Series OSR/C

कोड नं. **57/2**
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 **11** 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 **11** 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. हरित गृह प्रभाव में सर्वाधिक योगदान देने वाली दो गैसों के नाम लिखिए । *1*

Name the two gases contributing maximum to the green house effect.

2. मैंग्रोव (कच्छ) द्वारा प्रतिदर्शित जैवविविधता का स्तर क्या होता है, लिखिए । इसी स्तर में आने वाला कोई एक और उदाहरण दीजिए । *1*

Write the level of biodiversity represented by a mangrove. Give another example falling in the same level.

3. जैल-वैद्युतकरण संचलन में आधात्री के रूप में इस्तेमाल किए जाने वाले पदार्थ का नाम लिखिए और इसकी भूमिका भी बताइए । *1*

Name the material used as matrix in gel-electrophoresis and mention its role.

4. कृषि भूमि में नीले-हरे शैवाल लगाए जाने के पक्ष में एक कारण बताइए । *1*

State one reason for adding blue-green algae to the agricultural soil.

5. यदि किसी सुकेंद्रकी कोशिका में DNA प्रतिकृति होने के बाद कोशिका विभाजन नहीं होता है, तो क्या होगा ? *1*

What will happen if DNA replication is not followed by cell division in a eukaryotic cell ?

6. निम्नलिखित में से सही कथन पहचानिए और उसे लिखिए :

(a) *ड्रोसोफ़िला* नर में एक *X* तथा एक *Y* क्रोमासोम होते हैं ।

(b) *ड्रोसोफ़िला* नर में दो *X* क्रोमासोम होते हैं । *1*

Identify and write the correct statement :

(a) *Drosophila* male has one *X* and one *Y* chromosome.

(b) *Drosophila* male has two *X* chromosomes.

7. ऐसा क्यों है कि बच्चे को स्तन-पान कराती माँ में ऐसा करना एक प्राकृतिक गर्भनिरोधक होता है, एक कारण बताइए । *1*

State one reason why breast-feeding the baby acts as a natural contraceptive for the mother.

8. निम्नलिखित द्वारा जनन करने वाले एक-एक पौधे का उदाहरण दीजिए :

(a) उपरिभूस्तारी

(b) भूस्तारिका *1*

Give one example each of a plant that reproduces by :

(a) runner

(b) offset

खण्ड B

SECTION B

9. जैवप्रौद्योगिकी प्रयोगों के लिए कोशिकाओं को समर्थ बनाना क्यों अनिवार्य है ? कोई दो विधियाँ गिनाइए जिनके द्वारा ऐसा किया जा सकता है । *2*

Why is making cells competent essential for biotechnology experiments ? List any two ways by which this can be achieved.

10. *बेसिलस थुरिंजिऐंसिस* में 'क्राई' ('cry') जीन क्या संकेत देते हैं ? कपास की फ़सल के लिए इसका महत्त्व लिखिए । *2*

What do 'cry' genes in *Bacillus thuringiensis* code for ? State its importance for cotton crop.

11. किन्हीं दो ढंगों का उल्लेख कीजिए जो आनुवंशिकत: रूपांतरित जीवों का उपयोगी होना दर्शाते हों । *2*

Write any two ways how genetically modified plants are found to be useful.

12. ऐसे दो कारण बताइए जिनके द्वारा प्राक्केंद्रकी प्रजातियों की गणना कठिन हो जाती है । *2*

Provide two reasons that make the count of prokaryotic species difficult.

13. "शैवाल प्रस्फुटन" क्या होता है ? इसके होने का कारण क्या होता है, बताइए और साथ ही इसके दो हानिकारक प्रभाव भी लिखिए । *2*

What is an "algal bloom" ? State its cause and any two harmful effects.

14. मानव शुक्राणु के केवल शीर्ष क्षेत्र का आरेख बनाइए और उसके भागों का नामांकन कीजिए । *2*

Draw and label the parts of the head region only of a human sperm.

15. गर्भनिरोधक गोलियों में क्या होता है और वे किस प्रकार से कारगर रूप में गर्भनिरोध करती हैं ? *2*

What do oral pills contain and how do they act as effective contraceptives ?

16. इंग्लैण्ड के सफ़ेद पंखों वाले तथा काले पंखों वाले शलभों का उदाहरण लेते हुए समझाइए कि प्रकृति में प्राकृतिक वरण किस प्रकार होता है । *2*

Explain how natural selection operates in nature by taking an example of white winged and dark winged moths of England.

17. सक्रिय प्रतिरक्षा तथा परोक्ष प्रतिरक्षा में विभेद कीजिए । *2*

अथवा

बहि:प्रजनन तथा बहि:संकरण में अन्तर बताइए ।

Differentiate between active and passive immunity.

OR

Differentiate between outbreeding and outcrossing.

18. ऐसे दो जीवधारी समूहों के नाम लिखिए जो 'ऊर्ण' (फ़्लॉक्स) बनाते हैं । वाहित मल के जैविकीय उपचार के दौरान BOD के स्तर पर उनका क्या प्रभाव पड़ता है, लिखिए । *2*

Name two groups of organisms which constitute 'flocs'. Write their influence on the level of BOD during biological treatment of sewage.

खण्ड C

SECTION C

19. किसी एक ऐसी तकनीक का सुझाव दीजिए एवं उसका वर्णन कीजिए जिसके द्वारा किसी रोगग्रस्त गन्ना पौधे से एक वायरस-मुक्त स्वस्थ पौधा प्राप्त किया जा सकता है । *3*

Suggest and describe a technique through which a virus-free healthy plant can be obtained from a diseased sugarcane plant.

20. बैकुलोवायरसों तथा *बेसिलस थुरिंजिऐंसिस* को जैव-नियंत्रण साधनों के रूप में किस प्रकार इस्तेमाल किया जाता है ? सहज उपलब्ध रासायनिक पीड़कनाशियों की बजाए उन्हीं को क्यों पसंद किया जाता है ? *3*

How are Baculoviruses and *Bacillus thuringiensis* used as bio-control agents ? Why are they preferred over readily available chemical pesticides ?

21. *E. coli* क्लोनिंग वाहक pBR322 का एक योजना आरेख बनाइए और उसमें निम्नलिखित का नामांकन कीजिए : *3*

(a) ori

(b) rop

(c) ऐम्पिसिलिन प्रतिरोध जीन

(d) टेट्रासाइक्लिन प्रतिरोध जीन

(e) प्रतिबंधन स्थल BamHI

(f) प्रतिबंधन स्थल EcoRI

अथवा

(a) EcoRI द्वारा पहचाने जाने वाले न्यूक्लिओटाइडों के अनुक्रम वाले एक वाहक तथा एक विजातीय DNA के खण्डों का आरेख बनाइए ।

(b) EcoRI की क्रिया के उपरांत बने वाहक DNA खण्ड तथा विजातीय DNA खण्ड के आरेख बनाइए तथा चिपचिपे सिरों का नामांकन कीजिए ।

Draw a schematic diagram of the *E. coli* cloning vector pBR322 and mark the following in it :

(a) ori

(b) rop

(c) ampicillin resistance gene

(d) tetracycline resistance gene

(e) restriction site BamHI

(f) restriction site EcoRI

OR

(a) Draw schematic diagrams of segments of a vector and a foreign DNA with the sequence of nucleotides recognised by EcoRI.

(b) Draw the vector DNA segment and foreign DNA segments after the action of EcoRI and label the sticky ends produced.

22. क्या आप इस बात का समर्थन करते हैं कि प्रतिष्ठित खेल प्रतियोगिता में भाग लेने वाले खिलाड़ीयों का "डोप" परीक्षण किया जाना चाहिए ? अपने उत्तर के समर्थन में तीन कारण बताइए । *3*

Do you support 'Dope' test being conducted on sportspersons participating in a prestigious athletic meet ? Give three reasons in support of your answer.

23. मानव जनसंख्या में प्रसारशील आयु पिरामिड का आरेख बनाइए और उसके विषय में समझाइए । उसे इस प्रकार क्यों कहा जाता है ? *3*

Draw and explain expanding age pyramids of human population. Why is it so called ?

24. तीन कारण बताते हुए लिखिए कि हार्डी-वीनबर्ग साम्य किस प्रकार प्रभावित किया जा सकता है । *3*

Giving three reasons, write how Hardy-Weinberg equilibrium can be affected.

25. (a) RNA *पौलीमरेज़ III* के ट्रांसक्रिप्शन (अनुलेखन) उत्पाद क्या-क्या होते हैं ?

(b) "आच्छादन (कैपिंग)" तथा "पुच्छायन (टेलिंग)" में विभेदन कीजिए ।

(c) *hnRNA* को पूरा-पूरा लिखिए । *3*

(a) What are the transcriptional products of RNA *polymerase III* ?

(b) Differentiate between 'Capping' and 'Tailing'.

(c) Expand *hnRNA*.

26. किसी एक रक्त संबंधित अलिंगसूत्री मेंडलीय विकार का नाम लिखिए । इसे मेंडलीय विकार क्यों कहा जाता है ? यह विकार माता-पिता से संतानों में किस प्रकार प्रेषित होता है ? *3*

Name a blood related autosomal Mendelian disorder. Why is it called Mendelian disorder ? How is the disorder transmitted from parents to offsprings ?

27. (a) कुछ किस्म की घासों के बीजों को असंगजनिक बीज क्यों कहा जाता है ? समझाइए ।

(b) किसान को स्वीकार कराने के लिए कि उसे असंगजनिक फ़सल इस्तेमाल करनी चाहिए, दो कारण बताइए । *3*

(a) Why are seeds of some grasses called apomictic ? Explain.

(b) State two reasons to convince a farmer to use an apomictic crop.

खण्ड D

SECTION D

28. एक ऐसे एकसंकर संकरण का F_2 पीढ़ी तक के संकरण का हिसाब लगाइए जो दो मटर-पौधों के बीच तथा दो ऐंटीराइनम पौधों के बीच उनके फूलों के रंग (विपर्यसी विशेषक) के संदर्भ में हो रहा हो । किए गए इन संकरणों में वंशागति के प्ररूप पर टिप्पणी कीजिए । *5*

अथवा

किसी बैक्टीरियम के भीतर होने वाली ट्रांसक्रिप्शन (अनुलेखन) की प्रक्रिया का वर्णन कीजिए ।

Work out a monohybrid cross upto F_2 generation between two pea plants and two *Antirrhinum* plants both having contrasting traits with respect to colour of flower. Comment on the pattern of inheritance in the crosses carried above.

OR

Describe the process of transcription in a bacterium.

29. (a) उस समष्टि वृद्धि प्रतिरूप का नाम लिखिए जिसका निरूपण इस समीकरण द्वारा होता है $\left\{\frac{dN}{dt} = rN\right\}$.

इस समीकरण में "r" क्या दर्शाता है ? समष्टि वृद्धि में इसका महत्त्व बताइए ।

(b) जनसंख्या वेरहल्स्ट-पर्ल संभारी वृद्धि वक्र का उपयोग करते हुए वहन क्षमता का सिद्धांत समझाइए । *5*

अथवा

(a) उपयुक्त उदाहरण देते हुए समझाइए कि विभिन्न पोषण स्तरों से ऊर्जा का प्रवाह किस प्रकार होता है । इस पिरामिड में प्रत्येक छड़ किसका प्रतिदर्श करती है ?

(b) पारिस्थितिकी पिरामिडों की कोई दो परिसीमाएँ लिखिए ।

(a) Name the population growth pattern the equation $\left\{\frac{dN}{dt} = rN\right\}$ represents. What does "r" represent in the equation ? Write its importance in population growth.

(b) Explain the principle of carrying capacity by using population Verhulst-Pearl logistic growth curve.

OR

(a) With suitable examples, explain the energy flow through different trophic levels. What does each bar in this pyramid represent ?

(b) Write any two limitations of ecological pyramids.

30. (a) किसी द्विबीजपत्री पौधे के एक परिपक्व हुए भ्रूण का नामांकित आरेख बनाइए ।

(b) किसी आवृतबीजी की परिपक्व लघुबीजाणुधानी की संरचना का वर्णन कीजिए । *5*

अथवा

मानव मादा में रजो-चक्र की विभिन्न प्रावस्थाओं के विषय में समझाइए तथा इन प्रावस्थाओं का पिट्यूटरी हॉर्मोनों के भिन्न स्तरों के साथ सहसंबंध बताइए । *5*

(a) Draw a labelled diagram of a matured embryo of a dicotyledonous plant.

(b) Describe the structure of a matured microsporangium of an angiosperm.

OR

Explain the different phases of menstrual cycle and correlate the phases with the different levels of pituitary hormones in a human female.

SECTION – A

1. **Name the two gases contributing maximum to the green house effect.**
   Ans. CO2, CH4 ½+1/2

2. **Write the level of biodiversity represented by a mangrove. Give another example falling in the same level.**

   Ans. Ecological; Estuaries/desert/rain forest/coral reef/ wetland / alpine meadows (anyone) ½+½

3. **Name the material used as matrix in gel-electrophoresis and mention its role.** **1**

   Ans. Agarose gel / seaweed; sieving effect to separate DNA fragments ½+½

4. **State one reason for adding blue-green algae to the agricultural soil.** **1**
   Ans. To increase fertility of soil /to fix N2-/enhances N2 content 1
5. **What will happen if DNA replication is not followed by cell division in a eukaryotic cell?** **1**
   Ans. Results in polyploidy/ chromosomal abnormality 1
6. **Identify and write the correct statement:**
   (a) Drosophila male has one X and one Y chromosome
   (b) Drosophila male has two X chromosomes

   Ans. Drosophila male has one X and one Y chromosome 1

7. **State one reason why breast-feeding the baby acts as a natural contraceptive for the mother.**
   Ans. Breast-feeding prevents ovulation during lactation/absence of menstruation 1
8. **Give one example each of a plant that reproduce by :**
   (a) Runner
   (b) Offset

   Ans. a) Runner - *Oxalis*

   b) Offset - water hyacinth ½ + 1/2

SECTION – B

9. **Why is making cells competent essential for biotechnology experiments ? List any two ways by which this can be achieved.** **2**

Ans. Enable host cells/bacteria to take up DNA/ r-DNA
-Bacterial cell treated with (divalent cation) Ca^{++} + heat (42^0C) +r-DNA on ice / /microinjection/gene gun/ vector disarmed pathogen 1+1=2

10. What do 'Cry' genes in *Bacillus thuringiensis* code for ? State its importance for cotton crop. 2

Ans. *Cry* codes for Bt toxin 1

Bt toxin (protein encoded) are insect group specific 1

11. Write any two ways how genetically modified plants are found to be useful. 2

Ans. Tolerant to abiotic stresses/reduced reliance on chemical pesticide/reduced post harvest losses/increased efficiency of mineral usage/enhanced nutritional value (Any two) 1x2=2

12. Provide two reasons that make the count of prokaryotic species difficult. 2

Ans. Conventional taxonomic methods (Morphlogical) not suitable difficult to culline in lab 1x2=2

13. What ia an "algal bloom " ? State its cause and any two harmful effects. 2

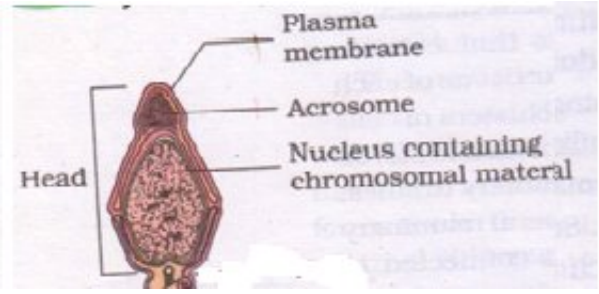
Ans. Excessive growth of planktonic(free-floating) algae 1

Presence of large amounts of nutrients ½

Deterioration of water quality/fish mortality/toxic to human beings and animals/depletion of O_2 ½

14. Draw and label the parts of the head region only of a human sperm. 2

Ans. Plasma membrane, Acrosome; Nucleus;



(½ x 3labels +½ diagram=2)

15. What do oral pills contain and how do they act as effective contraceptives? 2

Ans. Progestogens / Progestogen-estrogen hormone 1

Inhibit ovulation/implantation/alter quality of cervical mucus to prevent/retard entry of sperm(any one) 1

16. Explain how natural selection operates in nature by taking an example of white winged and dark winged moths of England. 2

Ans. Before industrialization/more white winged moths/as no pollution/lichen growing on tree camouflage/dark winged moths picked by predators 1

After industrialisation/more dark winged moths/pollution/no lichen/tree trunk became dark/dark winged camouflage/white winged picked by predators 1

17. Differentiate between active and passive immunity. **2**

OR

Differentiate between outbreeding and outcrossing.

Ans. **Active immunity**- When a host is exposed to antigens, which may be in terms of dead or living microbes/proteins; antibodies are produced in the host body

Passive Immunity- When ready made antibodies are directly given to protect the body against foreign agent /antigen protein 1+1=2

OR

Out breeding- breeding of unrelated animals between same breeds, no common ancestors /between different breeds/cross breeding/different species/ interspecific hybridisation

Out crossing-Mating within same breed, no common ancestors for 4-6 generations 1+1=2

18. Name two groups of organisms which constitute 'flocs' .Write their influence on level of BOD during biological treatment of sewage. **2**

Ans. Aerobic bacteria; fungi; they consume organic matter of effluents; use O2/ reduce BOD

SECTION – C

19. **Suggest and describe a technique through which a virus-free healthy plant can be obtained from a diseased sugarcane plant.** **3**

Ans. Apical/axillary meristem; remove meristem; grow in vitro 1x3=3

20. How are Baculoviruses and Bacillus thuringiensis used as bio-control agents ? Why are they preferred over readily available chemical pesticides ? **3**

Ans. **baculo virus**-used as species specific/narrow spectrum//insecticidal application

Bacillus thurengiensis-available in sachets as dried spores which are mixed with water and sprayed

(any one difference)

No negative impacts on plants, mammals/birds/fish/non target insects 1+1+½+½=3

21. Draw a schematic diagram of the E. coli cloning vector pBR322 and mark the following in it : **3**

(a) ori

(b) rop

(c) ampicillin resistance gene

(d) tetracycline resistance gene

(e) restriction site BamHI

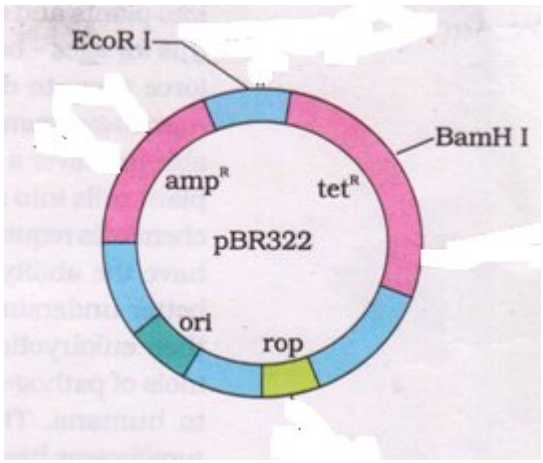
(f) restriction site EcoRI

OR

(a) Draw schematic diagrams of segments of a vector and a foreign DNA with the sequence of nucleotides recognized by EcoRI.

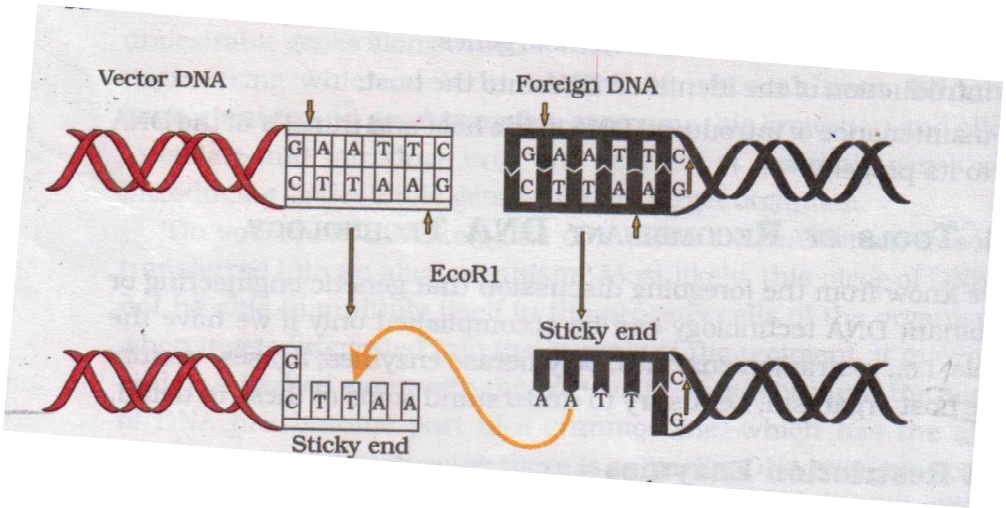
(b) Draw the vector DNA segment and foreign DNA segments after the action of EcoRI and label the sticky ends produced.

Ans.



½ X 6=3

OR



Vector DNA,Foreign DNA,Sticky ends,Arrow for joining,Correct sequence,Correct position for cutting

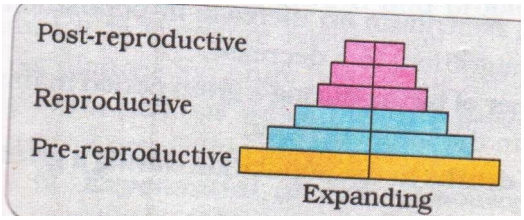
(½ x 6=3)

22. Do you support 'Dope' test being conducted on sportspersons participating in a prestigious athletic meet ? Give three reasons in support of your answer. 3

Ans. Yes, it helps to diagnose unnatural enhanced performance, unethical (Cheating)or any other appropriate points 1+1+1=3

23. **Draw and explain expanding age pyramids of human population. Why is it so called ?** **3**

Ans.



expanding age pyramids of human population explains that population is growing, because pre reproductive age is more in number (½ x 3labels + ½ diagram+ ½ explanation+½ reason=3)

24. **Giving three reasons , write how Hardy – Weinberg equilibrium can be affected.** **3**

Ans. Gene flow-/ Gene migration- changes gene frequency(gain or loss)
Genetic drift-By chance change in frequency
Recombination - mixing causes change in frequency –
Mutation-heritable changes
Natural selection- Speciation (any three)

25**. a) What are the transcriptional products of RNA polymerase III ?** **3**

(b)Differentiate between 'Capping' and 'Tailing'.
(c) Expand hnRNA.

Ans. a) tRNA,5srRNA,SnRNA 1
b) one diff 1
c) Heterogenous nuclear RNA 1

26. **Name a blood related autosomal Mendelian disorder. Why is it called Mendelian disorder ? How is the disorder transmitted from parents to offsprings?** **3**

Ans. Sickle cell anemia, 1
As alteration/mutation in a single gene in HbA peptide at 6^{th} position instead of GAG(Glu)it is GUG(Val) 1
It is transmitted when both partners are carrier/ the gene (heterozygous) Hb^A Hb^S 1

27**. (a) Why are seeds of some grasses called apomictic ? Explain.** **3**

(b) state two reasons to convince a farmer to use an apomitic crop.

Ans. a) produce seeds without fertilization 1

b) There is no segregation of characters/farmers can use hybrid seeds year after year/he doesn't need to buy hybrid seeds every year(any two) (2)

SECTION – D

28. Work out a monohybrid cross upto f2 generation between two pea plants and two Antirrhinum plants
both having contrasting traits with respect to colour of flower. Comment on the pattern of inheritance in
the crosses carried above. 5

OR

Describe the process of transcription in a bacterium.

Ans Any trait pea plant
(Tall) (dwraf)
Parents TT X tt ½
Gametes T t
Selfing F1 Tt X Tt ½
(Progency)
F2 TT Tt Tt tt
Phenotypic ratio 3 : 1 ½
(Tall) (dwraf)
Genotypic ratio (TT) : 2(Tt) :: 1(tt) ½
Pattern – Dominut/recessive ½

Red White
parent RR X rr ½
R r
Selfs F1 Rr X Rr
(progency)
RR Rr Rr rr
(Red) (Pink) (Pink) (White)

pheuotypi ratio- 1 : 2 : 1 ½
(Red) (Pink) (white)
Genotypic- 1 : 2 : 1 ½
(RR) (Rr) (rr)
Incomlpete dominance ½

OR

Explanation
Initiation- RNA polymerase binds to promoter and initiates transcription. 1
Elongation- RNA polymerase also facilitates opening of the helix and continues elongation. 1
Termination – once RNA polymerase reaches the terminator region, the nascent RNA falls off and also the RNA polymerase 1

(Name & function)RNA polymerase- 1
Initiation factor (Sigma) ½
Termination factor (rho) ½

29. (a) Name the population growth pattern the equation {dN / dt =rN} represents. What does "r" represent in the equation ? Write its importance in population growth. **5**

(b) Explain the principle of carrying capacity by using population Verhulst-Perl logistic growth curve.

OR

(a) With suitable examples, explain the energy flow through different trophic levels. What does each bar in this pyramid represent ?

(b) Write any two limitations of ecological pyramids.

Ans Exponential/geometric 1

a) r = Intrinsic rate of natural increase,

importance – higher the 'r' higher the population growth/any biotic or abiotic factor on population growth 1

b) Given habitat has enough resource to support a maximum possible number beyond which no- further growth is possible. This is carrying capacity K asymptote- is K 1+1

OR

a) In an ideal energy pyramid the primary producers convert only 1% of the energy in the sunlight available to them. the subsequent trophic levels pass on 10% of the energy received from previous trophic level to the next trophic level.
each bar /level in the pyramid represent the amount of energy transferred to the next trophic level.

b) (i) did not take into account the same species belonging to 2 trophic levels.
(ii) assumes simple food chain and not food web
(iii) Saprophyte are not considered (any two)

30.

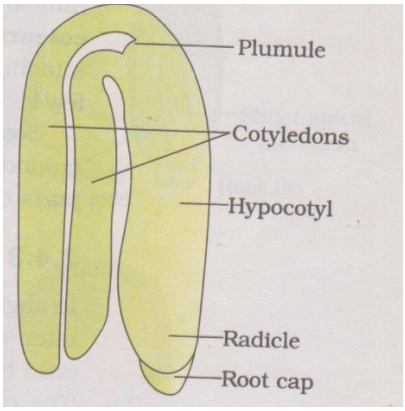
(a) Draw a labeled diagram of a matured embryo of a dicotyledonous plant. **5**

(b) Describe the structure of matured microsporangium of an angiosperm.

OR

Explain the different phases of menstrual cycle and correlate the phases with the different levels of pituitary hormones in human females.

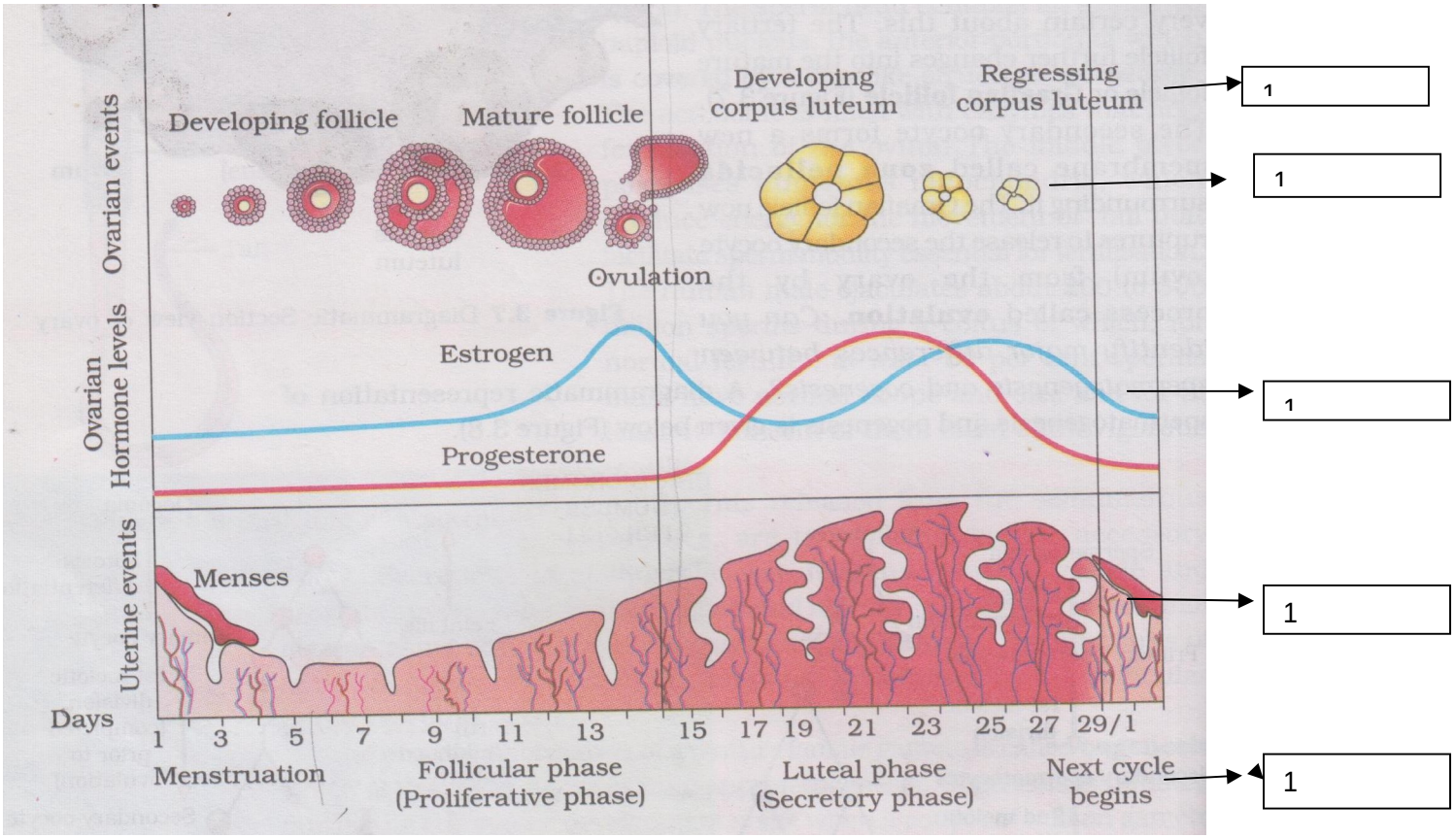
Ans. (a)



(½x5 labels=2½+½ diagram)

(b) Circular in out line, surrounded by four wall layers ,innermost being tapetum , sporogenous tissue occupies the centre of microsporangium // diagram with any four labels ½x4=2

OR



OR explained 1x5=5