Series OSR/C

कोड नं. **57/1**
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*

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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.*

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खण्ड A

SECTION A

1. एक ऐसे प्राणी का उदाहरण दीजिए जिनमें मदचक्र होते पाए जाते हैं । *1*

Give one example of an animal which exhibits Oestrous cycle.

2. 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.

3. निम्नलिखित में से सही कथन चुनिए : *1*

(a) अनेक पक्षियों की मादा में एक जोड़ी असमान ZW क्रोमोसोम होते हैं, जबकि नरों में एक जोड़ी समान ZZ क्रोमोसोम होते हैं ।

(b) अनेक पक्षियों की मादा में एक जोड़ी समान ZZ क्रोमोसोम होते हैं, जबकि नरों में एक जोड़ी असमान ZW क्रोमोसोम होते हैं ।

Identify the correct statement :

(a) Female of many birds has a pair of dissimilar ZW chromosomes, while the males possess a pair of similar ZZ chromosomes.

(b) Female of many birds has a pair of similar ZZ chromosomes, while the males possess a pair of dissimilar ZW chromosomes.

4. 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 ?

5. 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.

6. 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.

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7. 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.

8. 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.

खण्ड B

SECTION B

9. 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.

10. ऐम्नियोसेंटेसिस किसे कहते हैं ? इसका किस प्रकार दुरुपयोग किया जाता है ? *2*

What is amniocentesis ? How is it misused ?

11. निम्नलिखित को उनके श्रेष्ठतर होते जाते हुए विकासक्रम में लिखिए : *2*

ग्नीटेलीज़; फ़र्न्स; *ज़ोस्टेरोफ़िल्लम*; *गिंक्गो*

Rearrange the following in increasing order of evolution :

Gnetales; Ferns; *Zosterophyllum*; *Ginkgo*

12. 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.

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13. 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.

14. 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.

15. शरीर में संश्लिष्ट होने पर मानव इन्सुलिन को और आगे प्रक्रमित किया जाना होता है जिसके बाद ही वह कार्य कर सकती है । इस विषय में कारण बताते हुए समझाइए । *2*

Human insulin when synthesised in the body needs to be processed before it can act. Explain giving reasons.

16. 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.

17. 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.

18. ऐसा कैसे होता है कि किसी जल पिंड में फ़ॉस्फ़ेटों तथा नाइट्रेटों जैसे पोषकों का भारी मात्रा में प्रवाह होना वहाँ के जलीय जीवन को भीषण रूप से प्रभावित कर देता है, समझाइए । उत्तरदायी परिघटना का नाम लिखिए । *2*

Explain how does the inflow of large amount of nutrients like phosphates and nitrates into the water body drastically affects the aquatic life there. Name the phenomenon responsible.

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खण्ड C

SECTION C

19. (a) अनिषेकफलन की तुलना में असंगजनन किस प्रकार भिन्न होता है ?

(b) ऐसी किन्हीं दो विधियों का वर्णन कीजिए जिनके द्वारा कोई असंगजनिक बीज पैदा किया जा सकता है । *3*

(a) How is apomixis different from parthenocarpy ?

(b) Describe any two modes by which apomictic seeds can be produced.

20. ऐसा क्यों है कि मानव मादाओं में हीमोफ़िलिया विरलत: ही पाया जाता है ? इस रोग का कोई एक चिकित्सीय रोग-चिह्न बताइए । *3*

Why is haemophilia rare in human females ? Mention a clinical symptom for the disease.

21. (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*.

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22. 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.

23. 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.

24. 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.

25. 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 ?

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26. *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.

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27. 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 ?

खण्ड D

SECTION D

28. (a) आवृतबीजियों में बीजाण्ड के भीतर एक परिपक्व मादा युग्मकोद्भिद के बनने का वर्णन कीजिए ।

(b) उस/उन कोशिका/कोशिकाओं की संरचना का वर्णन कीजिए जो परागनली को भ्रूण-कोश के भीतर प्रवेश करने का मार्गदर्शन कराती है/हैं । *5*

अथवा

मानव मादा में रजो-चक्र की विभिन्न प्रावस्थाओं के विषय में समझाइए और इन प्रावस्थाओं का अण्डाशयी हॉर्मोनों के विभिन्न स्तरों के साथ क्या सहसंबंध है, बताइए । *5*

(a) Describe the formation of mature female gametophyte within an ovule in angiosperms.

(b) Describe the structure of the cell(s) that guide(s) the pollen tube to enter the embryo-sac.

OR

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

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29. 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.

30. (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 ।

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(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.

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Marking Scheme

SECTION – A

Q.1 Give one example of an animal which exhibits oestrous cycle. 1

Ans.1. (any non primate mammal)-cow/dog/cat/dear/tiger/sheep // (any primate mammal)-
Monkeys/apes/humans (any one) 1

Q**.2 State one reason why breast-feeding the baby acts as a natural contraceptive for the mother.** 1

Ans.2 Breast-feeding prevents ovulation during lactation/absence of menstruation 1

Q.3 Identify the correct statement: 1

(a) Female of many birds has a pair of dissimilar ZW chromosomes, while the males possess a pair of similar ZZ chromosomes.
(b) Female of many birds has a pair of similar ZW chromosomes, while the males possess a pair of dissimilar ZZ chromosomes.

Ans.3. a 1

Q.4 What will happen if DNA replication is not followed by cell division in a eukaryotic cell? 1

Ans. Results in polyploidy/ chromosomal abnormality 1

Q.5 State one reason for adding blue-green algae to the agricultural soil. 1

5. To increase fertility of soil /to fix N2-/enhances N2 content 1

Q.6 Name the material used as matrix in gel-electrophoresis and mention its role. 1

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

Q.7 Write the level of biodiversity represented by a mangrove. Give another example falling in the same level. 1

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

Q.8 Name the two gases contributing maximum to the green house effect. 1

Ans. 8. CO_2 & CH_4 ½+½

SECTION – B

Q.9 Draw and label the parts of the head region only of a human sperm. 2

Ans.9. Plasma membrane, Acrosome; Nucleus;

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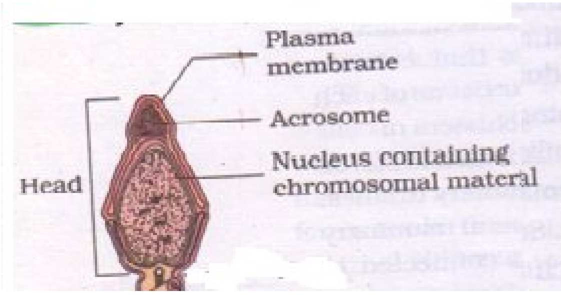

½ X 3labels+½ diagram=2

Q.10 What is amniocentesis? How is it misused? 2

Ans.10. Test of the amniotic fluid surrounding the developing embryo, to study the chromosomal pattern (for an abnormality); to know the foetal sex / female foeticide ½+½+1=2

Q.11 Rearrange the following in increasing order of evolution: 2

Gnetales; Ferns; Zosterophyllum; Ginkgo

11. Zosterophyllum, fern, Gingo, Gnetals ½ X 4=2

Q.12 Differentiate between active and passive immunity. **2**

OR

Differentiate between out breeding and out crossing.

12. **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

Q.13 Name two groups of organisms which constitute 'flocs' .Write their influence on level of BOD during biological treatment of sewage.

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

Q.14. Why is making cells competent essential for biotechnology experiments ? List any two ways by which this can be achieved.

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

Q.15. Human insulin when synthesized in the body needs to be processed before it can act. Explain giving reasons. 2

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Ans.15. Insulin synthesized as pro-hormone (pro-insulin),which has extra stretch-C peptide along with A and B polypeptide. C peptide has to be removed, for insulin to be processed. ½ X 4=2

Q.16. Write any two ways how genetically modified plants are found to be useful. 2

Ans.16. 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

Q.17 Provide two reasons that make the count of prokaryotic species difficult. 2

Ans.17. Conventional taxonomic methods (Morphological) not suitable; difficult to culture in lab. 1x2=2

Q.18 Explain how does the inflow of large amount of nutrients like phosphates and nitrates into the water body drastically affects the aquatic life there. Name the phenomenon responsible. 2

Ans. 18.Promote algal growth; (algae consume O2 of water) water deficient in dissolve O2, mortality of fish: Eutrophication ½ X 4=2

SECTION – C

Q.19. (a) How is apomixes different from parthenocarpy? **3**

(b)Describe any two modes by which apomictic seeds can be produced.

19. a) **Parthenocarpy**-fruits develop without fertilization/fruits are without seeds.
Apomixis-Development of seeds without fertilization/ asexual reproduction that mimics sexual reproduction / diploid egg cell formed without meiotic division
b) diploid egg cell formed without meiotic division, nucellar cells 1+1+½+½=3

Q.20 Why is haemophilia rare in human females ? Mention a clinical symptom for the disease. 3
20. Sex linked mendelian disorder; females(homozygous recessive) do not live upto reproduction age; uncontrolled bleeding; 1+1+1=3

Q.21 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
b) Capping-addition of $^{m}G_{ppp}$ / ^{m}GTP . Tailing-Poly A tail/200-300 adenylate residues
c) Heterogenous nuclear RNA

Q.22. Giving three reasons , write how Hardy – Weinberg equilibrium can be affected. 3
22. 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)

Q. 23. Do you support 'Dope' test being conducted on sportspersons participating in a prestigious athletic meet ? Give three reasons in support of your answer. 3

23. Yes, it helps to diagnose unnatural enhanced performance, unethical (Cheating)or any other appropriate points

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1+1+1=3

Q.24. Suggest and describe a technique through which a virus-free healthy plant can be obtained from a diseased sugarcane plant. 3

Ans. 24. Apical/axillary meristem; remove meristem; grow in vitro 1x3=3

Q.25. 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

Q. 26. 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

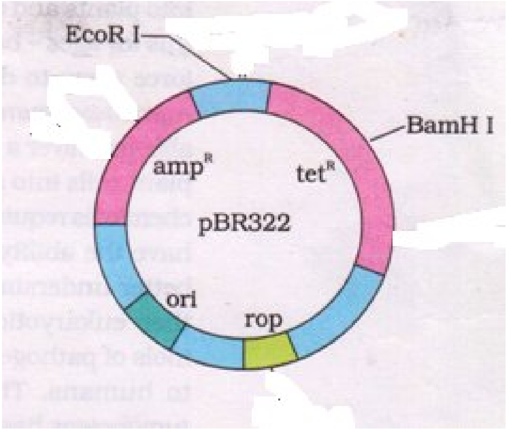
(f) restriction site EcoRI

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.26 (a)



½ X 6=3

OR

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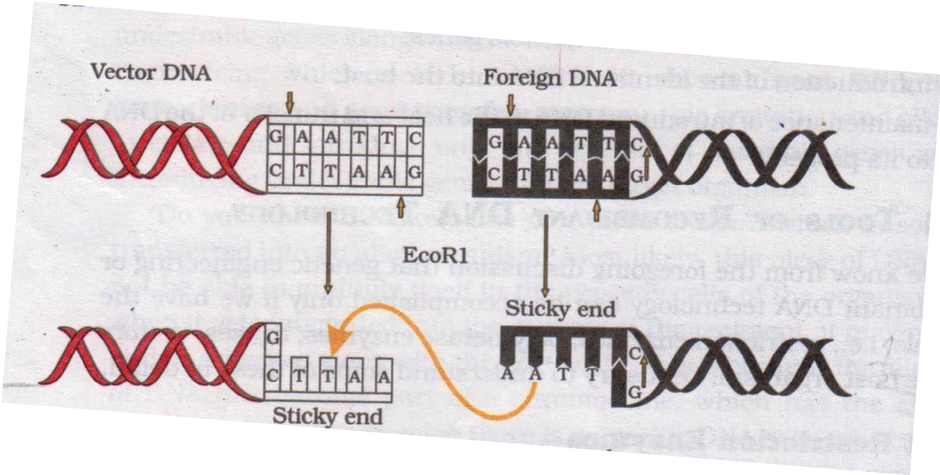
26. (b)

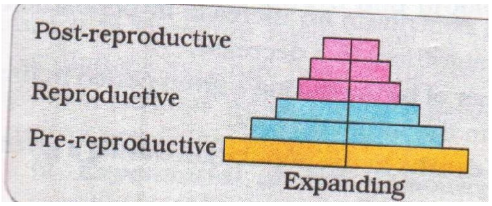


Vector DNA,Foreign DNA,Sticky ends,Arrow for joining,Correct sequence,Correct position for cutting

½ X 6=3

Q.27. Draw and explain expanding age pyramids of human population. Why is it so called ? 3

Ans.27.



expanding age pyramids of human population explains that population is growing, because pre reproductive age is more in number (½ X3labels)+ ½ diagram+½ explanation+½ reason=3

SECTION – D

Q. 28. (a) Describe the formation of mature female gametophyte within an ovule in angiosperms. **5**

(b) Describe the structure of cell(s) that guides(s) the pollen tube to enter the embryo-sac.

OR

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

Ans. 28.a)

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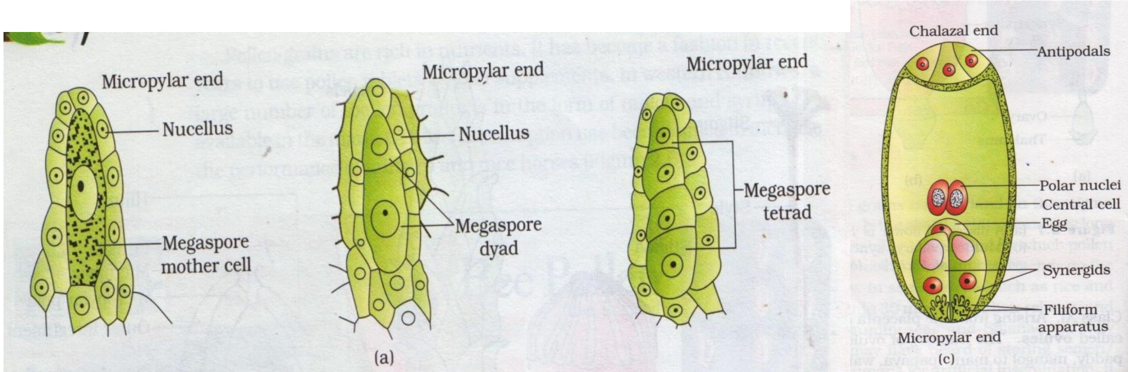
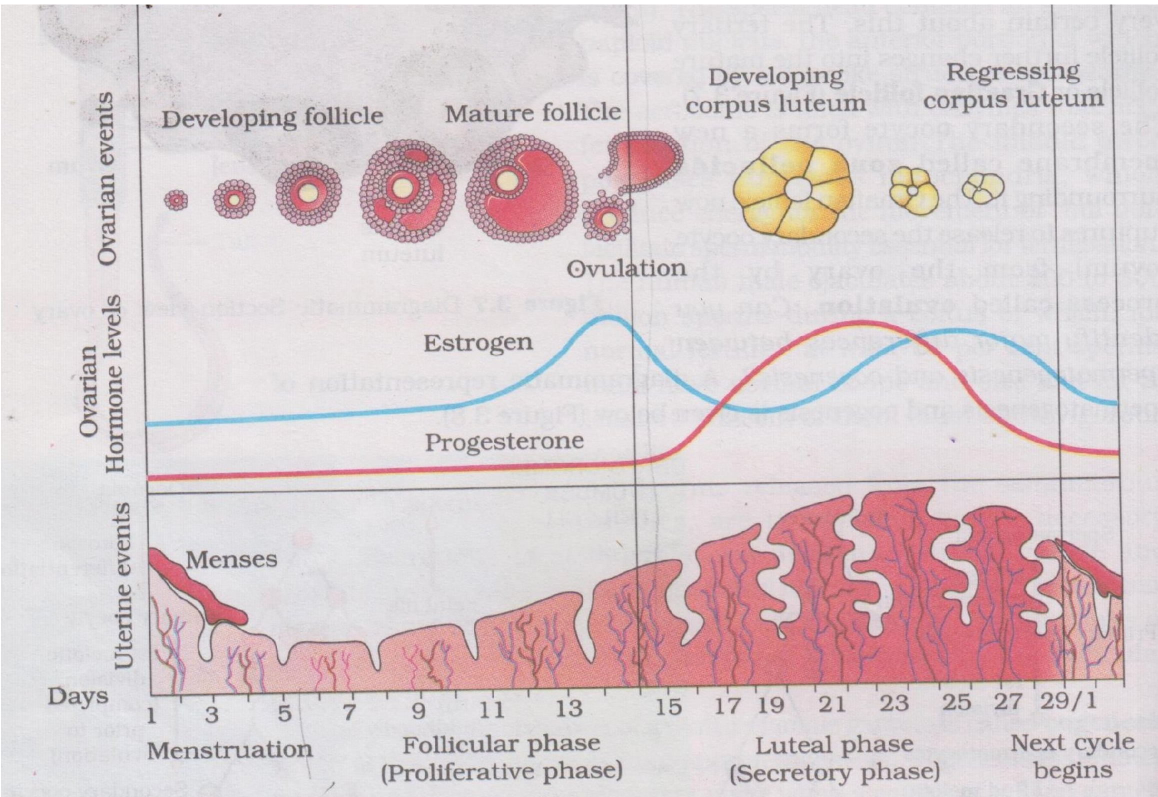


1/2 1/2 1/2 (1/2 x 5= 2 ½)

b) Synergids, have thick wall/ filiform apparatus (1)

OR



Menstruation , Follicular/proliferative phase, Luteal/secretory phase along with parallel changes in ovary and uterus 1x3=3

Ovarian hormones 1+1=2

Q.29. 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.29. Any trait pea plant Red White

(Tall) (dwraf) parent RR X rr ½

Parents TT X tt ½ R r

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Gamets 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

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

30. (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-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.

Ans. 30. 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) P.NO 249- 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)

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