List-I		List-II	
A.	Common cold	I.	Plasmodium
B.	Haemozoin	II.	Typhoid
C.	Widal test	III.	Rhinoviruses
D.	Allergy	IV.	Dust mites

Choose the correct answer from the options given below :

(1) A-III, B-I, C-II, D-IV

(2) A-IV, B-II, C-III, D-I

(3) A-II, B-IV, C-III, D-I

(4) A-I, B-III, C-II, D-IV

167. Synthesis of DNA from RNA is explained by

(1) central dogma reverse

(2) reverse transcription

(3) Teminism

(4) all of these

168. Rough endoplasmic reticulum differs from smooth walled endoplasmic reticulum by the presence of -

(1) DNA

(2) Protein

(3) Ribosomes

(4) Ergastic substance

165. संकर बीजों को वर्ष दर वर्ष उत्पादित करना होता है क्योंकि-

(1) संकर पादप आगामी वर्ष में बंध्य हो जाते है।

(2) ये आगामी वर्ष में अधिक संकर ओज दर्शाते है।

(3) संकर ओज एक पीढी से आगे यथावत नहीं रह पाता क्योंकि दूसरी पीढ़ी में जीन्स का पृथक्करण हो जाता है।

(4) संकर बीज उत्पादन में लगी औद्योगिक इकाईयां बीजों की लागत बढ़ा रही है।

166. सूची I को सूची II के साथ सुमेलित करें -

सूची -I		सूची -II	
A.	सामान्य जुखाम	I.	प्लाज्मोडियम
B.	हीमोजॉइन	II.	टायफॉइड
C.	विडाल परीक्षण	III.	राइनोवाइरस
D.	एलर्जी	IV.	धूल चिचड़ी

निम्न विकल्पों से सही उत्तर का चयन करो:

(1) A-III, B-I, C-II, D-IV

(2) A-IV, B-II, C-III, D-I

(3) A-II, B-IV, C-III, D-I

(4) A-I, B-III, C-II, D-IV

167. RNA से DNA के संश्लेषण की व्याख्या किसके द्वारा की गई

(1) सेन्ट्रल डोग्मा रिवर्स

(2) रिवर्स ट्रांसक्रिप्शन (व्युत्क्रम अनुलेखन)

(3) टेमीनिज्म

(4) ये सभी

168. खुरदरी अंतर्द्रव्यी जालिका चिकनी भित्तियुक्त अंतर्द्रव्यी जालिका से किसकी उपस्थिति के कारण भिन्न होती है?

(1) DNA

(2) प्रोटीन

(3) राइबोसोम

(4) कोशिकीय अजैव पदार्थ

169. Given below are two statements :

Statement I : Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.

Statement II : Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

169. नीचे दो कथन दिए गए है:

कथन I : अस्थि मज्जा मुख्य लसीकाभ अंग है जहाँ लसीकाणु सहित सभी रक्त कोशिकाएँ उत्पादित होती है।

कथन II : दोनों अस्थि मज्जा एवं थाइमस टी-लसीकाणु के विकास एवं परिपक्वन के लिए सूक्ष्म वातावरण प्रदान करती है।

ऊपर दिए गए कथनों के प्रकाश में निम्न विकल्पों से सर्वाधिक सही उत्तर का चयन करो:

(1) कथन I सही है लेकिन कथन II गलत है।

(2) कथन I गलत है लेकिन कथन II सही है।

(3) दोनों कथन I और कथन II सही है।

(4) दोनों कथन I और कथन II गलत है।

170. Which enzyme is not involved in DNA replication?

(1) DNA polymerase

(2) Primase

(3) Ligase

(4) Restriction Endonuclease

170. इनमे से कौनसा एंजाइम DNA प्रतिकृतियन मे भाग नही लेता है?

(1) DNA पॉलीमरेज

(2) प्राइमेज

(3) लाइगेज

(4) प्रतिबंधन एण्ड्रोन्यूक्लिऐज

171. A bivalent in pachytene stage, consists of:-

(1) Two chromatids and one centromere

(2) Two chromatids and two centromeres

(3) Four chromatids and two centromeres

(4) Four chromatids and four centromeres

171. पैकाइटीन प्रावस्था में एक युगली किससे बनता हैं-

(1) दो क्रोमेटिड्स और एक गुणसूत्र बिंदु

(2) दो क्रोमेटिड्स और दो गुणसूत्र बिंदु

(3) चार क्रोमेटिड्स और दो गुणसूत्र बिंदु

(4) चार क्रोमेटिड्स और चार गुणसूत्र बिंदु

172. Match the Column I with Column II –

	Column I		**Column II**
(a)	AIDS	(i)	α-Interferon
(b)	Cancer	(ii)	Macrophages
(c)	Biological Response modifier	(iii)	Don't die of ignorance
(d)	HIV factory	(iv)	Metastasis

(1) a-ii, b-iii, c-i, d-iv

(2) a-iii, b-iv, c-ii, d-i

(3) a-iv, b-iii, c-ii, d-i

(4) a-iii, b-iv, c-i, d-ii

172. कॉलम I को कॉलम II मिलान करें –

	कॉलम I		**कॉलम II**
(a)	AIDS	(i)	α-इंटरफ़ेरोन
(b)	कैंसर	(ii)	मैक्रोफेज
(c)	जैविक प्रतिक्रिया रूपांतरक	(iii)	अज्ञानता के कारण मत मरो
(d)	HIV फैक्ट्री	(iv)	मेटास्टेसिस

(1) a-ii, b-iii, c-i, d-iv

(2) a-iii, b-iv, c-ii, d-i

(3) a-iv, b-iii, c-ii, d-i

(4) a-iii, b-iv, c-i, d-ii

173. DNA consists of two complementary nucleotide chains. If the sequence of nucleotide in one of the chains is AGCTTCGA, then the nucleotide sequence in the other chain shall be

(1) TAGCATAT

(2) GATCCTAG

(3) TCGAAGCT

(4) GCTAAGCT

174. In meiotic cell division, centromere splits during

(1) Metaphase II

(2) Anaphase II

(3) Metaphase I

(4) Anaphase I

175. Match the list - I with list - II.

	List-I		List-II
(a)	Locusta	(i)	Parapodia
(b)	Nereis	(ii)	Chitinous exoskeleton
(c)	Pila	(iii)	Water vascular system
(d)	Asterias	(iv)	Radula

(1) a-iv, b-ii, c-i, d-iii

(2) a-ii, b-i, c-iv, d-iii

(3) a-iv, b-iii, c-ii, d-i

(4) a-iii, b-iv, c-i, d-ii

176. In which of the following phases centromeres split and chromatids separate and then chromatids move to opposite poles?

(1) Metaphase-I, Anaphase

(2) Anaphase, Anaphase-I

(3) Anaphase-I, Metaphase-II

(4) Anaphase, Anaphase-II

177. Which of the following is **not** correctly matched?

(1) **Gregarious pest** – Locusta (locust)

(2) **Living fossil –** Limulus (king – crab)

(3) **Economically important insects –** Apis (honey bee), Bombyx (silkworm)

(4) **Vectors –** Mosquitoes (Anopheles, Culex and Aedes) and Lac insect (Laccifer)

178. Synapsis is pairing of

(1) Any two chromosomes

(2) Non homologous chromosomes

(3) Sister chromatids

(4) A paternal & a maternal chromosome

173. DNA में दो पूरक न्यूक्लियोटाइड श्रृखंला होती हैं। यदि एक श्रृखंला में न्यूक्लियोटाइड का अनुक्रम AGCTTCGA है, तो दूसरी श्रृखंला में न्यूक्लियोटाइड का अनुक्रम होगा

(1) TAGCATAT

(2) GATCCTAG

(3) TCGAAGCT

(4) GCTAAGCT

174. अर्द्धसूत्री विभाजन में, गुणसूत्र बिंदु किस अवस्था में विभाजित होता है?

(1) मेटाफेज़ II

(2) ऐनाफेज़ II

(3) मेटाफेज़ I

(4) ऐनाफेज़ I

175. सूची-I को सूची -II से सुमेलित करे -

	सूची -I		सूची -II
(a)	लोकस्टा	(i)	पेरापोडिया
(b)	नेरीस	(ii)	काइटिन का बाह्य कंकाल
(c)	पाइला	(iii)	जल संवहन तंत्र
(d)	ऐस्टेरिअस	(iv)	रेडुला

(1) a-iv, b-ii, c-i, d-iii

(2) a-ii, b-i, c-iv, d-iii

(3) a-iv, b-iii, c-ii, d-i

(4) a-iii, b-iv, c-i, d-ii

176. निम्नलिखित में से किस अवस्था में गुणसूत्रबिंदु (सेन्ट्रोमियर) विभाजित हो जाते हैं और क्रोमेटिड अलग होते हैं, तथा क्रोमेटिड विपरीत ध्रुवों की ओर चले जाते हैं?

(1) मेटाफेज-I, ऐनाफेज

(2) ऐनाफेज, ऐनाफेज-I

(3) ऐनाफेज-I, मेटाफेज-II

(4) ऐनाफेज, ऐनाफेज-II

177. निम्न मे से कौनसा सही सुमेलित **नहीं** है?

(1) **यूथ चारी पीड़क -** लोकस्टा

(2) **जीवित जीवाश्म -** लिमूलस (राज कर्कट) (किंग क्रेब)

(3) **आर्थिक रूप से महत्वपूर्ण कीट -** एपीस (मधुमक्खी), बॉम्बेक्स (रेशम कीट)

(4) **वाहक कीट -** मच्छर (एनोफलीज, क्यूलेक्स तथा एडीज) और लाख कीट (लैसिफर)

178. सिनैप्सिस किसका जोड़ा है?

(1) कोई दो गुणसूत्रों

(2) अ-समजात गुणसूत्रों

(3) सिस्टर गुणसूत्रों

(4) एक पैतृक और एक मातृक गुणसूत्रों

179. Given below are two statements : One is labelled are Assertion A and the other is labelled as Reason R.

Assertion A : Members of subphylum vertebrate possess notochord during the embryonic period. The notochord is replaced by a cartiliaginous or bony vertebral column in the adult.

Reason R : Thus all chordates are vertebrates but not all vertebrates are chordates.

In the light of the above statements, choose the correct answer from the option given below:-

(1) A is true but R is false

(2) A is false but R is true

(3) Both A and R are true and R is the correct explanation of A

(4) Both A and R are true but R is NOT the correct explanation of A

180. Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them ?

(1) **Platypus** and **Macropus** =Viviparous

(2) **Ostrich** and **Corvus** = Scales on hind limbs

(3) **Chelone** and **Neophron**= Skin cast

(4) **Salamandra** and **Rana** = Internal fertilization

179. नीचे दो कथन दिये गये हैं: एक अभिकथन A दूसरा कारण R है।

अभिकथन A : कशेरूकी उपसंघ के सदस्यों में भ्रूणीय काल में पृष्ठ रज्जु होती है। वयस्क में पृष्ठ रज्जु उपास्थिमय अथवा अस्थिल मेरूदंड में परिवर्तित हो जाती है।

कारण R : इसलिए सभी रज्जुक कशेरूक हैं लेकिन सभी कषेरूक रज्जुक नहीं होते है।

उपर दिए गए कथनों के संदर्भ में निम्न विकल्पों से सही उत्तर का चयन करों-

(1) Aसत्य है लेकिन R असत्य है।

(2) A असत्य है परन्तु R सत्य है।

(3) दोनों A एवं R सत्य हैं एवं R, A का सही स्पष्टीकरण है।

(4) दोनों A एवं R सत्य हैं लेकिन R, A का सही स्पष्टीकरण नही है।

180. निम्नलिखित में से कौनसे जन्तुओं का जोड़ा उनके सामने वर्णित विशेषताओं के संबंध में एक दूसरे के समान है?

(1) **प्लेटीपस** तथा **मेक्रोपस** = जरायुज

(2) **शुतुरमुर्ग** तथा **कोर्वस** = पश्च पादों पर स्केल्स

(3) **किलोन** तथा **नियोफ्रॉन** = त्वचीय केंचुल

(4) **सेलेमेन्डर** तथा **राना** = आंतरिक निषेचन

SOLUTION

Physics

1. Answer: A

Sol:

$n_e n_h = (n_i)^2$

n_e is concentration of electron,

n_h is concentration of holes and n_i is the concentration of electron pairs in the intrinsic semi-conductor.

Here;

$n_h = 10^{21},\ n_e = ?,\ n_i = 10^{19}$

$10^{21} \times n_e = 10^{19} \times 10^{19}$

$n_e = \frac{10^{38}}{10^{21}} = 10^{17}\ m^{-3}$

2. Answer: C

Sol:

Displacement = Area of graph with sign

Displacement =

$\left(\frac{1}{2} \times 10 \times 5\right) + (10 \times 5) + \left(\frac{1}{2} \times 5 \times 30\right) + \left(\frac{1}{2} \times 5 \times 20\right) - \frac{1}{2}(5)(20)$

$= 25 + 50 + 75 + 50 - 50$

$= 150\ m$

Distance $\rightarrow$ Area of graph with positive value

Distance = 25 + 50 + 75 + 50 + 50 = 250

$\frac{\text{Distance}}{\text{Displacement}} = \frac{250}{150} = \frac{5}{3}$

3. Answer: A

Sol:

Here from the graph we see that both x,y are at same temperature but they are varying w.r.t time, so

$\left(\frac{dT}{dt}\right)_x > \left(\frac{dT}{dt}\right)_y$

Now from the Kirchoff's law, we know that emissivity is equal to absorptivity, so the body which emits more will also absorb more.

Therefore, $e_x > e_y$ and $A_x > A_y$

4. **Answer:** B

Sol:

$\lambda = \frac{2\pi}{2\pi} = 1\text{m}$

$\frac{\lambda}{2} = \frac{1}{2}\text{m}$

5. **Answer:** C

Sol:

The Magnetic force is given by

$F = Bil$

$where\ l = displacement\ length$

$l = length\ AB$

$here\ l = \sqrt{L^2 + (2r)^2}$

$l = \sqrt{L^2 + 4r^2}$

then, force is equal to

$F = Bi\sqrt{L^2 + 4r^2}$

6. **Answer:** C

Sol:

From the formula of Bulk modulus

$\beta = \frac{-\Delta P}{\left(\frac{\Delta V}{V}\right)}$

$\therefore \frac{\Delta V}{V} = -\frac{\Delta P}{\beta} = -\frac{(0-1\times10^5)}{1.25\times10^{11}} = 8\times10^{-7}$

7. **Answer:** A

Sol:

By Kepler's third law, $T^2 \propto R^3$

$\therefore \frac{T_1^2}{T_2^2} = \frac{T_1^3}{T_2^3}$ or $\left(\frac{T_2}{T_1}\right)^2 = \left(\frac{R_2}{R_1}\right)^3$

$\Rightarrow T_2^2 = T_1^2\left(\frac{3.5R}{7\,R}\right)^3$

$(\therefore R_2 = R + 2.4\,R \text{ and } R_1 = R + 6\,R)$

or $T_2^2 = \frac{T_1^2}{8} \Rightarrow T_2 = \frac{T_1}{2\sqrt{2}}$

$\Rightarrow T_2 = \frac{24}{2\sqrt{2}}$

$\therefore T_2 = 6\sqrt{2}\text{h}$

8. **Answer:** D

Sol:

According to given pattern of wave, the wavelength can be gives as:

$\frac{3\lambda}{2} = 6$

$\lambda = \frac{12}{3} = 4m.$

So, option (4) is correct.

9. **Answer:** D

Sol:

Given,

$K_{Ag} \Rightarrow 11K_{fe}$

$\frac{dQ}{dt} = \frac{\Delta T}{\left(\frac{L}{K_{eq}A}\right)}$

Let the temp. at the intersection be T

$H \Rightarrow \frac{100-T}{\frac{L}{K_{fe}A}} = \frac{T-0}{\frac{L}{K_{Ag}.A}}$

K_{fe} (100 – T) = K_{Ag}(T – 0)
K_{fe} (100 – T) = 11K_{fe}(T – 0)
100 – T = 11 T

$T \Rightarrow \frac{100}{12} \Rightarrow 8.3\ ^{\circ}C$

10. **Answer:** C

Sol:

Velocity of train A

$v_A = 90\frac{km}{hr} = 90 \times \frac{5}{18} = 25\ m/s$

Velocity of train B

$v_B = 54\frac{km}{hr} = 54 \times \frac{5}{18} = 15\ m/s$

Velocity of train B w.r.t. train A

$= \left|\vec{v}_B\right| - \left|\vec{v}_A\right|$

$= 15 - (-25)\ m/s = 40\ m/s$

$\text{Time of crossing} = \frac{\text{length of train}}{\text{relative velocity}}$

$(8) = \frac{\ell}{40}$

$\ell = 8 \times 40 = 320\ \text{meter}$

11. Answer: B

Sol:

The rise of a liquid in a capillary is given as,

$$h = \frac{2T\cos\theta}{\left(\frac{D}{2}\right)\rho g}$$

Since, we know that height of capillary rise is inversely proportional to radii of tube, i.e.,

$$\text{height} \propto \frac{1}{\text{radius}}$$

$$\Rightarrow \frac{h_1}{h_2} = \frac{D_2}{D_1} = \frac{22}{66}$$

$$\Rightarrow D_1 : D_2 = 3 : 1$$

12. Answer: D

Sol:

$$2V_0 = \sqrt{v_0^2 + v_x^2}$$

$$4V_0^2 = v_0^2 + v_x^2$$

$$V_x^2 = 3V_0^2$$

$$\therefore \sqrt{3}v_0 = \frac{qE_0 t}{m}$$

$$t = \frac{\sqrt{3}mv_0}{qE_0}$$

13. Answer: B

Sol:

$$\text{At depth, } g' = g\left(1 - \frac{h}{R}\right) \text{or } g\left(1 - \frac{d}{R}\right)$$

$$\Rightarrow \frac{g}{n} = g\left(1 - \frac{d}{R}\right)$$

$$\text{or } d = R\left(\frac{n-1}{n}\right)$$

14. Answer: C

Sol:

$$I_{net} = I_1 + I_2 + 2\sqrt{I_1 I_2}\cos\phi \quad \text{----(1)}$$

$$\text{Here, } I_1 = I_2 = I_o \text{ and} \cos 60^o = \frac{1}{2}$$

in equation (1), resultant intensity

$$I_{net} = I_o + I_o + \left(2I_o \times \frac{1}{2}\right) = 3I_o$$

$$\Rightarrow I_{net} = 3I_o$$

15. Answer: C

Sol:

$\vec{r} = 10t\hat{i} + 15t^2\hat{j} + 7\hat{k}$

$\vec{v} = \frac{d\vec{r}}{dt} = 10\hat{i} + 30\hat{t}\hat{j}$

$\vec{a} = \frac{d\vec{v}}{dt} = 30\hat{j}$

$\vec{F} = \left(m\right)\vec{a} = \left(m\right)\left(30\hat{j}\right) = \text{along positive } y - \text{axis}$

16. Answer: B

Sol:

Kinetic energy of N moluecule of gas $E = \frac{3}{2}NkT$

Initially $E_1 = \frac{3}{2}N_1\,kT_1$ and finally $E_2 = \frac{3}{2}N_2\,kT_2$

But according to proble $E_1 = E_2$ and $N_2 = 2N_1$

$\therefore \frac{3}{2}N_1\,kT_{11} = \frac{3}{2}\left(2N\right)kT_2 \Rightarrow T_2 = \frac{T_1}{2}$

Since the kinetic energy constant $\frac{3}{2}N_1kT_1 = \frac{3}{2}N_2kT_2$

$N_1T_1 = N_2T_2 \therefore NT = \text{constant}$

From ideal gas equation of N molecule PV = NkT

$P_1V_1 = P_2V_2 \therefore P_1 = P_2$

[As $V_1 = V_2$ and NT = constant]

17. Answer: B

Sol:

$e = \left|\frac{d\phi}{dt}\right| = \left|\frac{-Ldi}{dt}\right|$

$e = \left|\frac{-L\Delta I}{\Delta t}\right| \Rightarrow L = \left|\frac{e\Delta t}{\Delta I}\right| = \frac{5\times10^{-3}}{1}$ = 5 mH

18. Answer: B

Sol:

There is silence at point D, o it is a point of destructive interference.

For Minima,

$\Delta y = \left(n - \frac{1}{2}\right)\lambda$

$2\ell - \ell = \frac{1}{2}\lambda$

$\lambda = 2\ell$

19. Answer: C

Sol:

We have, me = qE

$q = \frac{mg}{E} = \frac{mg}{V/d}$

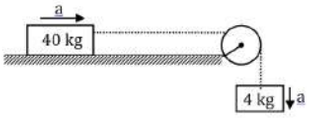
$= \frac{1.96\times10^{-15}\times10}{(400/0.02)}$

$= \frac{1.96\times10^{-14}}{20\times10^{4}} = 0.98 \times 10^{-18}$

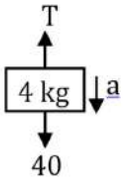
$= 9.8\times10^{-19} \approx 6e$

20. Answer: D

Sol:

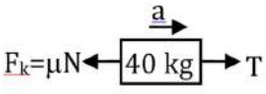


Let the acceleration of both blocks is a.



For 4 kg block applying second law :

$40 - T = 4a$



$F_k = 0.02 \times 40 \times 10 = 8N$

For 40 kg block applying Newton's second law

$T - 8 = 40\,a$

Solving above equations

$a = \frac{8}{11} ms^{-2}$

21. Answer: A

Sol:

$D\omega = -DU$

$D\omega = -DU = -2J$

22. Answer: C

Sol:

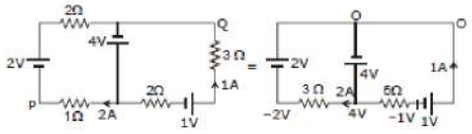
$Z = \sqrt{R^2 + (2\pi vL)^2}$

$=\sqrt{(40)^2+4\pi^2\times(50)^2\times(95.5\times10^{-3})^2}$

$\simeq 50$ ohm

23. Answer: B

Sol:



Now, $V_p = +2 - 4 + V_Q$

$V_P - V_Q = 2\ V$

24. Answer: B

Sol:

The velocity of sound can be mathematically expressed as

$$v = \sqrt{\frac{\gamma P}{d}}$$

where is γ specific heat ratio, P is the pressure of gas and d is the density of the medium.

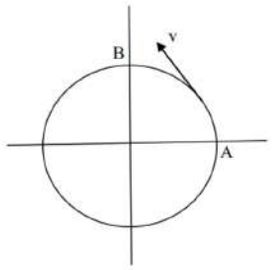
According to this, the velocity of sound in a medium is inversely proportional to the square of the density of that medium,

$$v \propto \frac{1}{\sqrt{d}}$$

So, the velocity will be lower for denser medium and higher for rarer medium.

25. Answer: B

Sol:



$\overrightarrow{v_A} = v\hat{j}$

$\overrightarrow{v_B} = -v\hat{i}$

Time to reach from A to B $= \frac{2\pi R}{4} \times \frac{1}{v} = \frac{\pi R}{2v}$

Displacement from A to B $= R\sqrt{2}$

Now, Average velocity from A to B

$= \frac{\text{Displacement}}{\text{Time}} = \frac{R\sqrt{2}}{\frac{\pi R}{2v}} = \frac{2\sqrt{2}v}{\pi}$

Instantaneous velocity at B is $-v\hat{i}$

According to question,

$\frac{\text{instantaneous velocity}}{\text{average velocity}} = \frac{\pi}{x\sqrt{2}}$

$\frac{v}{\frac{2\sqrt{2}v}{\pi}} = \frac{\pi}{x\sqrt{2}}$

$\frac{\pi}{2\sqrt{2}} = \frac{\pi}{x\sqrt{2}}$

$\Rightarrow x = 2$

26. Answer: B

Sol:

$P = \frac{T_2}{T_1 - T_2}$

$5 = \frac{265}{T_1 - 265}$

$T_1 - 265 = 53$

$T_1 = 318\ K$

$T_1 = 45^\circ C$

27. Answer: D

Sol:

The Einstein's equation for photoelectric effect is given by,

$\mathrm{KE_{max}} = \mathrm{hf} - \mathrm{hf_0}$

where, $KE_{max} = maximum\ kinetic\ energy\ of\ photo\ electron,$

$f = frequency\ of\ incident\ light$

$and\ f_0 = threshold\ frequency.$

Since maximum kinetic energy of photo electrons is greater than zero so

$hf - hf_0 > 0$

28. Answer: C

Sol:

The electrical potential producd by the nucleus at the position of the electron,

$\mathrm{V} = 9 \times 10^9 \times \frac{\mathrm{q}}{\mathrm{r}}$

$= 9 \times 10^9 \times \frac{(+1.6 \times 10^{-19})}{0.53 \times 10^{-10}} = 27.2\mathrm{V}$

29. Answer: B

Sol:

For prism use have,

$\mathrm{Li} + \mathrm{Le} = \mathrm{LA} + \mathrm{LD} \quad \ldots(\mathrm{i})$

if $\mathrm{i} = 15^\circ$, then $\mathrm{e} = 60^\circ$

and $\mathrm{D} = 30^\circ$

From eq.(i),

$15^\circ + 60^\circ = \mathrm{A} + 30^\circ$

$\Rightarrow \mathrm{A} = 45^\circ$

30. Answer: C

Sol:

$\omega^2 \mathrm{x} = \mathrm{V}_\circ = \omega\sqrt{\mathrm{A}^2 - \mathrm{x}^2}$

$\mathrm{A}^2 - \mathrm{x}^2 = \mathrm{x}^2\omega^2$

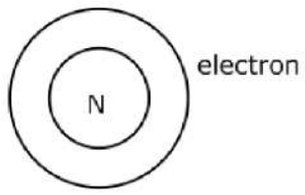
$(3)^2 - (2)^2 = \left(\frac{2\pi}{\mathrm{T}}\right)^2 \times 4$

$\mathrm{T}^2 = \frac{16\pi^2}{5}$

$\mathrm{T} = \frac{4\pi}{\sqrt{5}}$

31. Answer: B

Sol:



Energy to remote electron is very low because electron is bounded to nucleus at outside.

So $E_e < E_n$

32. Answer: D

Sol:

Potential difference across C si 10 V.

$\therefore q = CV = 6 \times 10 = 60\ \mu C$

33. Answer: B

Sol:

$$I = 2\left[5(0.2)^2 + 2(0.4)^4\right.$$

34. Answer: A

Sol:

We have,

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$$

Here u = −25 cm , R = 20 cm, $\mu_1 = 1.0$ and $\mu_2 = 1.5$

Putting the values in (i),

$$\frac{1.5}{v} + \frac{1.0}{25\ \text{cm}} = \frac{1.5-1.0}{20\ \text{cm}}$$

or, $\frac{1.5}{v} = \frac{1}{40\ \text{cm}} - \frac{1}{25\ \text{cm}}$

or, $v = -100\,\text{cm}.$

As v is negative, the image is formed to the left of the separating surface at a distance of 100 cm from it.

35. Answer: B

Sol:

We have

$\vec{B} = \left(\frac{\sqrt{3}}{2}\hat{i} + \frac{1}{2}\hat{j}\right)30\sin\left[\omega\left(t - \frac{z}{c}\right)\right]$

$\vec{E} = \vec{B} \times \vec{c}$ *and* $E = B_0 c$

here, $\vec{E}\left(\frac{\sqrt{3}}{2}\left(-\hat{j}\right) + \frac{1}{2}\hat{i}\right)$

and $E_0 = 30c$

$\vec{E} = \left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right)30\,c\sin\left[\omega\left(t - \frac{z}{c}\right)\right]$

36. Answer: D

Sol:

Zero (No potential difference across voltmeter).

37. Answer: C

Sol:

KE of rotation = $\frac{1}{2}I\omega^2 = \frac{1}{2} \times \left(\frac{2}{5}mr^2\right)\omega^2$

= $\frac{1}{2} \times \frac{2}{5} \times 1 \times \left(\frac{3\times3}{100\times100}\right)(50 \times 50)$

$\frac{9}{20}$ Joule

38. Answer: B

Sol:

$a\sin\theta = n\lambda$ where n=1

$\theta = \sin^{-1}\left(\frac{\lambda}{a}\right)$ ..... (1)

According to question

$\lambda = 2 \times 10^{-3}$ m

a = 4×10^{-3} m ..... (2)

From equation (1) and (2)

$\theta = \sin^{-1}(1/2) \Rightarrow \theta = 30°$.

39. Answer: D

Sol:

Wheatstone bridge is balancd.

$\frac{P}{Q} = \frac{R}{S}$

$\Rightarrow \frac{40}{10} = \frac{60}{15} = \frac{4}{1}$

$\Rightarrow V_{AB} = V_{AD}$

So,

$40I_1 = 60I_2$

$\Rightarrow I_1 = 1.5\, I_2$

Heat produced in AB = $I_1^2 Rt$

$= (1.5I_2)^2 \times 40 \times t = 90I_2^2 t$

Heat produced in BC, = $I_1^2 Rt$

$= (1.5I_2)^2 \times 10 \times t = 22.5I_2^2 t$

Heat produced in AD = $I_2^2 Rt$

$= I_2^2 \times 60 \times t = 60I_2^2 t$

Heat produced in DC = $I_2^2 Rt$

$= I_2^2 \times 15 \times t = 15I_2^2 t$

40. Answer: C

Sol:

$3 \times 16 = 6 \times v_2$

$v_2 = 8$ m/s

KE = $\frac{1}{2} \times 6 \times (8)^2$

41. Answer: D

Sol:

Fringe width : $\beta = \frac{D\lambda}{d}$

According to question, $\frac{\beta_2}{\beta_1} = \frac{\lambda_2}{\lambda_1}\frac{D_2}{D_1}\frac{d_1}{d_2}$

Here, $D_2 = 2D_1$ & $d_2 = \frac{d_1}{2}$

$\frac{\beta_2}{\beta_1} = \frac{\lambda_2}{\lambda_1}\frac{(2D_1)}{D_1}\frac{d_1}{\left(d_1/2\right)} = 4\frac{\lambda_2}{\lambda_1}$

$\frac{\beta_2}{\beta_1} = 4\frac{\lambda_2}{\lambda_1} = \frac{4\times4\times10^{-7}}{6.4\times10^{-7}} = 2.5$

$\beta_2 = 2.5\beta_1 = 2.5 \times 10^{-4}$

42. Answer: A

Sol:

T.E. = K.E. + P.E.

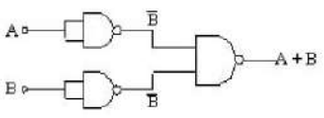
$= \frac{1}{2} \times mv^2 + mgh$

$= \frac{1}{2} \times 10 \times (10)^2 + 10 \times 10 \times 20$

= 2500 J

43. Answer: B

Sol:



44. Answer: B

Sol:

Stress is on x-axis

$\because$ slope of B is more

$\therefore$ B is more elastic

45. Answer: C

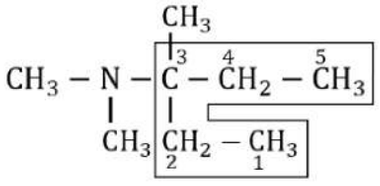
Sol:

$[v] = [M^0 L^1 T^{-1}]$; $[a] = [M^0 L^1 T^{-2}]$

$[F] = [M^1 L^1 T^{-2}]$; $[W] = [M^1 L^2 T^{-2}]$

46. Answer: C

Sol:



3, N, N–trimethylpentan-3-amine

47. Answer: C

Sol:

Given V_1 = 8cm^3

V_2 = 80 cm^3

n = 5

T = 27 + 273 = 300K

$$\boxed{\Delta S_T = 2.303\ nR\log\frac{V_2}{V_1}}$$

on substituting the above value,

we get,

$$\Delta S_T = 2.303 \times 5 \times 8.314 \times \log\frac{80}{8}$$

$$\Delta S_T = 2.303 \times 5 \times 8.314$$

$$\Delta S_T = 19.14 \times 5$$

$$\boxed{\Delta S_T = 95.74\ JK^{-1}}$$

48. Answer: D

Sol:

Element	% of element	Atomic mass	Atomic ratio	Simplest ratio
C	80	12	$\frac{80}{12} = 6.67$	$\frac{6.67}{6.67} = 1$
H	20	1	$\frac{20}{1} = 20$	$\frac{20}{6.67} = 3$

Empirical formula = CH_3

49. Answer: B

Sol:

$$P_S = \frac{1}{3} \times 100 + 50 \times \frac{2}{3} = \frac{200}{3}$$

$$X_B = \frac{100/3}{200/3} = \frac{1}{2}$$

50. Answer: C

Sol:

a) $NaCl \rightarrow Na^{+}(10e^{-}) + Cl^{-}(18e^{-})$

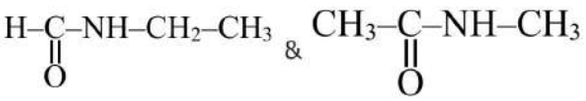
b) $BeCl_2 \rightarrow Be^{2+}(2e^{-}) + 2\,Cl^{-}(18e^{-})$

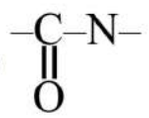
c) $MgF_2 \rightarrow Mg^{2+}(10e^{-}) + 2F^{-}(10e^{-})$

d) $CaS \rightarrow Ca^{2+}(18e^{-}) + S^{2-}(18e^{-})$

51. Answer: B

Sol:



Have different alkyl grouping around polyvalent finctional group 

Metamers

52. Answer: A

Sol:

Part 1: Enthalpy
Enthalpy is a thermodynamics quantity that measure heat changes at constant pressure. It is useful to define a new state function and it is refer as (H).

Part 2: Calculation of bond enthalpy
The reaction is proceed in the following ways-

$P(s) + \frac{3}{2}Cl_2(g) \rightarrow PCl_3(g)$

The above given reaction results in the formula -

$\Delta_f H(PCl_3, g) = \Delta H_{atomization}(P, s) + 3 \times \Delta_f H(Cl, g) - (B.E(P-Cl) \times 3)$

Substituting the value in above formula-

$306\ kJ/mol = 314\ kJ/mol + 3 \times 121\ kJ/mol - (B.E(P-Cl) \times 3)$

$B.E(P-Cl) = 123.66\ kJ/mol$

53. Answer: B

Sol:

Third excites state n=4

$n-\ell-1=2$

$4-\ell-1=2$

$\ell=1$

$= \sqrt{\ell(\ell+1)}\hbar$

$= \sqrt{1(1+1)}\,\hbar = \sqrt{2}\,\hbar$

54. Answer: A

Sol:

OSMOTIC PRESSURE

$\pi = iCRT$

$[\pi \propto i]$

For NaCl, i = 2 max.

for urea, glucose and sucrose, i = 1

NaCl gives maximum ion hence it will show highest osmotic pressure.

55. Answer: D

Sol:

I_2 is solid and sublimes at ordinary temperature because of weak vanderwaal's force between I_2 molecules.

56. Answer: C

Sol:

According to Bronsted-Lowry theory, acid is a substance which donates an H^+ ion or a proton and forms its conjugate base and the base is a substance which accepts an H^+ ion or a proton and forms its conjugate acid.

$CO_3^{2-} + H^+ \rightarrow HCO_3^-$

57. Answer: A

Sol:

$$\log\left[\frac{k_2}{k_1}\right] = \frac{E_a}{2.303R}\left[\frac{T_2 - T_1}{T_1 T_2}\right]$$

$k_2/k_1 = 2; T_2 = 308, T_1 = 298K$

$$\therefore \log 2 = \frac{E_a}{2.303 \times 8.314} \times \frac{10}{308 \times 298}$$

$$E_a = 52.903 \times 10^3 J$$

or $E_a = 52.903\ kJ$

58. Answer: C

Sol:

$Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$

Here we can see that, aluminium metal displaces chromium metal and therefore this is metal displacement reaction.

59. Answer: B

Sol:

Geometrical isomers are the compounds having same molecular formula but different arrangements of atoms in space. There are two necessary conditions for a compound to possess geometrical isomerism.

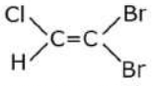
(i) It must have restricted rotation of bond. It can be due to double bond or ring.

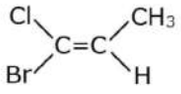
(ii) There must be two unlike atoms or groups linked to each double bonded C-atom.

e.g. XYC = CXY and YXC = CXZ

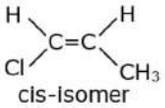
Alkenes containing identical groups are atoms on doubly bonded C-atom do not show geometrical isomerism.

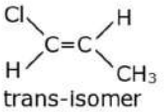
eg. AAC = CAA, AAC = BB, AAC = AB etc.

(i) Compound  contain identical Br atoms on one doubly bonded carbon, hence does not show geometrical isomerism.

(ii) Compound  contains all different groups/atoms on doubly bonded C-atoms, hence it cannot show geometrical isomerism.

Compound (iii) and (iv) follow all the conditions of geometrical isomerism and are geometrical isomers of each other.

(iii) 
cis-isomer

(iv) 
trans-isomer

60. Answer: D

Sol:

MnS is pink and the rest of them are black.

61. Answer: A

Sol:

Initial Rate = k [A] $[B]^2$

$Rate_1$ = k [0.60] $[0.80]^2$ .....(i)

$Rate_2$ = k $[A_t]$ $[B_t]|^2$ .....(ii)

Given reaction,

$A_{(g)}$ + $2B_{(g)} \longrightarrow C_{(g)}$ + $D_{(g)}$

0.60atm 0.80atm 0 0 t = 0

(0.6 – 0.2) (0.8–0.4) 0.2 0.2atm

0.40atm 0.40 atm 0.2atm 0.2 atm t = t

Put value of pressure of t = t in rate equation (II)

$Rate_2$ = k [.40] $[.40]^2$

$$\frac{\text{Rate}_2}{\text{Rate}_1} = \frac{k\left[0.4\right][0.4]^2}{k\left[0.6\right][0.8]^2}$$

$$\frac{\text{Rate}_2}{\text{Rate}_1} = \frac{2\times1}{3\times4} = \frac{1}{6}$$

62. Answer: C

Sol:

For WAWB type of salt

$$\text{pH} = \frac{1}{2}[\text{pK}_w + \text{pK}_a - \text{pK}_b]$$

pK_w of water at 25° C is 14.

pK_a of acetic acid

$$\text{pK}_a = -\log \text{K}_a$$

pK_a = - log 1.8×10^{-5} = - (log 1.8 + log 10^{-5})

= - (0.255 - 5) = 4.745

pK_b of ammonium hydroxide

$$\text{pK}_b = -\log \text{K}_b$$

pK_b = - log 1.8×10^{-5} = - (log 1.8 + log 10^{-5})

= - (0.255 - 5) = 4.745

As we know

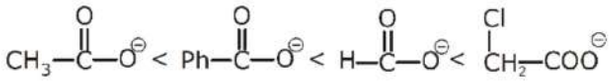
$$\text{pH} = \frac{1}{2}[\text{pK}_w + \text{pK}_a - \text{pK}_b]$$

$$= \frac{1}{2}[14 + 4.745 - 4.745] = 7$$

So pH = 7 (Neutral solution)

63. Answer: D

Sol:



64. Answer: C

Sol:

(1) Nitrogen can not form pentahalide due to the absence of vacant d- d-orbitals in outermost orbitals

(2) EN=N>P

65. Answer: A

Sol:

Conjugate acid of (II) is stabilized by charge delocalization.

66. Answer: D

Sol:

Acidic buffer solution: Acidic buffer are solution of a mixture of weak acid and salt of its conjugate base of that acid with a strong base.

a) $\mathrm{HCN} + \mathrm{NaCN}$

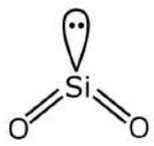
Basic bufer solution: Basic buffer are solution of a mixture of weak base and salt of its conjugate acid of that base with a strong acid.

c) $\mathrm{NH_4\,OH} + (\mathrm{NH_4})_2\,\mathrm{SO_4}$

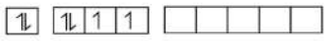
d) $\mathrm{HCOOH} + \mathrm{NaOH}$ is not a buffer solution.
Since formic acid is not present in excess amount.

67. Answer: C

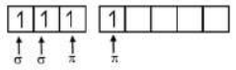
Sol:



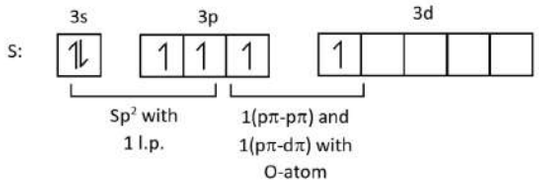
S = [Ne] $3s^2$ $3p^4$ $3d^0$



S* = $3s^2$ $3p^3$ $3d^1$

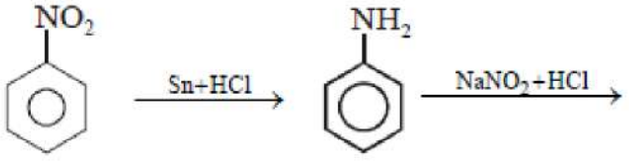


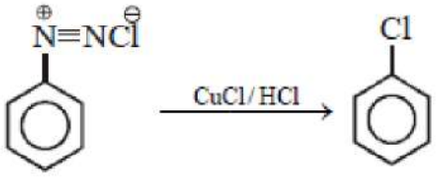
O = [He] $2s^2$ $2p^4$



68. Answer: C

Sol:





69. Answer: B

Sol:

$$E = E^o - \frac{0.0591}{2}\log\frac{1}{\left[Zn^{+2}\right]}$$

$$E = E^o + \frac{0.0591}{2}\log\left[Zn^{+2}\right]$$

$$E = E^o + \frac{0.0591}{2} \times (-2)$$

$E=E^o-0.0591$

70. Answer: A

Sol:

Both Assertion and Reason are correct and Reason is correct for the Assertion.

71. Answer: B

Sol:

In the given reaction

$2AgCl(s) + H_2(g)\ (1\ bar) \rightarrow 2HCl\ (aq) + 2Ag$

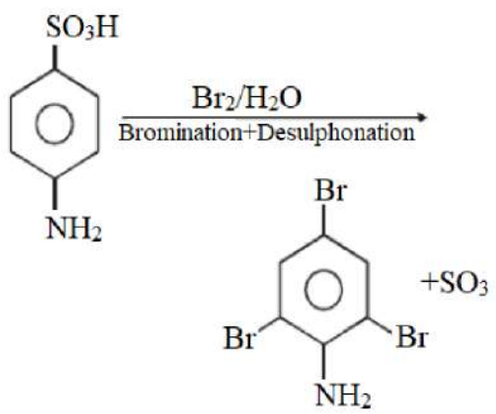
Silver is undergoing reductino $Ag^+ \rightarrow Ag$

Hence it will act as cathode in following cell.

$Pt(s) \mid H_2(g), 1bar \mid 1m\ HCl\ (aq) \mid 1mAg^+(aq) \mid Ag(s).$

72. Answer: A

Sol:



73. Answer: C

Sol:

Anhydrous aluminium chloride is hydrolysed partly with the moisture in the atmosphere to give HCl gas. This HCl combines with the moisture in the air and appears white in colour.

Hydrolysis of $AlCl_3$ gives HCl which fumes in the air.

$$AlCl_3 + 3H_2O \rightarrow Al(OH)_3 + 3\,HCl$$

74. Answer: D

Sol:

Given that -

$\Lambda_m^\circ(H_2SO_4) = x\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ(K_2SO_4) = y\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ\left(CH_3COOK\right) = z\ S\ cm^2\ mol^{-1}$

$\Lambda_m^\circ\ (H_2SO_4) =$

$2\ \Lambda_m^\circ\ (H^+) + \Lambda_m^\circ\left(SO_4^{2-}\right) \ldots . (1)$

$\Lambda_m^\circ\ (K_2SO_4) = 2\ \Lambda_m^\circ\ (K^+)$

$+ \Lambda_m^\circ\left(SO_4^{2-}\right) \ldots (2)$

$\Lambda_m^\circ\ (CH_3COOK) = \Lambda_m^\circ\ (CH_3COO^-) + \Lambda_m^\circ\ (K^+) \ldots . (3)$

$\Lambda_m^\circ\ (CH_3COOH) = \Lambda_m^\circ\ (CH_3COO^-) + \Lambda_m^\circ\ (H^+) \ldots . (4)$

$2 \times \text{Equation}\ (4) = \text{Equation}(3) \times 2 + \text{Equation}(1) - \text{Equation}(2)$

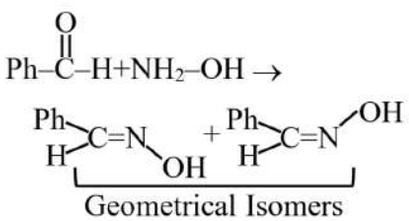
$2\Lambda_m^\circ\ (CH_3COOH) = 2z + x - y$

$\Lambda_m^\circ\ (CH_3COOH) = \frac{2z+x-y}{2}$

$\Lambda_m^\circ\ (CH_3COOH) = z + \frac{x-y}{z}$

75. Answer: B

Sol:



76. Answer: A

Sol:

Bond order of N_2 = 3

Bond order of N_2^+ = 2.5

Bond order of N_2^- = 2.5

Therefore, the correct answer is (A)

77. Answer: C

Sol:

Mole at equilibrium

$$K_C = \frac{x^2}{(a-x)V}$$

Addition of inert gas at constant V has no effect on reactions having $\Delta n=0$ or $\Delta n \neq 0$. But addition of inert gas at constant P has effect on reactions having $\Delta n \neq 0$; and no effect if $\Delta n=0$. The given reaction has $\Delta n \neq 0$ and thus choice (c) is correct. Also, the effect may be shown as : on addition of inert gas at constant P, volume increases. To have K_C constant, x must increase.

78. Answer: C

Sol:

Methyl Cyanide on reacting with a Grignard's reagent produces a ketone

$$\underset{\text{methyl cyanide}}{CH_3-C\equiv N} \xrightarrow{+CH_3MgI} CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=NMgI$$

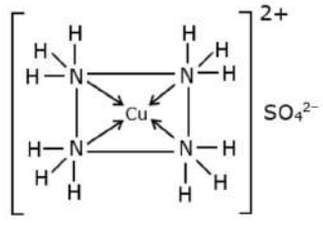
$$\xrightarrow[-MgINH_2]{+H_2O} CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=O$$

acetone

79. Answer: D

Sol:

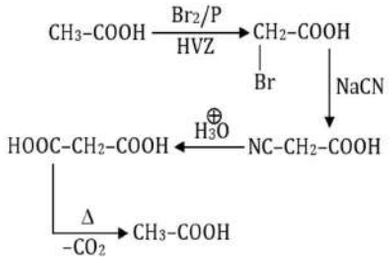
Structure of $[Cu(NH_3)_4]SO_4$ is as follows:



Thus, we can see, this molecule contains covalent bond between N and H atoms, coordinate bond between N and Cu atom and electrovalent bond between SO_4^{2-} and $[Cu(NH_3)_4]^{2+}$ ion. Thus,

80. Answer: A

Sol:



81. Answer: D

Sol:

Square planer complex do not show optical isomerism due to presence of plane of symmetry.

82. Answer: C

Sol:

Valine is one of the 20- essential amino acid for metabolism.

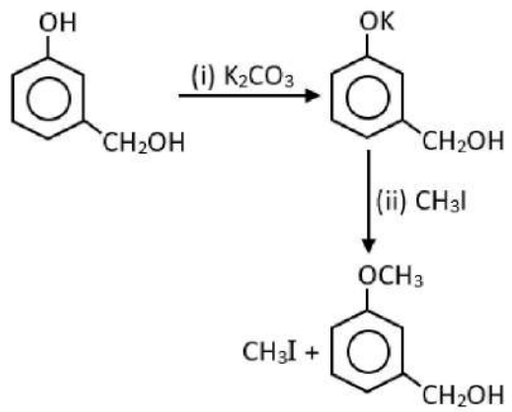
83. Answer: A

Sol:

Tetrahedral complex rarely formed low spin complex because Δ_t is not large enough to facilitete back pairing

84. Answer: B

Sol:



85. Answer: B

Sol:

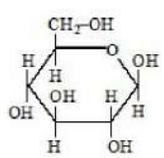
The Mond process, sometimes known as the carbonyl process, This process converts nickel oxides into nickel metal with very high purity being attainable in just a single process.

$$\underset{\text{Impure Nickel}}{\text{Ni}} + 4\,\text{CO} \xrightarrow{330\text{–}350\text{K}} \text{Ni}\,(\text{CO})_4 \xrightarrow{450\text{–}470} \underset{\text{pure}}{\text{Ni}} + 4\,\text{CO}$$

86. Answer: B

Sol:

In aqueous solution, more than 99% of glucose molecules, exist in cyclic isomeric form. This conversion to a ring form arises from the open-chain form by a nucleophilic addition reaction between the aldehyde group at C-1 and the hydroxyl group at C-4 or C-5, yielding a hemiacetal group -C(OH)-O-, at C-1. The reaction between C-1 and C-5 creates a molecule with a six-membered ring, called pyranose. The position of the hydroxyl on the C-1 determines the alpha or the beta form of the pyranose. In general, β-D-glucopyranose may also be called as β-D-glucose.



87. Answer: C

Sol:

Other than La^{3+} and Lu^{3+} all other lanthanides are paramagnetic in +3 state.

88. Answer: B

Sol:

Prussian blue is a dark blue complex. Synthetic pigment by oxidation, of ferrous ferrocyanide salts. It contains ferric hexacynoferrate (II) in a cubic lattice crystal structure.

$$2Fe_2(SO_4)_3 + 3K_4\left[Fe(CN)_6\right]$$

$$\rightarrow Fe_4\left[Fe(CN)_6\right]_3 + 6K_2SO_4$$

89. Answer: C

Sol:

i) H can't precipitate the salt of Zn from its solution because H has less reducing property as compared to Zn.

ii) H can't precipitate the salt of Cu from its solution because H has less reducing property/power as compared to Cu.

iii) H can precipitate the salt of Ag from its solution because H has higher reducing property/power as compared to Ag.

iv) H can't precipitate the salt of Fe from its solution because H has less reducing property/power as compared to Fe.

90. Answer: D

Sol:

As Cu^{+2} ion test in excess of KCN means this form complex in presence of excess KCN .

This is due to the formation of the complex ion $\left[\mathrm{Cu}\left(\mathrm{CN}\right)_4\right]^{3-}$.

$$\mathrm{CuSO_4} + \mathrm{KCN} \rightarrow \mathrm{K_3}\left[\mathrm{Cu}\left(\mathrm{CN}\right)_4\right]^{3-}$$

91. Answer: C

Sol:

Skeletal system consists of a framework of bones and a few cartilages. In human beings, this system is made up of 206 bones and a few cartilages. It is grouped into two principal divisions – the axial and the **appendicular skeleton**.

Axial skeleton comprises 80 bones distributed along the main axis of the body. **The skull**, **vertebral column, sternum and ribs** constitute axial skeleton.

The bones of the **limbs alongwith their girdles** constitute the **appendicular skeleton**.

92. Answer: D

Sol:

Perianth is the collective name of the nonessential floral organs. Calyx and corolla are called as accessory whorls. In some plants they are not differentiated from one another, in such case they are termed as perianth. Hence, the perianth is the term used when calyx and corolla are similar.

93. Answer: D

Sol:

Ecology is the study of living organisms (plants, animals, microbes) and their interaction with the environment.

Physiological ecology ;Physiological ecology refers to the study of physiology of different organisms. This in turn helps to explore their mechanism of adaptation to the respective environment in terms of reproduction and survival.

94. Answer: A

Sol:

Accessory pigments like carotenoids and chlorophyll b enhance the efficiency of photosynthesis by absorbing a broader spectrum of light wavelengths, which allows plants to capture more energy from sunlight compared to relying solely on chlorophyll a.

If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

95. Answer: A

Sol:

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96. Answer: D

Sol:

Column-I	Column-II
(a) Making multiple copies of any template DNA	(iii) Cloning
(b) Technique to alter the chemistry of genetic material	(iv) Genetic engineering
(c) Technique of using live organisms or enzymes to produce products	(i) Biotechnology
(d) Separate bands of DNA are cut from agarose gel	(ii) Elution

97. Answer: B

Sol:

ALVEOLAR PRESSURE-

Inspiration is an active process whereas expiration is a passive process.

It is the pressure of the air which is moving inside your lungs or outside. This pressure is negative at the time of Inspiration as the air moves out from the mouth to the lungs where the alveoli are situated at a lower level.

And at the time of Expiration, this value of pressure is positive as air flows out from the region of alveoli in the lungs at lower pressure to the higher pressure outside. During expiration, muscles of the diaphragm relax.

Inspiration occurs via the active contraction of muscles – such as the diaphragm.

Hence, the correct option is "2" - Inspiration is an active process whereas expiration is a passive process.

98. Answer: A

Sol:

(A) Family - (5) Solanaceae

(B) Kingdom - (4) Plantae

(C) Order - (2) Polymoniales

(D) Species - (1) nigrum

99. Answer: C

Sol:

Nerves arising from brain are called cranial nerves. There are 12 - pairs of cranial nerves found in reptiles, birds and mammals but amphibians and fishes have only 10 - pairs of cranial nerves (Accessory spinal and hypoglossal nerves are absent).

So Fifth cranial nerve of frog is calledTrigeminal nerve.

The vagus nerve, is the tenth cranial nerve or CN X, and interfaces with the parasympathetic control of the heart, lungs, and digestive tract. The vagus nerves are normally referred to in the singular.

The ophthalmic nerve (CNV1) is a terminal branch of the trigeminal nerve (along with the maxillary and mandibular nerves). It provides sensory innervation to the skin, mucous membranes and sinuses of the upper face and scalp.

The optic nerve connects the eye to the brain. The optic nerve carries the impulses formed by the retina, the nerve layer that lines the back of the eye and senses light and creates impulses. These impulses are dispatched through the optic nerve to the brain, which interprets them as images.

100. Answer: B

Sol:

In solanaceae family, ovary is superior, oblique ovary. The gynoecium is located in an oblique position relative to the flowers median plane. Carpels are obliquely placed and ovules on swollen axile placenta.

In Cruciferae family, parietal placentation are occurs.

In Malvaceae family, axial placentation are occurs.

In Poaceae family, basal placentation are occurs.

Hence, the correct answer is **Solanaceae**.

101. Answer: D

Sol:

same ecological niche, Explanation: An ecological niche is the role and position a species has in its environment and how it meets its needs of food and shelter, how it surviveand reproduce. Two different species cannot share same ecological niche as theirrequirement is different from each other.

102. Answer: B

Sol:

Photosynthetically active radiation (PAR) is light of wavelengths **400-700 nm** and is the portion of the light spectrum utilised by plants for photosynthesis. Hence statement I is false.

Mineral ions required for photolysis of water are **manganese, calcium and chlorine**. Oxygen is released as the byproduct of photosynthesis in the photolysis process. Hence statement II is false.

In **Cyclic Photophosphorylation plant** cells **only** accomplish the **ADP to ATP** for immediate energy for the cells. This process usually takes place in the thylakoid membrane and uses Photosystem I and the chlorophyll P700.Hence statement III is true.

103. Answer: C

Sol:

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104. Answer: D

Sol:

Biotechnology is the branch of biology that comprises of living systems and organisms for developing new and useful products.

The definition given by the European Federation of Biotechnology is a comprehensive one and comprise of traditional and modern view.

The definition is as follows- Integration of natural science and organism cells, parts thereof and molecular analogies for products and services.

Hence, the correct answer is option "4" - The integration of natural science and organisms cells, parts thereof and molecular analogies for products and services.

105. Answer: B

Sol:

The amine group of haemoglobin is reacted by about 20–25% of CO_2 resulting in the formation of carboxyhaemoglobin. The deoxygenated blood, when it reaches the alveoli of the lungs, then there occurs the dissociation of the carbaminohaemoglobin and sodium bicarbonate due to low PCO_2 and high level of PO_2 in the alveoli.

The stimulation of this dissociation is done by oxyhaemoglobin. The CO_2, thus freed from the blood, goes into the atmosphere. Haldane effect is the effect of oxyhaemoglobin on the dissociation of these compounds. The oxyhaemoglobin acts like a strong acid in this reaction (i.e., it frees H^+ ion in the medium).

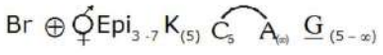
106. Answer: A

Sol:

In binomial nomenclature, the components "X" and "Y" are the **generic name** and the **specific epithet.** 'Z' indicates **Carolus Linnaeus** that introduced the binomial system of nomenclature in 1751.

107. Answer: C

Sol:



108. Answer: C

Sol:

Sensory nerves found in the epidermis mediate touch reception, pain, and thermal sensation. The skin is innervated by two types of nerve fibers, sensory and autonomic. Nerve fibers innervating the skin originate from dorsal root ganglia nerve cell bodies of sensory nerves .The sensory nerves elongate from the dorsal root ganglion and migrate toward the skin.Sensory nerves penetrate the basement membrane and innervate the epidermis by moving vertically, terminating at the granular layer of the epidermis.

109. Answer: B

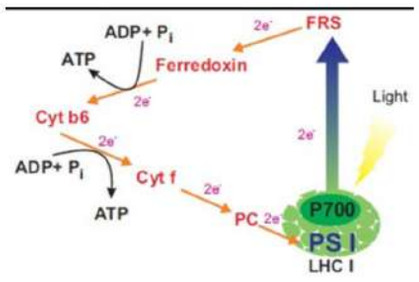
Sol:

E.P. Odum (1969) defined ecology as "the study of structure and function of nature" .

American biologist at the University of Georgia known for his pioneering work on ecosystem ecology

110. Answer: D

Sol:



Cyclic Photophosphorylation	Non-Cyclic Photophosphorylation
Only PS I is involved	PS I and PS II are both involved
Water is not required	Photolysis of water is required
Oxygen is not evolved	Oxygen is evolved
NADPH is not synthesized	NADPH is synthesized
Used to produce additional ATP in order to meet cell energy demands	Products can be used for the light independent reactions

In **cyclic photophosphorylation** only photosystem I is active. movement of the electrons in a ***cyclic*** manner for synthesizing ATP molecules.occur in both stroma and grana thylakoid.

111. Answer: A

Sol:

Parturition (giving birth after the full development of the fetus) is induced by the signals released through the developing fetus when the oxytocin hormone is released from the pituitary gland. This is known as fetal ejection reflex.

This causes contractions in the uterine walls that trigger the release of oxytocin hormone which further increases the contraction rate.

These contractions with the help of oxytocin hormone helps in the expulsion of the fetus out of the uterine cavity of the mother.

Hence, the correct answer is option "1" - II→I →IV→ V→ III

112. Answer: D

Sol:

Correct statements

Origin of replication' is a sequence from where replication starts by binding of polymerase enzyme.

DNA ligase acts on cut DNA molecules and joins their ends.

Plasmid is autonomously replicating circular extra-chromosomal DNA.

More than 900 restriction endonucleases have been discovered from over 230 strains of bacteria.

113. Answer: C

Sol:

The amount of blood pumped by heart per minute is called cardiac output or heart output.

114. Answer: B

Sol:

Mucor and Rhizopus are fungi that belong to the class Phycomycetes.

While other option are not :-

Ascomycetes → Includes **sac fungi** like *Penicillium* and *Saccharomyces*; they reproduce sexually with **ascospores** in an **ascus**.

Basidiomycetes → Includes **club fungi** like *Agaricus* (mushrooms) and *Puccinia* (rust fungi); reproduce by **basidiospores**.

Deuteromycetes → Also called **Fungi Imperfecti**, these fungi (e.g., *Alternaria*) reproduce only **asexually** by **conidia**.

115. Answer: C

Sol:

Here the hormone can be ADH . Because, here the target tissue is kidney cell and the ADH mainly acts on collecting ducts of the kidney and increases the water reabsorption in this part.

116. Answer: B

Sol:

A is **desert.**

B is **grassland.**

C stands for **tropical forest.**

D is a **temperate forest.**

E stands for **coniferous forest.**

F stands for **Arctic and Alpine Tundra.**

117. Answer: B

Sol:

The above given figure is norplant.

Norplant is placed subcutenous and having levonorgestral.

These having 6 match stick like cyclinder which is effective up to 5 years.

Norplant having 2 cyclinder are effective till 2 years.

118. Answer: D

Sol:

Dicot stem

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119. Answer: B

Sol:

In **anaerobic respiration**, sugar (typically glucose) undergoes incomplete breakdown due to the absence of oxygen. The products differ depending on the organism:

- **In yeast and some bacteria**: The process produces **alcohol and CO_2** (alcoholic fermentation).
  - Equation:
    $C_6H_{12}O_6 \rightarrow 2\,C_2H_5OH + 2\,CO_2$
- **In muscle cells during intense exercise**: **Lactic acid** is produced (lactic acid fermentation).

120. Answer: D

Sol:

B–galactosidase acts on it, Explanation: X-gal is an analog of lactose, and therefore may be hydrolyzed by the β-galactosidase enzyme which cleaves the β-glycosidic bond in D-lactose.
X-gal, when cleaved by β-galactosidase, yields galactose and 5-bromo-4-chloro-3-hydroxyindole. The latter then spontaneously dimerizes and is oxidized into 5,5'-dibromo-4,4'-dichloro-indigo, an intensely blue product which is insoluble. X-gal itself is colorless, so the presence of blue-colored product may therefore be used as a test for the presence of active β-galactosidase. This easy identification of an active enzyme allows the gene for β-galactosidase (the lacZ gene) to be used as a reporter gene in various applications.

121. Answer: B

Sol:

The total cardiac cycle is for 0.8 seconds

Atrial systole is for 0.1 sec.

Atrial diastole is 0.7 sec.

The closure of semilunar valve is at end of ventricular systole (0.3 sec).

Ventricular diastole is 0.5 sec.

AV valves close at the end of atrial systole and beginning of ventricular systole (0.1 second) now the time gap between these two events is 0.5 seconds.

122. Answer: B

Sol:

Euglenoids are single celled organism i.e. mostly autotrophic (is the organism which behaved like plants in the presence of light) but they can be heterotrophic (in the absence of organic food, it behaves like a heterotrophs). They share the characteristics of both plants and animals.

Archaebacteria live in some of the harshest habitats such as extreme salty areas, hot springs etc. Nostoc is true bacteria that help in atmospheric nitrogen. Paramecium has cilia on the surface of the body included in protozoa.

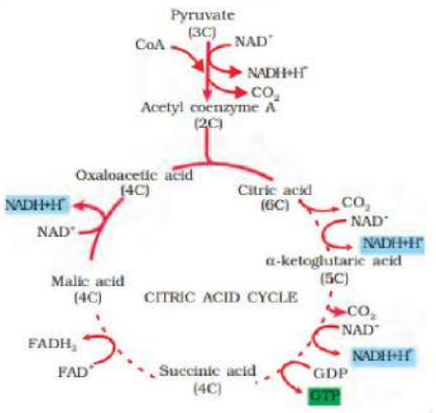
Hence the correct answer is **Euglena**.

123. Answer: B

Sol:

C – Generates ATP through substrate level phosphorylation

During the conversion of succinyl-CoA to succinic acid a molecule of GTP is synthesised. This is a substrate level phosphorylation. In a coupled reaction GTP is converted to GDP with the simultaneous synthesis of ATP from ADP. Also there are three points in the cycle where NAD^+ is reduced to NADH + H^+ and one point where FAD^+ is reduced to $FADH_2$.



124. Answer: A

Sol:

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125. Answer: B

Sol:

Vascular bundles of monocot stem are scattered in the ground tissue and V.B. are generally oval shape. Vascular bundles lie towards the center are large in size and less in number. Vascular bundles situated towards the periphery are small in size but more in number. Each vascular bundle is conjoint collateral and closed (cambium is absent between the xylem and phloem) and xylem is endarch (xylem is centrifugal).

126. Answer: D

Sol:

Tropical rainforests have a very dense plant cover and experience a large amount of precipitation, thus the forest floor is always damp.

Thus, the conditions there have led animals to get adapted to arboreal habitats. Most animals found there are tree dwellers as almost every space on the forest floor is occupied by vegetation.

Hence, the correct answer is option "4".

127. Answer: A

Sol:

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128. Answer: A

Sol:

Golden rice is a genetically modified crop which is highly nutritive and have high content of vitamin-A

129. Answer: D

Sol:

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Correct statements

4. Angiotensin II also activates the adrenal cortex to release Aldosterone. Aldosterone causes reabsorption of Na+ and water from the distal parts of the tubule. This also leads to an increase in blood pressure and GFR.

Incorrect statements

1. ADH facilitates water reabsorption from latter parts of the tubule, thereby preventing diuresis.

2. The JGA plays a complex regulatory role. A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood to angiotensin I and further to angiotensin II.

3. An increase in blood flow to the atria of the heart can cause the release of Atrial Natriuretic Factor (ANF) and It acts as a check on the renin angiotensin mechanism.

130. Answer: B

Sol:

Heterocysts, which are specialized cells found in the cyanobacterium Nostoc, are specifically adapted for nitrogen fixation. Nitrogen fixation is the process by which atmospheric nitrogen is converted into a form that can be used by living organisms, such as ammonia or nitrate.

Heterocysts are specialized cells within Nostoc that are involved in nitrogen fixation. They have thick cell walls and lack photosynthetic pigments like chlorophyll, making them different from the other cells in the filamentous cyanobacteria.

131. Answer: C

Sol:

LH and FSH are collectively called **gonadotropins. Luteinizing hormone (LH)** plays a key role in **gonadal** function. LH, in synergy with follicle-stimulating hormone (FSH), stimulates follicular growth and ovulation.

Growth hormone (GH), also called **somatotropin,** It stimulates the growth of essentially all tissues of the body, including bones.

Oxytocin is a hormone that acts on organs in the body (including the breast and uterus) and as a chemical messenger in the brain.

Prolactin, also called **luteotropic hormone (LTH) or luteotropin,** is a protein hormone produced by the pituitary gland of mammals that acts with other hormones to initiate the secretion of milk by the mammary glands.

132. Answer: D

Sol:

Bulliform cells(motor cells) are found in the epidermis.These cells work to reduce the rate of transpiration.Their main function is to store the water. It results in rolling of leaf to prevent the water loss due to transcription under stress. When water is abundant, water and bulge are absorbed and shrink when less water is present, curling the leaf which helps to reduce water loss due to evaporation. This is important because folding the leaf changes its exposure to light and the amount of water it retains.

133. Answer: B

Sol:

The Tropical Savanna biome is located in **South America and Australia.** It is also called **tropical grassland.** The rainfall is seasonal and very high. In this biome, **grass** is found along with a few **scattered trees.**

134. Answer: C

Sol:

Oxygen is required in cellular respiration in the electron transport chain. The presence of oxygen is vital since it drives the whole process by removing hydrogen from the system.

It serves as the final electron acceptor of the electron transport chain, facilitating the movement of electrons down the chain and hence producing ATP, or adenosine triphosphate.

Carbon dioxide is a waste byproduct of cellular respiration. This is removed from the body by respiration. All plants and animals respire by reducing carbohydrates in their cells to produce energy and give out carbon dioxide into the atmosphere.

135. Answer: A

Sol:

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136. Answer: D

Sol:

Insulin consists of two short polypeptide chains: chain A and chain B, that are linked together by disulphide bridges.

Insulin is in pro-hormone form(it contains extra stretch called c-peptide) and needs to be processed before it becomes fully functional hormone(C-peptide is not present).

The main challenge for production of insulin using rDNA techniques was getting insulin assembled into a mature form.

Hence according to the given situation it will **not be a functional insulin** and will not treat pateint sucessfully and in addition may cause allergic reactions.

Hence, the correct answer is option "4" - Only (iii).

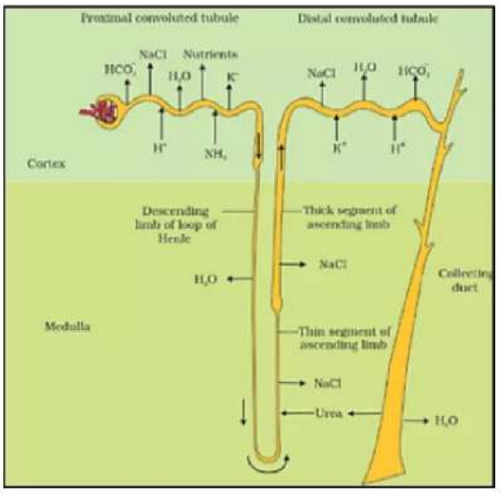
137. Answer: D

Sol:

Distal convoluted tubule (DCT) and collecting duct allow extensive reabsorption of water and certain electrolytes, which help in osmoregulation.

Approximately 7 –10 % of filtered calcium is reabsorbed in the DCT.

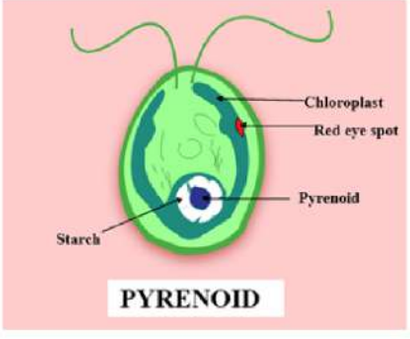
The proximal convoluted tubule helps in maintaining the pH and ionic balance by reabsorbing hydrogen ions, ammonia, and potassium ions into the filtrate.



138. Answer: B

Sol:

Most of the members of green algae have one or more storage bodies called Pyrenoids located in the chloroplasts. It contains protein besides starch.



Hence, the correct answer is **algae**.

139. Answer: B

Sol:

Geometric growth is the growth where the successive change in population differs by constant ration. It is characterised by a slow growth in the initial stages and a rapid growth during the later stages. The daughter cells derived from mitosis retain the ability to divide, but slow down because of a limited nutrient supply.

The exponential growth can be expressed as:

$W_1 = W_0$ ert

W_1 = final size (weight, height, number etc.)

W_0 = initial size at the beginning of the period

r = growth rate

t = time of growth

e = base of natural logarithms

140. Answer: D

Sol:

	YR	Yr	yR	yr
YR	YYRR	YYRr	YyRR	YyRr
Yr	YYRr	YYrr	YyRr	Yyrr
yR	YyRR	YyRr	yyRR	yyRr
yr	YyRr	Yyrr	yyRr	yyrr

Phenotypic ratio :

Yellow Round : Yellow Wrinkled : Green Round : Green Wrinkled

9 : 3 : 3 : 1

Genoypic ratio :

YYRR : YYRr : YyRR : YyRr : YYrr : Yyrr : yyRR : yyRr : yyrr

1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1

So as in this above-given dihybrid cross, we can see that YYRR, YYrr, yyRR and yyrr is coming only one time so overall 4 genotype is there which represented only once in a dihybrid cross.

141. Answer: C

Sol:

Geographical location, Explanation: The marine biome is the biggest biome in the world. It covers about 70% of the earth. It includes five main oceans: the Pacific, Atlantic, Indian, Arctic, and Southern, as well as many smaller Gulfs and Bays. Marine biomes remain almost same for all geographical location. It is affected by temperature, salinity and types of sea floor or stratification.

142. Answer: D

Sol:

All the given options are correct for Bt transgenic plant except option (d). It can be corrected as follows Bttransgenic plants are genetically engineeredplants that contain genes from Bacillus thuringiensis. These are resistant to various diseases, pests, insects and possess other important characteristics.

143. Answer: A

Sol:

i) Process of tubular secretion helps to secrete the urea from the blood to the collecting duct which is finally excreted in form of urine. The purified blood comes from the kidney through the renal vein which has the blood with the least amount of urea.

iii) The kidney conserves water by first diluting urine as it moves through the loop of Henle and then concentrating urine in the distal tubules and collecting ducts.

iv) Glomerular filtrate contains all the components of blood plasma except the proteins.

144. Answer: C

Sol:

Haploid

145. Answer: C

Sol:

For one of the progeny to have O blood group parents will have have heterozygous blood group for A and B.

In ABO blood grouping A and B are dominant and O is recessive hence need to be in pair if expressed.

Hence, the correct answer is option "3".

blood group of parents	A	O
B	AB	BO
O	AO	OO

146. Answer: A

Sol:

We must remember that the **physico- chemical** (**abiotic**) **components alone do not characterise the habitat of an organism completely; the habitat includes biotic components also** – pathogens, parasites, predators and competitors – of the **organism** with which they interact constantly.

147. Answer: A

Sol:

Cytokinin is a plant hormone which promote nutrient mobilisation which helps in the delay of leaf senescence.

148. Answer: A

Sol:

A human protein that is obtained from transgenic animals and is widely used to treat emphysema is α −1-antitrypsin. Transgenic animals produce a lot of useful biological products which are used to create several protein molecules. This is done by the introduction of a portion of DNA which codes for particular products such as human proteins.

149. Answer: A

Sol:

Cytotaxonomy that is based on cytological information like chromosome number, structure, behaviour and chemotaxonomy that uses the chemical constituents of the plant to resolve confusions, are also used by taxonomists these days.

150. Answer: C

Sol:

$x^a x^a \times x^A y$

$x^A \quad y$

$x^a \quad x^A x^a \quad x^a y$

$50\% \quad 50\%$

151. Answer: B

Sol:

A larger protected area meant for conservation of biodiversity and culture of that area is called Biosphere Reserve.

A national park is a park in use for conservation purposes, created and protected by national governments.

A wildlife sanctuary is an area where animals and birds can live protected and safe in their natural habitats, away from poaching or trafficking.

To take care of natural heritage of India, government has set-up 90 national parks and 448 wild life sanctuaries. The Indian government has established 14 biosphere reserves to protect larger areas of natural habitat.

152. Answer: C

Sol:

Ethylene promotes the elongation of internodes in deep-water rice plants so that the leaves and upper parts of the plant remain above water.

153. Answer: C

Sol:

The squamous epithelium is made of a single thin layer of flattened cells with irregular boundaries. They are found in the walls of blood vessels and air sacs of lungs and are involved in functions like forming a diffusion boundary.

Cuboidal/Columnar involved in functions like secretion and absorption.

154. Answer: B

Sol:

Dragonflies are the natural predators of mosquitoes. Hence, they can be used as biocontrol agents to protect the crops from mosquitoes.

155. Answer: A

Sol:

Crossing over is the process of exchange of genetic material between non-sister chromatids of homologous chromosomes which produce new genetics combinations.

Further, the independent assortment is segregation of factors for a trait independent of other factors during gamete formation followed by their random rearrangement in progeny thereby producing both parental and new combinations. The linkage is the tendency of closely placed genes on a chromosome to stay together during inheritance (no crossover and independent assortment); it produces more parental combination and less/no new combinations of the gene.

Completely linked genes do not show crossover and independent assortment, thereby produce only parental combinations;

A number of recombinant types in a population depends on upon crossover frequency between the genes; the higher the crossover frequency, the higher is the number of recombinant types.

156. Answer: A

Sol:

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157. Answer: C

Sol:

Two male gametes are produced from a single pollen grain in flowering plants. Pollen grains released from pollen-sacs at the two-celled stage, wherein the generative cell divides further to form two male gametes. They are then released into the embryo sac. They fuse with the female gametes for the formation of the embryo (egg) and endosperm (central cells). Once pollination is achieved, the pollen tube grows up through the style and stigma and towards the ovules in the ovaries. In the pollen grains, the germ cells divide. This releases two sperm cells that move down the pollen tube.

One meiosis gives rise to four pollen grains. Each of these pollen grain gives rise to 2 male gametes. **Consequently, the overall outcome of meiosis is 8 male gametes.** In given question, there are 21MMC in an anther then the number of male gametes produced from them, is -

21 x 8 = 168.

158. Answer: D

Sol:

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The body of the frog is divisible into head and trunk. Neck and tail are absent in a frog.

Frog's forelimbs and hind limbs help in leaping, swimming, burrowing, and walking. The hind limbs of frogs have five digits while the forelimbs end in four digits. Hind limbs are more muscular and larger when compared to forelimbs.

159. Answer: B

Sol:

Lysosomes release the enzymes on activation by intracellular environment. In plants cells, particularly at the time of seed germination, lysosomal enzymes degrade macromolecules like starch and reserve proteins into glucose and amino acids respectively.

160. Answer: D

Sol:

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161. Answer: C

Sol:

In seed plants, fertilization is called Siphonogamy because the male gametes are brought to the egg present in female gametophyte by a pollen tube.

Internal fertilization: Syngamy occurs inside the body of organisms. It is present in the majority of plants like Bryophytes to **Angiosperms**. In all these organisms egg is formed inside the female body where syngamy occurs. The male gametes either through water or pollen tube, are transferred to female gametes. In order to enhance the chances of syngamy large number of sperms are produced in these organisms and to compensate for this, there is a significant reduction in the number of eggs produced.

162. Answer: C

Sol:

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163. Answer: B

Sol:

An informosome is a particle found in animal cells that is made up of a special protein and macromolecular ribonucleic acid (RNA). The protein in informosomes may help move mRNA from the nucleus to the cytoplasm, protect mRNA from destruction, and control the rate of protein synthesis.

164. Answer: B

Sol:

Ribosomes are the cell organelle which is non- membranous and found in both Prokaryotes and Eukaryotes. Prokaryotes and eukaryotes are the two different types of cells.

Eukaryotic cells contain membrane-bound organelles, such as the nucleus, endoplasmic reticulum, mitochondria while prokaryotic cells do not.

165. Answer: C

Sol:

Hybrid varieties of several of our food and vegetable crops are being extensively cultivated. Cultivation of hybrids has tremendously increased productivity. One of the problems of hybrids is that hybrid seeds have to be produced every year.

If the seeds collected from hybrids are sown, the plants in the **progeny will segregate** and do **not maintain hybrid characters.** Production of hybrid seeds is costly and hence the cost of hybrid seeds become too expensive for the farmers.**Apomictics** can also help preventing seggregation.

166. Answer: A

Sol:

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167. Answer: D

Sol:

Synthesis of DNA from RNA occurs by reverse transcriptase enzyme in reverse transcription, discovered by Temin & Baltimore

168. Answer: C

Sol:

The **main difference** is -

The endoplasmic reticulun bearing ribosomes on their surface is called rough endoplasmic reticulum (RER). In the absence of ribosomes they appear smooth and are called smooth endoplasmic reticulum (SER).

169. Answer: C

Sol:

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170. Answer: D

Sol:

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171. Answer: C

Sol:

Class 11th NCERT Page No. 168

During the pachytene stage of prophase I in meiosis, homologous chromosomes pair up to form bivalents (also called tetrads).

Each bivalent consists of:

Four chromatids: Two chromatids from each homologous chromosome.

Two centromeres: One centromere from each homologous chromosome.

172. Answer: D

Sol:

12th NCERT Page No. - 156, 157, 158

	Column I		Column II
(a)	AIDS	(iii)	Don't die of ignorance
(b)	Cancer	(iv)	Metastasis
(c)	Biological Response modifier	(i)	α-Interferon
(d)	HIV factory	(ii)	Macrophages

173. Answer: C

Sol:

Each strand has a backbone made of alternating groups of sugar (deoxyribose) and phosphate groups. Attached to each sugar is one of four bases: adenine (A), cytosine (C), guanine (G), and thymine (T). The two strands are held together by bonds between the bases, adenine forming a base pair with thymine, and cytosine forming a base pair with guanine. If a DNA nucleotide chain has AGCTTCGA sequence, then nucleotide sequence of other chain would be TCGAAGCT.

The correct answer is option C

174. Answer: B

Sol:

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In meiosis, the centromere divides during anaphase II. During anaphase II, the centromere of each chromosome splits, allowing the sister chromatids to move to opposite poles of the cell.

175. Answer: B

Sol:

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176. Answer: D

Sol:

Anaphase, Anaphase-II

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177. Answer: D

Sol:

Anopheles is the vector of malaria.

Lac insect (Laccifer) is not a vector.

Culex. Culex, a large group of mosquitoes also known as common house mosquitoes, are the principal vectors that spread the viruses that cause West Nile fever, St. Louis encephalitis, and Japanese encephalitis,

Aedes aegypti is a known vector of several viruses including yellow fever virus, dengue virus chikungunya virus and Zika virus.

178. Answer: D

Sol:

Chromosome synapsis is accompanied by the formation of complex structure called **synaptonemal complex**.

The complex formed by a pair of synapsed **homologous chromosomes(one from paternal and one from maternal)** is called a bivalent or a tetrad.

179. Answer: A

Sol:

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The members of subphylum Vertebrata possess notochord during the embryonic period. The notochord is replaced by a cartilaginous or bony vertebral column in the adult.

All vertebrates are chordates, but not all chordates are vertebrates. This is because vertebrates are a subphylum within the phylum Chordata, meaning all vertebrates are classified as chordates, but there are other chordates (like tunicates and lancelets) that are not vertebrates.

A is true but R is false

180. Answer: B

Sol:

Ostrich and **Corvus** = Scales on hind limbs

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