Series OSR/1/C

कोड नं. **57/1/3**
Code No.

रोल नं.
Roll No.

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **8** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **30** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **8** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **30** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक)

BIOLOGY (Theory)

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 70*

Time allowed : 3 hours *Maximum Marks : 70*

सामान्य निर्देश :

(i) ***सभी*** *प्रश्न अनिवार्य हैं ।*

(ii) *इस प्रश्न-पत्र में चार खण्ड* ***A, B, C*** *और* ***D*** *हैं । खण्ड* ***A*** *में* ***8*** *प्रश्न हैं जिनमें प्रत्येक का* ***एक*** *अंक है, खण्ड* ***B*** *में* ***10*** *प्रश्न हैं जिनमें प्रत्येक के* ***दो*** *अंक हैं, खण्ड* ***C*** *में* ***9*** *प्रश्न हैं जिनमें प्रत्येक के* ***तीन*** *अंक हैं तथा खण्ड* ***D*** *में* ***3*** *प्रश्न हैं जिनमें प्रत्येक के* ***पाँच*** *अंक हैं ।*

(iii) *कोई समग्र चयन-विकल्प (ओवरऑल चॉइस) उपलब्ध नहीं है । फिर भी,* ***2*** *अंकों वाले एक प्रश्न में,* ***3*** *अंकों वाले एक प्रश्न में और* ***5*** *अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं । ऐसे प्रश्नों में विद्यार्थी को केवल एक ही विकल्प का उत्तर देना है ।*

(iv) *जहाँ भी आवश्यक हो, बनाए जाने वाले आरेख साफ़-सुथरे तथा समुचित रूप में नामांकित हों ।*

General Instructions :

(i) ***All*** *questions are compulsory.*

(ii) *This question paper consists of four Sections* ***A, B, C*** *and* ***D****. Section* ***A*** *contains* ***8*** *questions of* ***one*** *mark each, Section* ***B*** *is of* ***10*** *questions of* ***two*** *marks each, Section* ***C*** *is of* ***9*** *questions of* ***three*** *marks each and Section* ***D*** *is of* ***3*** *questions of* ***five*** *marks each.*

(iii) *There is no overall choice. However, an internal choice has been provided in one question of* ***2*** *marks, one question of* ***3*** *marks and all the three questions of* ***5*** *marks weightage. A student has to attempt only one of the alternatives in such questions.*

(iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

खण्ड A

SECTION A

1. कोई दो कारण बताइए कि विभिन्न प्रकार के पारितंत्रों में प्राथमिक उत्पादकता भिन्न-भिन्न क्यों होती है । *1*

Mention any two reasons why the primary productivity varies in different types of ecosystems.

2. किसी एक लड़के में ADA-अभाव की पहचान हुई है । इसका कोई एक संभव उपचार सुझाइए । *1*

A boy has been diagnosed with ADA-deficiency. Suggest any one possible treatment.

3. निम्नलिखित में से किन दो जीवों में निषेचन बाह्य होता है ? *1*

अस्थिल मछलियाँ, फ़र्न, मेंढक, पक्षी ।

In which two of the following organisms is the fertilization external ?

Bony fishes, ferns, frogs, birds.

4. एक ऐसी आंतरगर्भाशयी युक्ति (IUD) का नाम लिखिए जिसका सुझाव आप इसलिए दे सकते हैं कि गर्भाशय ग्रीवा शुक्राणुओं के लिए प्रतिकूल हो जाए । *1*

Name an IUD that you would recommend to promote the cervix hostility to the sperms.

5. डी व्रीज़ के अनुसार 'महा-उत्परिवर्तन (सॉल्टेशन)' क्या होता है ? *1*

What is 'saltation' according to de Vries ?

6. निम्नलिखित में से ***दो*** सही कथन चुनिए : *1*

(i) अंग्रेज़ी के शब्द "एपिकल्चर" का अर्थ है एपिकल (शीर्षस्थ) विभज्योतक संवर्धन ।
(ii) पालक लौह-भरपूर होता है ।
(iii) हरित क्रांति के द्वारा दालों का उत्पादन अधिक होने लगा है ।
(iv) तौरिया सरसों में एफ़िडों का आग्रसन नहीं हो सकता ।

Identify the ***two*** correct statements from the following :
(i) Apiculture means apical meristem culture.
(ii) Spinach is iron-enriched.
(iii) Green revolution has resulted in improved pulse-yields.
(iv) Aphids cannot infest rapeseed mustard.

7. सहप्रभाविता दर्शाने वाले किसी एकसंकर संकरण में F_2 पीढ़ी में कितने प्रकार के लक्षणप्ररूपों की आशा की जाएगी ? *1*

How many kinds of phenotypes would you expect in F_2 generation in a monohybrid cross exhibiting co-dominance ?

8. अच्छी ओज़ोन कहाँ होती पाई जाती है ? इसे यह नाम क्यों दिया गया ? *1*

Where is good ozone present ? Why is it called so ?

खण्ड B

SECTION B

9. आलू के एक पौधे में एक वायरस (विषाणु) का संक्रमण हो गया है । इससे वायरस-मुक्त आलू पौधों को प्राप्त करने की एक विधि का नाम लिखिए और उसके विषय में समझाइए । *2*

A potato plant is infected with a virus. Name and explain a method to obtain virus-free potato plants from it.

10. जैवविविधता हानि के चार कारणों की सूची दीजिए । *2*

अथवा

उत्प्रेरक परिवर्तक में इस्तेमाल किए जाने वाले दो धातुओं के नाम लिखिए । पर्यावरण को स्वच्छ रखने में ये किस प्रकार सहायता करते हैं ? *2*

List four causes of biodiversity loss.

OR

Name two metals used in a catalytic converter. How do they help in keeping the environment clean ?

11. दूध से दही बनाने के लिए उसमें 'जामन' क्यों मिलाया जाता है ? समझाइए । *2*

Why is 'starter' added to set the milk into curd ? Explain.

12. किसी एक परजीवी में किन्हीं चार परजीवी अनुकूलनों की सूची बनाइए । *2*

List any four parasitic adaptations in a parasite.

13. किसान लोग केले की फ़सल को बिना बीज बोए उगाते हैं । समझाइए कि पौधे का संचरण किस प्रकार किया जाता है । *2*

Banana crop is cultivated by farmers without sowing of seeds. Explain how the plant is propagated.

14. मानवों में अण्डाणु के निषेचन होने के दौरान होने वाली घटनाएँ समझाइए । ऐसा कैसे होता है कि अण्डाणु के भीतर केवल एक ही शुक्राणु प्रवेश कर पाता है ? *2*

Explain the events that occur during fertilization of an ovum in humans. How is it that only one sperm enters the ovum ?

15. ट्रांसलेशन प्रक्रिया के दौरान *t*-RNA का चार्जिंग होना क्यों आवश्यक होता है ? *2*

Why is charging of *t*-RNA necessary during translation process ?

16. किसी एक प्रत्यूर्जक का नाम लिखिए और उससे उद्भासित होने पर मानव शरीर में क्या अनुक्रिया होती है, लिखिए । *2*

Name an allergen and write the response of the human body when exposed to it.

17. *एरिथ्रोज़ाइलम कोका* से प्राप्त होने वाली औषध का नाम लिखिए और बताइए कि मानव शरीर पर इसके क्या प्रभाव होते हैं । *2*

Name the drug obtained from *Erythroxylum coca* and write its effects on the human body.

18. मवेशियों में अंतःप्रजनन का महत्त्व समझाइए । *2*

Explain the importance of inbreeding in cattle.

खण्ड C

SECTION C

19. मॉर्गन ने *ड्रोसोफ़िला* पर कई द्विसंकर संकरण किए और पाया कि F_2-अनुपात प्रत्याशित मेंडलीय अनुपात से बहुत भिन्न-भिन्न आए । एक उदाहरण की सहायता से उसकी इन खोजों के विषय में समझाइए । *3*

Morgan carried out several dihybrid crosses in *Drosophila* and found F_2-ratios deviated very significantly from the expected Mendelian ratio. Explain his findings with the help of an example.

20. किसी ट्राँसक्रिप्शन (अनुलेखन) इकाई में निम्नलिखित के पाए जाने का स्थान और उनकी भूमिका के विषय में एक योजना आरेख की सहायता से समझाइए : *3*

प्रोमोटर (उन्नायक), संरचनात्मक जीन, अंतकारी ।

With the help of a schematic diagram, explain the location and the role of the following in a transcription unit :

Promoter, Structural gene, Terminator.

21. डार्विन के मत के अनुसार नए स्वरूपों के प्रकट होने की दर उनके जीवन-चक्रों के साथ जुड़ी होती है । समझाइए । *3*

According the Darwinian theory, the rate of appearance of new forms is linked to their life cycles. Explain.

22. एक प्ररूपी बायोगैस संयंत्र का नामांकित आरेख बनाइए । *3*

अथवा

(a) निम्नलिखित रोगों के उत्पन्नकर्ता जीवों के नाम लिखिए :

(i) श्लीपद

(ii) दद्रु (दाद)

(iii) अमीबिऐसिस

(b) इस प्रकार के रोगों के नियंत्रण में सार्वजनिक स्वास्थ्य रक्षा किस प्रकार सहायक हो सकती है ? *3*

Draw a labelled sketch of a typical biogas plant.

OR

(a) Name the causative organisms for the following diseases :

(i) Elephantiasis

(ii) Ringworm

(iii) Amoebiasis

(b) How can public hygiene help control such diseases ?

23. आपकी बस्ती के कुछ निवासियों ने व्यवसाय लाभ के लिए कुछ छोटे पैमाने वाले औद्योगिक/व्यापारिक क्रियाकलाप स्थापित किए हैं जैसे कि विकृतिविज्ञान प्रयोगशालाएँ तथा वस्त्र रंगने के केंद्र जिसके लिए उन्होंने नगरपालिका अधिकारियों से "कोई आपत्ति नहीं" सर्टिफ़िकेट नहीं ले रखे थे ।

क्या आप ऐसे क्रियाकलापों का समर्थन करेंगे ? अपने उत्तर के पक्ष में कोई तीन कारण बताइए । *3*

A few residents in your locality, for business gains, have established small-scale industrial / commercial activities such as pathological labs and fabric dyeing centres without obtaining 'No objection certificates' from municipal authorities.

Would you support these activities ? Give any three reasons in support of your answer.

24. (a) शिम्बों के परिपक्व बीज गैर-ऐल्बुमिनी होते हैं । तब क्या यह मान लिया जा सकता है कि शिम्बों में दोहरा निषेचन नहीं होता ? अपने उत्तर को समझाइए ।

(b) द्विबीजपत्री (मटर) तथा एकबीजपत्री (घास फ़ैमिली) के भ्रूणों में क्या-क्या अंतर होते हैं, सूची बनाइए । *3*

(a) Mature seeds of legumes are non-albuminous. Then, can it be assumed that double fertilisation does not occur in legumes ? Explain your answer.

(b) List the differences between the embryos of dicot (pea) and monocot (grass family).

25. किसी क्लोनिंग वाहक में 'क्लोनिंग स्थल' क्या होते हैं ? उनकी भूमिका समझाइए । pBR322 में ऐसे किन्हीं दो स्थलों के नाम लिखिए । *3*

What are 'cloning sites' in a cloning vector ? Explain their role. Name any two such sites in pBR322.

26. पोषी पादप तथा उसके उस भाग का नाम लिखिए जिसको *मेलॉइडोगाइन इन्कॉग्निटा* संक्रमित करता है । पोषी पादप में *ds*-RNA के उत्पादन में *ऐग्रोबैक्टीरियम* की भूमिका समझाइए । *3*

Name the host plant and its part that *Meloidogyne incognita* infects. Explain the role of *Agrobacterium* in the production of *ds*-RNA in the host plant.

27. एक भयंकर दुर्घटना में घटना स्थल से, झुलसे और बदशक्ल हुए अनेक मृत शरीर पाए गए जिनको पहचाना जाना अत्यंत कठिन था । उस तकनीक का नाम लिखिए एवं उसके विषय में समझाइए जिसकी सहायता से अधिकारीगण मृत जनों की पहचान कर सकें और उन्हें उनके अपने-अपने रिश्तेदारों को सौंप सकें । *3*

Following a severe accident, many charred-disfigured bodies are recovered from the site making the identification of the dead very difficult. Name and explain the technique that would help the authorities to establish the identity of the dead to be able to hand over the dead to their respective relatives.

खण्ड D

SECTION D

28. "DNA प्रतिकृति अर्धसंरक्षी होती है ।" इस सिद्धांत को प्रस्तावित करने वाले वैज्ञानिकों के तथा सिद्ध करने वालों के नाम लिखिए । इसे प्रयोगों के आधार पर किस प्रकार सिद्ध किया गया था ? समझाइए । *5*

अथवा

(a) मानवों में वर्णांधता (रंगांधता) एक लिंग-सहलग्न विशेषक है । इस विषय को एक संकर की सहायता से समझाइए ।

(b) मानवों में बच्चे के लिंग का निर्धारण पिता द्वारा होता है न कि माँ के द्वारा । इसके विषय में समझाइए । *5*

"DNA replication is semi-conservative." Name the scientists who proposed it and who proved it. How was it proved experimentally ? Explain.

OR

(a) Colourblindness in humans is a sex-linked trait. Explain with the help of a cross.

(b) In human beings, the sex of the child is determined by the father and not by the mother. Explain.

29. मानवों में शुक्राणुजनन घटनाओं को योजना रूप में दर्शाइए तथा उनके विषय में समझाइए । *5*

अथवा

आवृतबीजी फूल उभयलिंगाश्रयी हो सकते हैं, अनुन्मील्य-परागणी हो सकते हैं या उनमें स्व-निषेच्यता (आत्म-असंगतता) हो सकती है । इनमें से प्रत्येक के विशिष्ट लक्षणों का वर्णन कीजिए और बताइए कि इनमें से कौन-से एक प्रकार के फूल क्रमशः अंतःप्रजनन तथा बाह्यप्रजनन को बढ़ावा देते हैं । *5*

Schematically represent and explain the events of spermatogenesis in humans.

OR

Angiosperm flowers may be monoecious, cleistogamous or show self-incompatibility. Describe the characteristic features of each one of them and state which one of these flowers promotes inbreeding and outbreeding respectively.

30. (a) किसी थलीय पारितंत्र में फ़ॉस्फ़ोरस चक्रण के एक सरलीकृत मॉडल का आरेख बनाइए ।

(b) पारितंत्रों में इस प्रकार के चक्रों का महत्त्व लिखिए । *5*

अथवा

(a) जैवविविधता के संरक्षण के पक्ष में अल्पतः उपयोगी, व्यापकतः उपयोगी तथा नैतिक तर्क क्या हैं, समझाइए ।

(b) कुछ निश्चित क्षेत्रों को "अधिस्थलों" की संज्ञा देना जैवविविधता संरक्षण की ओर एक कदम क्यों कहा जाता है ? भारत के किन्हीं दो अधिस्थलों के नाम लिखिए । *5*

(a) Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.

(b) Write the importance of such cycles in ecosystems.

OR

(a) Explain the narrowly utilitarian, broadly utilitarian and ethical arguments in favour of conservation of biodiversity.

(b) How is designation of certain areas as hotspots a step towards biodiversity conservation ? Name any two hotspots in India.

SECTION A

1. **Mention any two reasons why the primary productivity varies in different types of ecosystems.**
   Type of plant species / environmental factors/ nutrients / photosynthetic capacity (any 2) (½ X 2 = 1)

2. **A boy has been diagnosed with ADA deficiency. Suggest any one possible treatment**
   Bone marrow transplant; enzyme replacement therapy/gene therapy(any two) (1/2x2=1)

3. **In which two of the following organisms is the fertilization external?**

   Bony fishes, ferns, frogs, birds.

   Bony fish, frogs (1/2x2=1)

4. **Name an IUD that you would recommend to promote the cervix hostility to the sperms**
   LNG-20 /progestasert (Any one) (1)

5. **What is "saltation" according to de Vries?**
   Single- step large mutation (1)

6. **Identify the <u>two</u> correct statements from the following**
   (i) Apiculture means apical meristem culture.
   (ii)Spinach is iron –enriched.
   (iii) Green revolution has resulted in improved pulse-yields
   (iv) Aphids cannot infest rapeseed mustard.
   (ii) and (iv) (1/2x2=1)

7. **How many kinds of phenotypes would you expect in F_2 generation in a monohybrid cross exhibiting co-dominance?**
   Three (1)

8. **Where is good ozone present? Why is it called so?**
   Stratosphere, shields against UV radiation of sun (1/2x2=1)

SECTION B

9. **A potato plant is infected with a virus .Name and explain a method to obtain virus-free potato plants form it.**
   Apical meristem culture, (1)
   Micropropagation /producing thousands of plants, through tissue culture/*in vitro* culture (1/2x2=1)

10. **List four causes of biodiversity loss.**

    Habitat loss , fragmentation, overexploitation, alien species invasion ,co-extinction (any four) (1/2x4=2)

OR

Name two metals used in a catalytic converter. How do they help in keeping the environment clean?

Platinum- Palladium ,Rhodium, (1/2+1/2=1)

The catalyst converter changes unburnt hydrocarbons → CO_2+H_2O/ CO→CO_2/ nitric oxide → N_2 (any two) (1/2x4=2)

11. Why is 'starter' added to set the milk into curd? Explain

Acts as an innoculum; contains LAB, at suitable temperature,coagulates milk to curd (1/2x4=2)

12. List any four parasitic adaptations in a parasite.

Loss of unnecessary sense organs/presence of adhesive organ/loss of digestive system/high reproductive capacity/ presence of suckers/hooks. (any 4) (1/2x4=2)

13. Banana crop is cultivated by farmers without sowing of seeds. Explain how the plant is propagated.

Vegetative propagation, rhizome (1x2=2)

14. Explain the events that occur during fertilization of an ovum in humans . How is it that only one sperm enters the ovum?

Completion of meiotic division of secondary oocyte, haploid ovum and polar body is formed ,fusion of the two nuclei . (any 2) (1/2+1/2)

Sperm induces the changes in zona pellucida and doesn't allow the other sperms to enter (1)

15. Why is charging of t-RNA necessary during translation process?

Formation of peptide bond requires energy which is provided by the charged tRNA
Amino acid can join with cognate t-RNA . (1+1=2)

16. Name an allergen and write the response of the human body when exposed to it.

Release of serotonin and histamine, from mast cells (½+1/2 =1)

17. Name the drug obtained from *Erythroxylum coca* and write its effects on the human body.

Cocaine ,
interferes with transport of neuro- transmitter - dopamine/ stimulates CNS/ produces sense of euphoria/ increased energy/ hallucinations (Any 3) (½+1½=2)

18. Explain the importance of inbreeding in cattle.

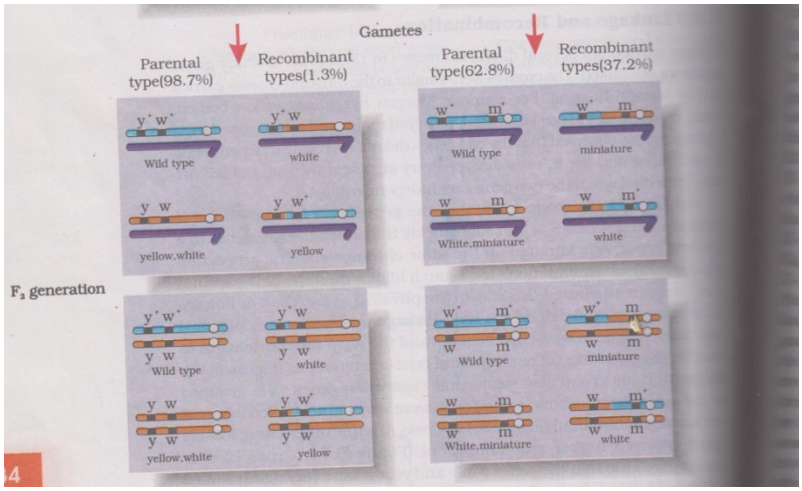
For maintaining purelines , inbreeding exposes harmful recessive genes that are eliminated by selection, helps in accumulation of superior genes, and elimination of less desirable genes.(any two) (1x2=2)

SECTION C

19. Morgan carried out several crosses in *Drosophila* and found F_2-ratios deviated very significantly from the expected Mendelian ratio. Explain his findings with the help of an example

Morgan's findings differ from Mendel's because of the phenomena of -
Linkage (genes present on the same chromosome) and recombination; (1/2x2=1)

Example : Cross A Cross B

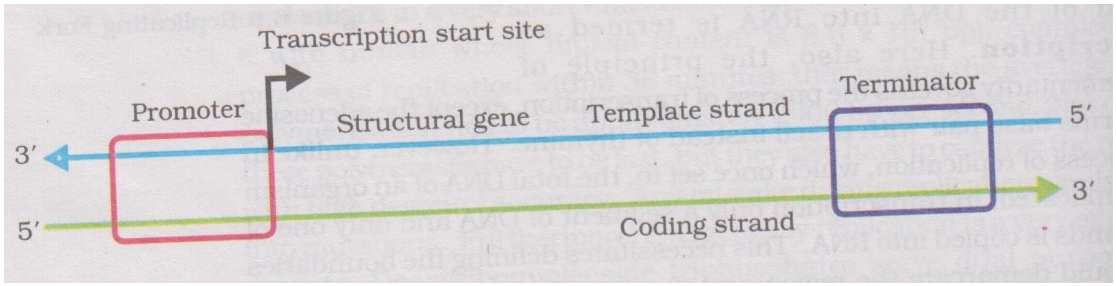


F2 generation(any one cross) ; [1/2 X 2=1]

Genes are closely linked- less recombinants, genes are far apart- more recombinants[1/2 X 2=1]

20. With the help of a schematic diagram, explain the location and the role of the following in a transcription unit:

Structure



Function-

Promotor- RNA polymerase binds to it starter

Structural gene- functional genes

Terminator- transcription ends here [½ X 6= 3]

21. According to the Darwinian theory, the rate of appearance of new forms is linked to their life cycles. Explain.

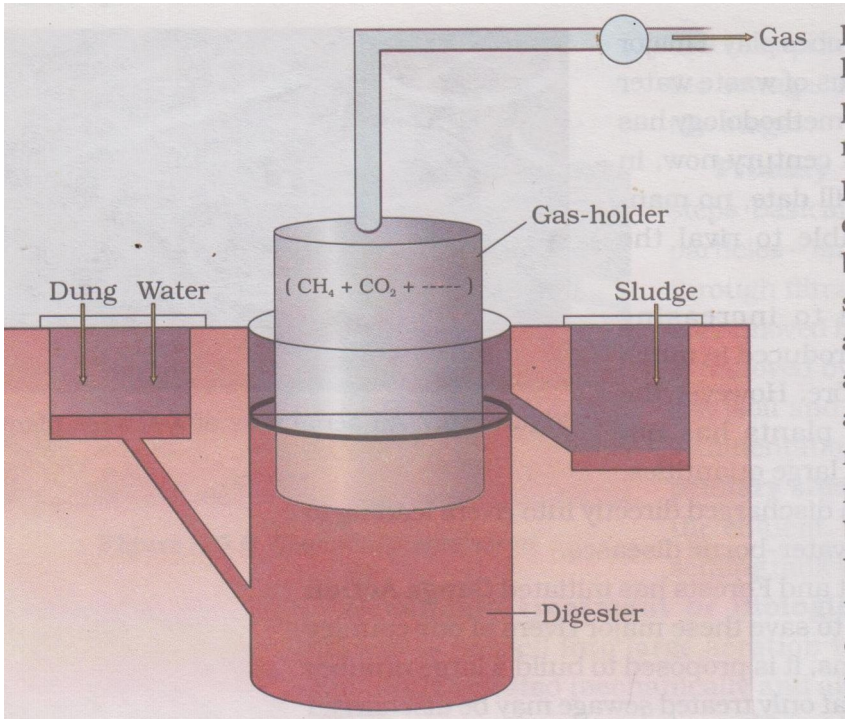
Microbes divide fast/ they produce million within hours.

Easy to see variant population in less span of time

But in higher organism life span is long so variations are not visible fast [1X3=3]

22. Draw a labeled sketch of a typical biogas plant.

Biogas plant



Proper diagram and labeling (1/2x6=3)

OR

(a) Name the causative organisms for the following diseases:

(i) Elephantiasis

(ii) Ringworm

(iii) Amoebiasis

(b) How can public hygiene help control such diseases?

(a) (i)Wuchereria ,
(ii) Microsporum / Epidermophyton/ Trichophyton
(iii)Entamoeba
(b) Proper disposal of waste/periodic cleaning/disinfection of water reservoirs, etc/standard practices of hygiene in public catering/eliminate vectors and their breeding placec(any three) (1/2x6=3)

23. A few residents in your locality , for business gains, have established small –scale industrial /commercial activities such as pathological labs and fabric dyeing centers without obtaining 'No objection certificates' from municipal authorities.

Would you support these activities? Give any three reasons in support of your answer.

No (Any 3 appropriate reasons)
Yes(Any 3 appropriate reasons) (1X3)

24. (a) Mature seeds of legumes are non-albuminous. Then, can it be assumed that double fertilization does not occur in legumes? Explain your answer.
(b) List the differences between the embryos of dicot (pea) and monocot(grass family).

(b)

Dicot embryo	Monocot embryo
2 cotyledons	One Cotyledon
Radicle and plumule not covered with sheath	Radicle covered with coleorhiza and plumule covered by coleoptile.

(1+1)

25. What are 'cloning sites' in a cloning vector? Explain their role. Name any two such sites in pBR322.

Cloning sites are recognition sites.

Role- where restriction enzyme will recognize and cut /ligation of alien DNA takes place here

any two examples- EcoRI,BamHI. (1+1+1/2+1/2=3)

26. Name the host plant and that *Meloidogyne incognitia* infects. Explain the role of *Agrobacterium* in the production of ds-RNA in the host plant.

Tobacco, Roots of tobacco plant

Using *Agrobacterium* vectors, nematode specific genes were introduced into the host plant ,

because of introduction of DNA both sense & antisense RNA are produced in host cell, the 2 RNAs being complimentary form a ds-RNA (that initiated RNAi) (1/2 X 6 = 3)

27. Following a severe accident, many charred –disfigured bodies are recovered from the site making the identification of the dead very difficult. Name and explain the technique that would help the authorities to establish the identity of the dead to be able to hand over the dead to their respective relatives.

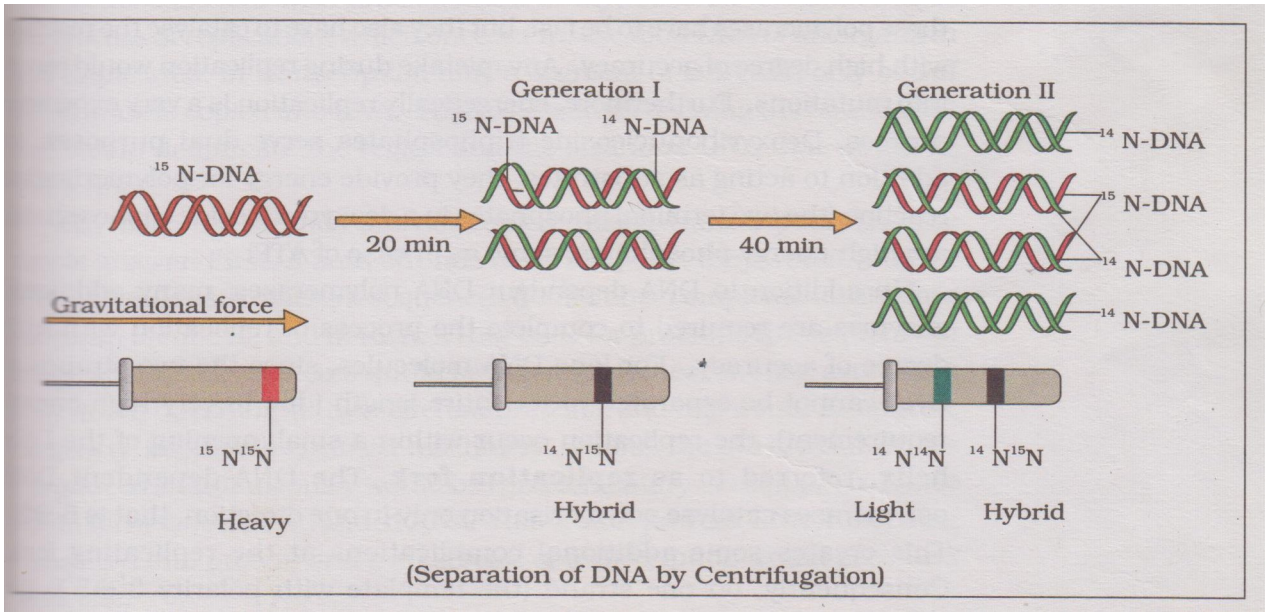
DNA fingerprinting -

Isolation of DNA and digestion of DNA by restriction endonucleases,separation of DNA fragments by electrophoresis,transferring(blotting) of separated DNA fragments to synthetic membranes,such as nitrocellulose or nylon,hybridization using labeled VNTR probe and,detection of hybridized DNA fragments by autoradiography. (1/2x6=3)

SECTION D

28. "DNA replication is semi-conservative". Name the scientists who proposed it and who proved it .How was it proved experimentally? Explain.

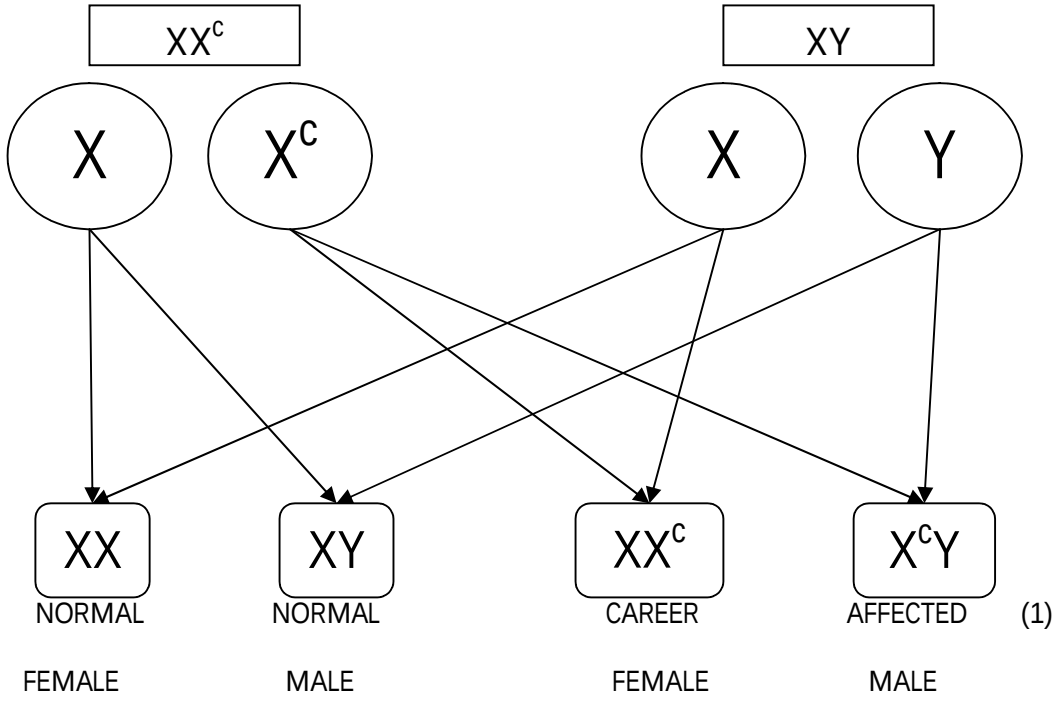
Meselson & Stahl (1)



(three steps with DNA and centrifugation tubes-(1+1+2))

OR

(a)Colour blindness in humans is a sex-linked trait. Explain with the help of a cross.

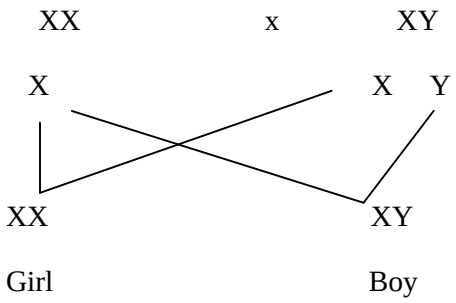


(1)

(1)

(1)

(b) In human beings, the sex of the child is determined by the father and not by the mother. Explain.



Parents

Gametes (1/2)

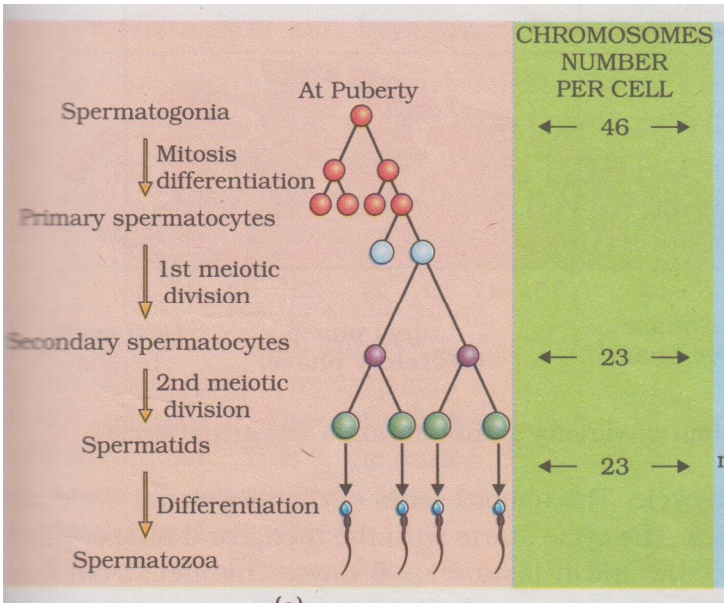
[1/2]

father – heterogametic, mother – homogametic// Female produce gametes with only 'X' chromosome. If

X chromosome from father- daughter is born

Y chromosome from father – son is born (½ + ½)

29. Schematically represent and explain the events of spermatogenesis in humans.



(1/2x10=5)

OR

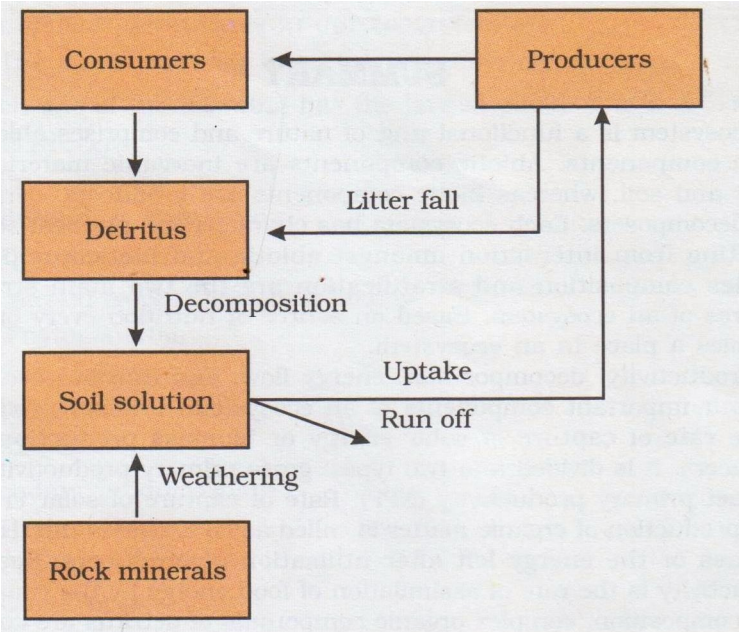
Angiosperm flowers may be monoecious, cleistogamous or show self-incompatibility. Describe the characteristic features of each one of them and state which one of these flowers promotes inbreeding and out-breeding respectively.

Monoecious-male and female flowers are present on the same plant,
Cleistogamous-flowers do not open
Self-incompatibility-genetic mechanism by which self- pollination does not take place (1x3=3)
Inbreeding is promoted by monoecious and cleistogamous flowers (1/2+1/2=1)
Outbreeding is promoted by flower showing self-incompatibility (1)

30. (a) Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.

(b)Write the importance of such cycles in ecosystems.

(a)



(any 8 labels) [1/2X8 = 4]

(b) Recycling of nutrients time & again [1]

OR

(a) Explain the narrowly utilitarian, broadly utilitarian and ethical arguments in favor of conservation of biodiversity.

(b) How is designation of certain areas as hotspots a step towards biodiversity conservation? Name any two hotspots in India.

(a)Narrowly utilitarian – Humans derive countless economic benefits from nature-
food, firewood, fibre, construction material, industrial products (tannins, lubricants, dyes, rennin, perfumes) , medicines

Broadly utilitarian – Role in many ecosystem services that nature provides eg – 20% O2 from Amazon forest, pollination (any other ecosystem service)

Ethical argument – what humans owe to the millions of organisms with whom we share this planet

eg philosophically/spiritually – every species has an intrinsic value [1/2 X 6 = 3]

(b) As these regions have very high levels of species richness & high degree of endemism, they need to be identified for maximum protection. [1/2 X 2 = 1]

Hotspots – Western Ghats & Sri Lanka, Indo- Burma, Himalayas (Any two) [1/2 X 2 = 1]