SET – 1

Series : SSO/C

कोड नं.
Code No. 57/1

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 **26** 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 जायेगा । 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 **26** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute 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** घंटे]* *[अधिकतम अंक : **70***

*Time allowed : **3** hours]* *[Maximum Marks : **70***

सामान्य निर्देश :

(i) *प्रश्न-पत्र में **पाँच** खण्डों में **26** प्रश्न दिए गए हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *खण्ड – **A** में प्रश्न संख्या **1** से **5** अति लघु-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न 1 अंक का है ।*

(iii) *खण्ड – **B** में प्रश्न संख्या **6** से **10** लघु-उत्तरीय प्रश्न **I** प्रकार के हैं, प्रत्येक प्रश्न **2** अंकों का है ।*

(iv) *खण्ड – **C** में प्रश्न संख्या **11** से **22** लघु-उत्तरीय प्रश्न **II** प्रकार के हैं, प्रत्येक प्रश्न **3** अंकों का है ।*

(v) *खण्ड – **D** में प्रश्न संख्या **23** मूल्य आधारित प्रश्न **4** अंकों का है ।*

(vi) *खण्ड – **E** में प्रश्न संख्या **24** से **26** दीर्घ-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न **5** अंकों का है ।*

(vii) *प्रश्न-पत्र में समग्र पर कोई विकल्प 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 । प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई **एक** प्रश्न हल करना है ।*

General Instructions :

(i) *There are a total of **26** questions and **five** sections in the question paper. **All** questions are compulsory.*

(ii) *Section **A** contains questions number **1** to **5**, Very Short Answer type questions of **1** mark each.*

(iii) *Section **B** contains questions number **6** to **10**, Short Answer type **I** questions of **2** marks each.*

(iv) *Section **C** contains questions number **11** to **22**, Short Answer type **II** questions of **3** marks each.*

(v) *Section **D** contains question number **23**, Value Based Question of **4** marks.*

(vi) *Section **E** contains questions number **24** to **26**, Long Answer type questions of **5** marks each.*

(vii) *There is no overall choice in the question paper, however, an internal choice is provided in **one** question of **2** marks, **one** question of **3** marks and all the **three** questions of **5** marks. In these questions, an examinee is to attempt any **one** of the **two** given alternatives.*

खण्ड – A

SECTION – A

1. उन दो विशिष्ट कोडोनों को बताइए जो mRNA की ट्रांसलेशनल इकाई के दोनों तरफ स्थित होते हैं । **1**

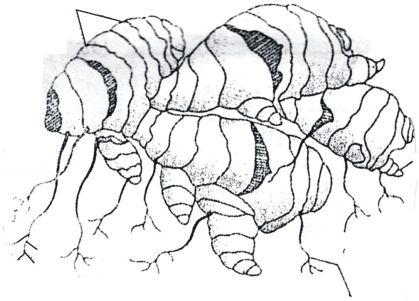
   Write the two specific codons that a translational unit of mRNA is flanked by one on either sides.

2. किलनियों और कुत्तों के बीच पाए जाने वाली पारस्परिक क्रिया किस प्रकार की होती है ? **1**

   State the type of interaction that exists between ticks and dogs.

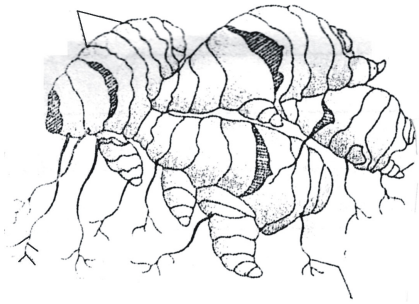
3. क्लाइनेफ़ेल्टर सिंड्रोम से ग्रस्त व्यक्तियों में पाए जाने वाले क्रोमोसोमी (गुणसूत्री) प्रभाव बताइए । **1**

   Write the chromosomal defect in individuals affected with Klinefelter's syndrome.

4. 

   यहाँ दिए गए चित्र को पहचानिए तथा उस कायिक भाग की चर्चा कीजिए जो उसे जनन में मदद करता है । **1**

Identify the picture and mention the vegetative part that helps it to propagate.

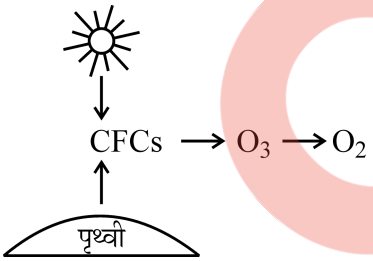


5. सैकैरम बारबेरी की तुलना में सैकैरम ऑफ़ीसिनेरम का आर्थिक महत्त्व बताइए । **1**
State the economic value of *Saccharum officinarum* in comparison to *S. barberi*.

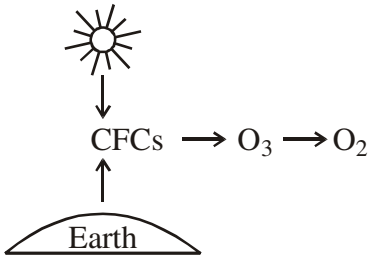
खण्ड – B
SECTION – B

6. प्रोटीन संश्लेषण में राइबोज़ाइम और निर्मोचन कारक के कार्य बताइए । **2**
State the functions of Ribozyme and release factor in protein synthesis respectively.

7. निम्नलिखित के कार्य बताइए : **2**
(a) cry 1AC जीन
(b) RNA व्यतिकरण (RNAi)
Write the functions of
(a) cry 1AC gene
(b) RNA interference (RNAi)

8. 

(a) CFC का पूरा नाम लिखिए ।
(b) यह ओज़ोन को किस प्रकार ऑक्सीजन में निम्नीकृत कर देता है ? **2**



(a) Expand CFC.
(b) How does it reduce ozone to oxygen ?

9. स्त्री में कॉर्पस ल्यूटियम की क्या नियति होती है यदि अंडाणु (i) निषेचित हो जाता है, या (ii) निषेचित नहीं होता ? **2**

अथवा

नरम नारियल के पानी और परिपक्व नारियल की मोटी, सफेद गिरी में अंतर बताइए तथा उनमें गुणसूत्र-संख्या भी बताइए ।

What happens to corpus luteum in human female if the ovum is (i) fertilized, (ii) not fertilized ?

OR

Write the difference between the tender coconut water and the thick, white kernel of a mature coconut and their ploidy.

10. बोगेनविलिआ के काँटे और कुकरबिट के प्रतान (टेंड्रिल) के बीच कारण बताते हुए विकासीय संबंध बताइए । **2**

State the evolutionary relationship giving reasons between the thorn of Bougainvillea and tendril of cucurbit.

खण्ड – C
SECTION – C

11. मानवों में ADA न्यूनता का कारण बताइए । आनुवंशिक इंजीनियरिंग से इसके रोगियों को क्या मदद मिली है ? **3**

Mention the cause of ADA deficiency in humans. How has genetic engineering helped patients suffering from it ?

12. शहरी क्षेत्रों में पेयजल की समस्या का प्रमुख कारण यही है कि हम अपने जल-निकायों की सुरक्षा करने में असफल रहे हैं । समझा कर बताइए कि द्रुत गति से होने वाला सुपोषण हमारे जल-निकायों को अवरुद्ध कर देता है जिसके कारण उनकी ऑक्सीजन दायी क्षमता समाप्त हो जाती है । **3**

Drinking water problem in our urban areas is caused mainly because we fail to protect our water bodies. Explain how accelerated eutrophication chokes our water bodies to death.

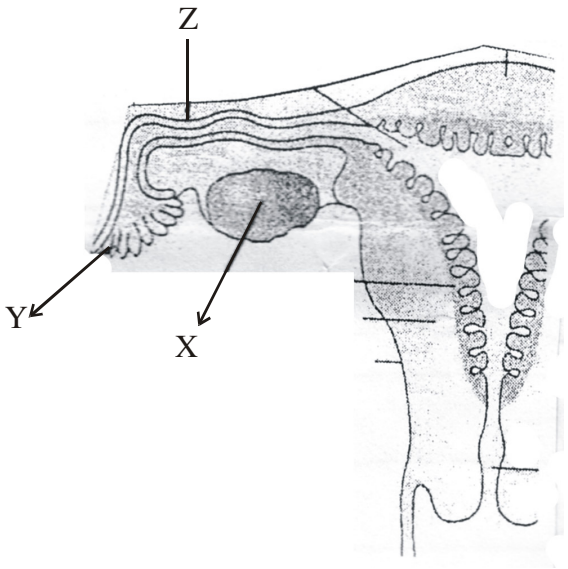
13. (a) सुदम और दुर्दम अर्बुदों (ट्यूमरों) में अंतर बताइए ।

(b) हाल ही जन्मे बच्चे के लिए नवदुग्ध क्या एक वरदान होता है ? **3**

(a) Differentiate between benign and malignant tumours.

(b) Why is colostrum a boon to the newborn baby ?

14.

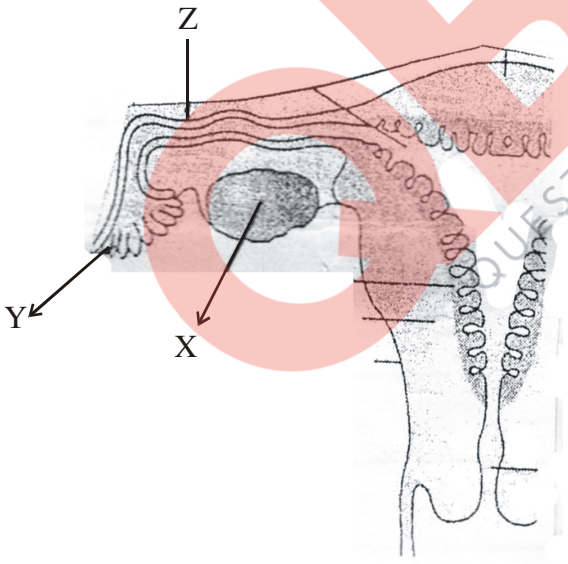


उपरोक्त आरेख में स्त्री के जनन-तंत्र का एक भाग दर्शाया गया है ।

(a) उन युग्मक कोशिकाओं का नाम बताइए जिन्हें हाल ही जन्मी बच्ची में से निकाल लिए गए भाग 'X' से प्राप्त किया गया होगा ।

(b) 'Y' भाग का नाम बताइए तथा उसका कार्य भी बताइए ।

(c) 'Z' भाग का नाम बताइए तथा यहाँ होने वाली घटनाओं की चर्चा कीजिए । **3**



This diagram above shows a part of the human female reproductive system.

(a) Name the gamete cells that would be present in 'X' if taken from a newborn baby.

(b) Name 'Y' and write its function.

(c) Name 'Z' and write the events that take place here.

15. जीवाश्मों का अध्ययन विकास का किस प्रकार समर्थन करता है ? समझाइए । **3**

अथवा

हार्डी वाइनबर्ग का साम्य अवस्था का नियम किस बात का संकेत करता है ? उन किन्हीं दो कारकों के नाम बताइए जो साम्यता में परिवर्तन ला सकते हैं । इस प्रकार के परिवर्तन आने से क्या घटना हो सकती है ?

How does the study of fossils support evolution ? Explain.

OR

What does Hardy-Weinberg Principle of equilibrium indicate ? List any two factors that could alter the equilibrium. What would such an alteration lead to ?

16. गोल कृमियों द्वारा होने वाले किन्हीं **दो** मानव रोगों के नाम बताइए । इन रोगों को उत्पन्न करने वाले कारकों के नाम बताइए तथा मानवों में इन रोगों के संक्रमण की विधि भी बताइए । **3**

Mention any two human diseases caused by round worms. Name their causative agents and their mode of transmission into the human body.

17. (a) एक्सॉनों और इंट्रॉनों में अंतर बताइए ।

(b) प्लाज़्मिड क्या होता है ? इसका चयन बैक्टर की भाँति क्यों किया जाता है ? **3**

(a) Differentiate between exons and introns.

(b) What is a plasmid ? Why is it selected as a vector ?

18. पारिस्थितिक अनुक्रमण क्या होता है ? अनुक्रमण की दर एक नए-नए स्थापित तालाब में अथवा जंगल की आग से नष्ट हुए एक वन में से किसमें अधिक तीव्र गति से होगी और क्यों होगी ? **3**

What is ecological succession ? Where and why would the rate of succession be faster in newly created pond or a forest destroyed by a forest fire ?

19. उच्च उत्पादन करने वाली गाय खाद्य-वृद्धि का एक उत्तम हल है । MOET प्रौद्योगिकी से गोवृंद की वृद्धि में किस प्रकार सहायता मिलती है ? **3**

High yielding cattle is a good solution for food enhancement. How does the MOET technology help to increase the herd size ?

20. यदि किसी परिवार में हीमोफिलिया नामक रोग का इतिहास है, तब उस परिवार की स्त्रियों की अपेक्षा पुरुषों में हीमोफ़िलिया रोग होने के अधिक संयोग होते हैं । **3**

(a) ऐसा क्यों होता है ?

(b) इस बीमारी के रोग लक्षण बताइए ।

If there is a history of haemophilia in the family, the chances of male members becoming haemophilic are more than that of the female.

(a) Why is it so ?

(b) Write the symptoms of the disease.

21. उच्च तुंगता वाले हिमालयी क्षेत्र में रहने वाले आदिवासियों को साँस लेने में क्यों दिक्कत होती है ? ऐसी स्थिति में जीवित बने रहने के लिए किस प्रकार अनुकूलित हो जाते हैं ? **3**

Why do tribes who live in high altitude of Himalayas experience discomfort in respiration ? How do they get adapted to survive in such a situation ?

22. अपने आर्तव-चक्र के दौरान सामान्य स्त्री में निम्नलिखित दिनों में होने वाली घटनाओं की व्याख्या कीजिए : **3**

(a) आठवें दिन से लेकर बारहवें दिन तक पिट्यूटरी हॉर्मोन का स्तर ।

(b) तेरहवें दिन से लेकर पंद्रहवें दिन तक गर्भाशय में होने वाली घटनाएँ ।

(c) सोलहवें दिन से लेकर तेईसवें दिन तक अंडाशय में होने वाली घटनाएँ ।

Explain the events in a normal woman during her menstrual cycle on the following days :

(a) Pituitary hormone levels from 8 to 12 days.

(b) Uterine events from 13 to 15 days.

(c) Ovarian events from 16 to 23 days.

खण्ड – D

SECTION – D

23. संगी-साथियों का दबाव किशोरों में धूम्रपान की आदतों को बढ़ावा देने में ऋणात्मक भूमिका अदा करता है । अपने स्कूल में कप्तान होने के नाते आप अपने स्कूल के सीनियर विद्यार्थियों के साथ मिलकर कोई दो ऐसे कार्यक्रम आरंभ करना पसंद करेंगे और इसी प्रकार अपने स्कूल के अधिकारियों के कोई दो ऐसे कार्यक्रम आरंभ करना चाहेंगे जिनसे इस समस्या का सामना किया जा सके । इस कार्य को करने में कार्यक्रम किस प्रकार मदद करेंगे ? व्याख्या कीजिए । **4**

Peer pressure plays a negative role in triggering smoking habits in adolescents. As a school captain list any two activities you would like to organize with the help of senior students of your school and any other two activities you would like your school authorities to organize for the students to tackle this problem. Explain how these activities will help in doing so.

खण्ड – E

SECTION – E

24. (a) मूल सिद्धांत (सेन्ट्रल डॉगमा) क्या होता है ? इसकी प्रस्तावना किसने की थी ?

(b) यह प्रमाणित करने के लिए कि DNA का प्रतिकृतियन अर्धसंरक्षी होता है, मेसेल्सन और स्टॉल द्वारा किए गए प्रयोग का वर्णन कीजिए । **5**

अथवा

(a) क्रमश: रुधिर समूह 'A' और 'B' वाले एक दंपति के बच्चे का रुधिर समूह 'O' है । एक क्रॉस बनाकर यह समझाइए कि यह किस प्रकार संभव हो सका । साथ ही यह भी दर्शाइए कि इस दंपति के अन्य बच्चों में संभावी रुधिर-समूह क्या हो सकते हैं ।

(b) जनसंख्या में रुधिर-समूहों के आनुवंशिक आधार की व्याख्या कीजिए ।

(a) What is Central dogma ? Who proposed it ?

(b) Describe Meselson and Stahl's experiment to prove that the DNA replication is semi-conservative.

OR

(a) A couple with blood groups 'A' and 'B' respectively have a child with blood group 'O'. Work out a cross to show how it is possible and the probable blood groups that can be expected in their other off-springs.

(b) Explain the genetic basis of blood groups in human population.

25. rDNA प्रौद्योगिकी द्वारा इंसुलिन बनाने के अनुप्रयोग की व्याख्या कीजिए । **5**

अथवा

(a) PCR के एक पूरे चक्र के विभिन्न चरणों का वर्णन कीजिए ।

(b) इस प्रकार का विस्तारित DNA अनुक्रम किस कार्य के लिए किया जाता है ?

Explain the application of rDNA technology to produce insulin.

OR

(a) Describe the different steps in one complete cycle of PCR.

(b) State the purpose of such an amplified DNA sequence.

26. (a) ऐंजियोस्पर्मों में माइक्रोस्पोरोजेनेसिस की प्रक्रिया का क्रमागत वर्णन कीजिए । **5**

(b) दो कोशिका वाली अंतिम संरचना का एक नामांकित आरेख बनाइए ।

अथवा

(a) मानव की शुक्रजनक नलिका का काटीय दृश्य बनाइए । इस आरेख में निम्नलिखित संरचनाओं का नामांकन कीजिए तथा उनके कार्य बताइए :
सर्टोली कोशिका, शुक्राणुजननी तथा लीडिग कोशिका ।

(b) शुक्राणुजनन की प्रक्रिया में पिट्यूटरी और लिंग हॉर्मोनों की भूमिका की व्याख्या कीजिए ।

(a) Describe in sequence the process of microsporogenesis in angiosperms.

(b) Draw a labelled diagram of a two celled final structure formed.

OR

(a) Draw a sectional view of a seminiferous tubule of human. Label sertoli cell, spermatagonia and leydig cell on it and write their functions.

(b) Explain the role of pituitary and sex hormones in the process of spermatogenesis.

Senior School Certificate Examination
COMPARTMENT (2015)
Marking Scheme - Biology (Theory)
Expected Answers/Value Points

General Instructions

The Marking Scheme and mechanics of marking

1. In the marking scheme-the marking points are separated by commas, one oblique line *(/)* indicates acceptable alternative, two obliques *(//)* indicate complete acceptable alternative set of marking points.
2. Any words/phrases given within brackets do not have marks.
3. Allow spelling mistakes unless the misspelt word has another biological meaning. Ignore plurals unless otherwise stated in the marking scheme.
4. In any question exclusively on diagram no marks on any description. But in questions on descriptions, same value points may be marked on the diagrams as a subsitute.
5. All awarded marks are to be written in the left hand margin at the end of the question or its part.
6. Place a tick (v') in red directly on the key/operative term or idea provided it is in correct context. Place "Half-tick" ½ wherever there is ½ mark in the. marking scheme. (Do not place tick indiscriminately just to show that you have read, the-answer).
7. If no marks are awarded to any part or question put a cross (x) at incorrect value portion and mark it zero (in words only).
8. Add up ticks or the half ticks for a part of the question, do the calculation if any, and write the part total or the question total in the left hand margin.
9. Add part totals of the question and write the question total at the end. Count all the ticks for the entire question as a recheck and draw a circle around the question total to confirm correct addition.
10. If parts have been attempted at different places do the totalling at the end of the part attempted last.
11. If any extra part is attempted or any question is reattempted, score out the last one and write "extra".
12. In questions where only a certain number of items are asked evaluate only that many numbers in sequence as is asked ignoring all the extra ones even if otherwise correct.
13. Transcribe the marks on the cover page. Add up question totals. Recheck the script total by adding up circled marks in the script.
14. Points/answer given in brackets in marking scheme are not so important and may be Ignored for marking.

Question Paper code 57/1

Set 1

Section A

Q nos 1-5 are of one mark each

Q1. Write the two specific codons that a translational unit of mRNA is flanked by one on either sides.

Ans. Start codon-AUG,

Stop codon- UAA/UGA/UAG ½ + ½

Q2. State the type of interaction that exists between ticks and dogs.

Ans. (Ecto)Parasitism 1

Q3. Write the chromosomal defect in individuals affected with Klinefelter's syndrome.

Ans. (Male) additional copy of X chromosome / XXY 1

Q4. Identify the picture and mention the vegetative part that helps it to propagate.

Ans. Rhizome of ginger/ underground stem, axillary bud grows from the node ½ + ½ = 1

Q5. State the economic value of *Saccharum officinarum* in comparison to S. *barberi.*

Ans.. Higher sugar content/thicker stem 1

Section B

Q nos 6-10 are of two marks each

Q6. State the functions of Ribozyme and release factor in protein synthesis respectively.

Ans.. Ribozyme- helps in peptide bond formation,

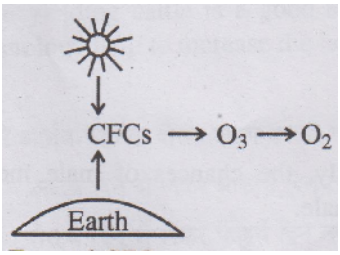
Release factor- terminates translation/ releases polypeptide from ribosome 1+1

Q.7 Write the functions of
(a) cry 1AC gene
(b) RNA interference (RNAi)

Ans. (a) It produces inactive pro-toxin in the host cell /produces proteins to control cotton bollworms

(b) It produces ds RNA which silences host mRNA/cellular defence mechanism/prevents infestation by nematodes 1+1

Q8.



(a) Expand CFC

(b) How does it reduce ozone to oxygen?

Ans.. a) Chloroflurocarbons

b) It releases Chlorine atoms which degrades ozone to release oxygen 1+1

Q9. What happens to corpus luteum in human female if the ovum is (i) fertilized, (ii) not fertilized?

OR

Write the difference between the tender coconut water and the thick, white kernel of a mature coconut and their ploidy.

Ans. i) Corpus luteum continues to secrete progesterone to maintain pregnancy/ it persists and produces progesterone

ii) it disintegrates/ changes into corpus albicans 1+1

OR

Coconut water from the tender coconut has free nuclear endosperm, kernel has the cellular endosperm
Ploidy of the endosperms- 3n/ Triploid ½ + ½ + 1=2

Q10. State the evolutionary relationship giving reasons between the thorn of Bougainvillea and tendril of cucurbit.

Ans.. Divergent evolution/ Homologous organs,

Similar in origin but perform different function 1+1=2

Section C

Q nos 11-22 are of three marks each

Q11. Mention the cause of ADA deficiency in humans. How has genetic engineering helped patients suffering from it?

Ans. Deletion/ mutation of the gene which forms the enzyme –adenosine deaminase. 1

Lymphocytes from the blood of the patient, can be grown in a culture outside the body, ADAcDNAgene can be inserted into the lymphocyte using retroviral vector, then lymphocytes can be returned to the patient .(They can start producing ADA) ½ x 4=2

Q.12 Drinking water problem in our urban areas is caused mainly because we fail to protect our water bodies. Explain how accelerated eutrophication chokes our water bodies to death.

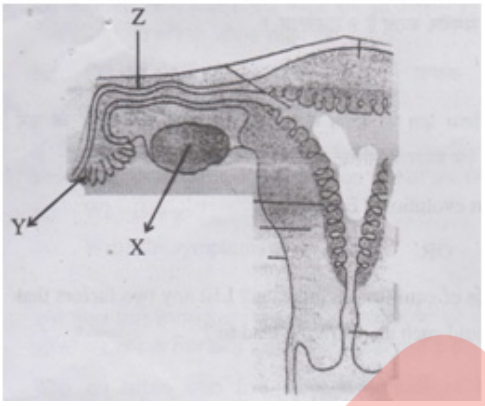
Ans. Sewage and industrial wastes are added to the lake, nitrates and phosphates act as plant nutrients, promotes algal bloom, dissolved oxygen depletes, less oxygen and pollutants poison the aquatic life , decomposing remains choke the lake to death. ½ x 6=3

Q.13. (a) Differentiate between benign and malignant tumors.
(b) Why is colostrum a boon to the newborn baby?

Ans. (a) Benign tumour- remains confined to original location/does not spread to other part of the body/ not cancerous 1
Malignant tumour-mass of proliferating (neoplastic)cells that invade and damage surrounding tissues/cancerou tumour/ tumour showing property of metastasis 1

(b) Colostrum contains antibodies/that provides resistance (immunity) to new born babies 1

Q.14. This diagram above shows a part of the human female reproductive system.
(a) Name the gamete cells that would be present in 'X' if taken from a newborn baby.
(b) Name 'Y' and write its function.
(c) Name 'Z' and write the events that take place here.



Ans. (a)X= Primary oocytes 1

(b)Y= Fimbriae, collection of ovum ½+ ½

(c) Z=ampullary- isthumic junction/fallopian tube, the ovum encounters the sperm/fertilisation takes place ½ + ½

Q.15 How does the study of fossils support evolution ? Explain.
OR
What does Hardy-Weinberg Principle of equilibrium indicate ? List any two factors that could alter the equilibrium. What would such an alteration lead to?

Ans. Fossils are remains/ hard parts of life forms, found in sedimentary rocks, some of them appear similar to modern organisms /some represent extinct organisms, study of fossils in different sedimentary layers indicates the geological period in which they existed (provide palaeontological evidence) 1 x 3

OR

(a) Allele frequencies are stable and constant from generation to generation /the gene pool (total genes and their alleles in a population) remains a constant/ sum total of all allelic frequencies is one 1
Factors– Gene migration, gene flow, genetic drift, mutation, genetic recombination, natural selection (any two ½ + ½)

(b) Leads to –Evolution 1

Q.16 Mention any two human diseases caused by round worms. Name their causative agents and their mode of transmission into the human body.

Ans.. Ascariasis ,Ascaris, contaminated water /vegetables/fruits,

Elephantiasis/filariasis, *Wuchereria bancrofti* /filarial worm, bite by female mosquito vectors ½ x 6 =3

Q.17 (a) Differentiate between exons and introns.
(b) What is a plasmid ? Why is it selected as a vector?

Ans. a) Exons are the coding or expressed sequences that appear in mature or processed RNA, introns are intervening sequences that do not appear in mature or processed RNA//Exons are codons that code for amino acid sequence, introns do not code for amino acids 1

b) Autonomously replicating circular DNA / extra chromosomal DNA,exclusively present in bacteria ½+ ½

It takes in alien DNA/acts as vector, and delivers is into a host cell ½+ ½

Q.18 What is ecological succession ? Where and why would the rate of succession be faster in newly created pond or a forest destroyed by a forest fire?

Ans. Gradual/predictable change in the species composition of a given area,

Rate of succession would be faster in a forest destroyed by a forest fire,

Such disturbances create new conditions that encourage some species and discourage or eliminate other species /since after a forest fire some soil is already present and succession is faster than primary succession

1 x 3 = 3

Q.19 High yielding cattle is a good solution for food enhancement. How does the MOET technology help to increase the herd size?

Ans. High yielding female administered with FSH ,6-8 eggs / multiple eggs produced, inseminated, fertilised eggs recovered non-surgically, at 32-cell stage , transferred to surrogate mother (for development) ½ x 6=3

Q.20 If there is a history of haemophilia in the family, the chances of male members becoming haemophilic are more than that of the females.
(a) Why is it so ?
(b) Write the symptoms of the disease.

Ans.. a) Defective gene is on X chromosome, in case the carrier female (mother) passes X^h to the son he suffers, if she passes X^h to the daughter, she has the other X(from father) to make it heterozygous so the daughters escape as carriers

½ x 4=2

b) The blood does not clot in the affected person after an injury or a small cut. 1

Q.21 Why do tribes who live in high altitude of Himalayas experience discomfort in respiration ? How do they get adapted to survive in such a situation?

Ans. Atmospheric pressure is low, O_2 content is lower at high attitude ½ + ½

Body increases RBC production, decreases binding capacity of haemoglobin, increases breathing rate (any two)

1+1

Q.22 Explain the events in a normal woman during her menstrual cycle on the following days:
(a) Pituitary hormone levels from 8 to 12 days.
(b) Uterine events from 13 to 15 days.
(c) Ovarian events from 16 to 23 days.

Ans. a) FSH and LH levels – low 1

b) Endometrium is highly vascularised / proliferative phase of uterine lining 1

c) Formation of corpus luteum / secretion of progesterone 1

Section D

Q no 23 is of four marks

Q.23 Peer pressure plays a negative role in triggering smoking habits in adolescents. As a school captain list any two activities you would like to organize with the help of senior students of your school and any other two activities you would like your school authorities to organize for the students to tackle this problem. Explain how these activities will help in doing so.

Ans. Students activities- Poster making , slogan writing , essay writing , processions , display of banners , highlighting its ill- effects during assembly, power-point presentation on harmful effects of tobacco (any two= ½ + ½)

School activities – Seminars, workshops, talks-by doctors, counsellors ,psychologists, government officials, vigilant supervision, value education through class teachers (any two= ½ + ½)

This will help in bringing about awareness/ prevent diseases associated with smoking /provide alternatives / help the smokers in doing away with this habit(Any other relevant point to be evaluated) (any two =1+1)

Section E

Q nos 24- 26 is of five marks each

Q.24(a) What is Central dogma ? Who proposed it?

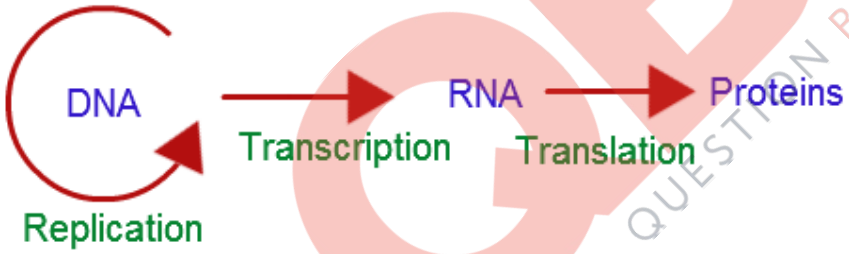
(b) Describe Meselson and Stahl's experiment to prove that the DNA replication is semi-conservative.

OR

(a) A couple with blood groups 'A' and 'B' respectively have a child with blood group 'O'. Work out a cross to show how it is possible and the probable blood groups that can be expected in their other off-springs.

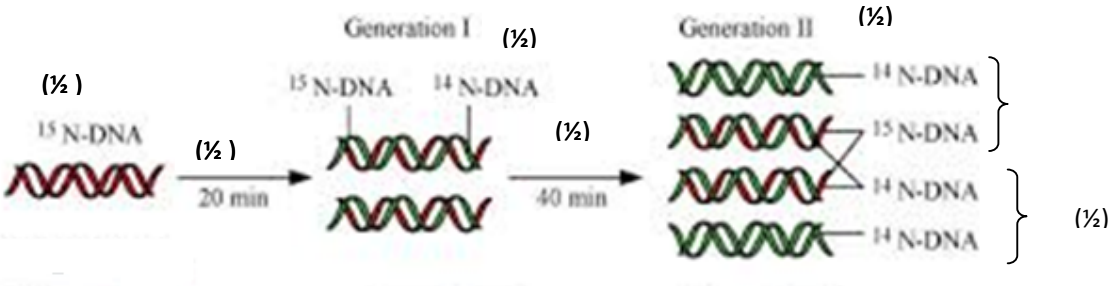
(b) Explain the genetic basis of blood groups in human population.

Ans. (a) Central dogma- 1



Given by Francis Crick 1

b)



(Same value points to be awarded in an explanation) ½ x 6 = 3

OR

Father =I^Ai

I^Ai (Father) X I^Bi (Mother) ½ + ½

	I^A	i
I^B	I^AI^B Blood Group AB	I^Bi Blood Group B
I	I^Ai Blood Group A	ii Blood Group O

(½)

(½)

Phenotypes of all off springs= AB, B, A and O blood group 1

b)Genetic basis of blood groups ;

Three alleles of one gene / multiple alleles/ gene I^A, I^B , I ½

A and B are co-dominant / expressed together ½

$I^A I^A$, $I^A I$ A

$I^B I^B$, $I^B I$ B 1

I^AI^B AB

Ii= O

Q.25 Explain the application of rDNA technology to produce insulin.

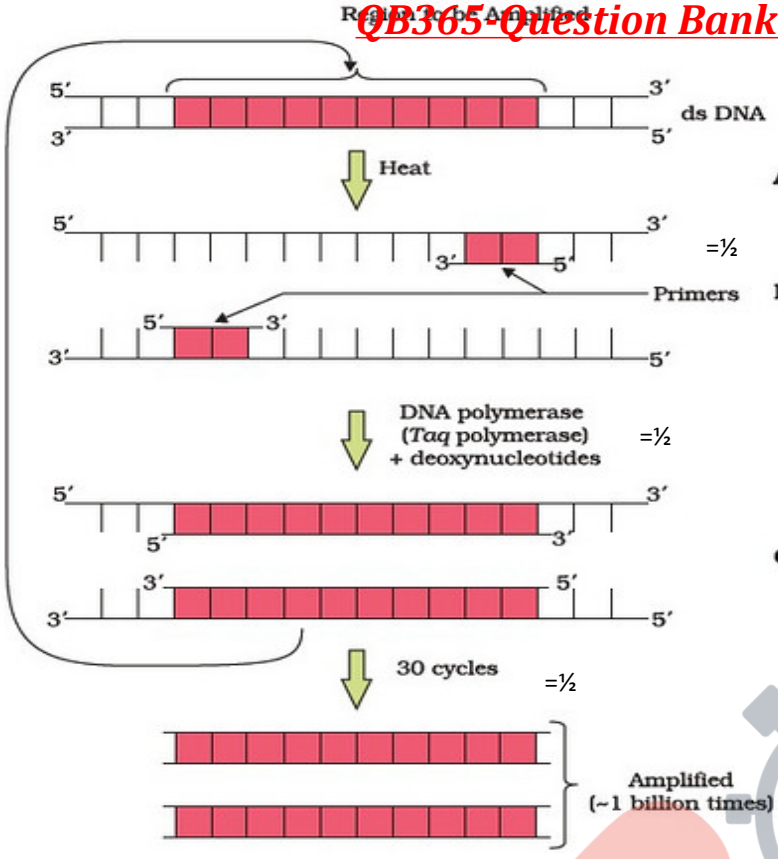
OR

(a) Describethe different steps in one complete cycle of PCR.

(b) State the purpose of such an amplified DNA sequence.

Ans. Human insulin is synthesised as a pro- hormone, the pro-hormone contains an extra C- peptide, the C- peptide is not present in mature insulin, and is removed during maturation, Eli-Lily-an American company prepared two DNA sequences, corresponding to A and B chains of human insulin, and introduced them in plasmids of E.coli to produce insulin chains, Chain A and B were produced separately, extracted and combined, by creating disulphide bonds ½ x10=5

OR



½ x6=3

(Same value points to be awarded in an explanation)

Purpose –used to ligate with a vector for further cloning/ detection of bacteria or virus by amplification of their DNA/detection of HIV in AIDS patient/to detect mutation in genes in suspected cancer patients. (any two= 1+1)

Q.26 (a) Describe in sequence the process of microsporogenesis in angiosperms.

(b) Draw a labelled diagram of a two celled final structure formed.

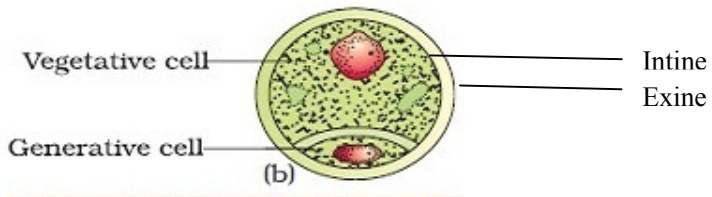
OR

(a) Draw a sectional view of a seminiferous tubule of human. Label sertoli cell, spermatagonia andleydig cell on it and write their functions.

(b) Explain the role of pituitary and sex hormones in the process of spermatogenesis.

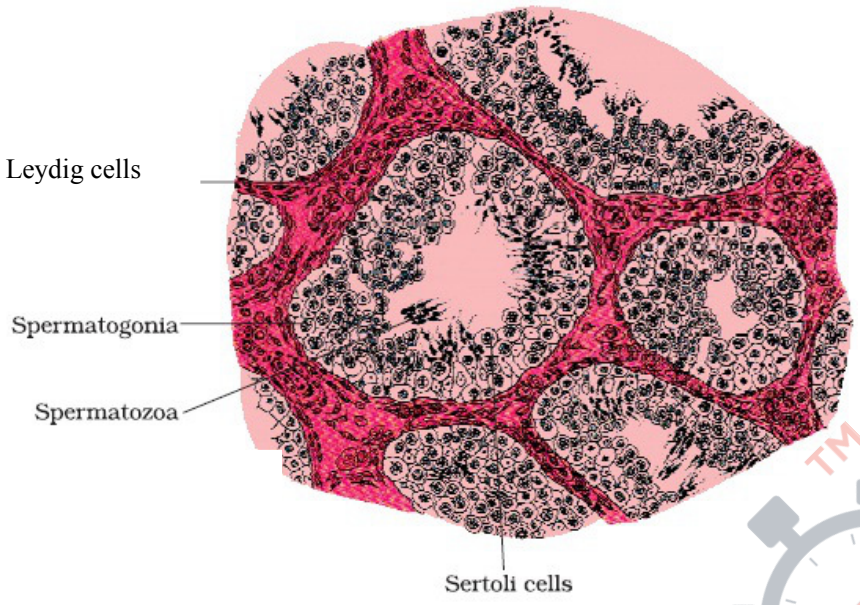
Ans. (a) Microsporogenesis-Each microspore mother cell divides meiotically, to form 4 haploid cells or tetrad, each microspore divides into two unequal cells- large vegetative cell and smaller generative cell; at this 2- celled stage the pollen grains are shed. Sometimes the generative cell divides mitotically to give rise to two haploid male gametes , that are shed at 3 - celled stage ½x6=3

b)



Labelling –exine, intine , vegetative cell , generative cell ½ x 4=2

OR



Label sertoli cells, spermatogonia, Leydig cells ½ x3=1 ½

Functions –Sertoli cells -secrete factors which help in the process of spermiogenesis/ provide nutrition to germ cells ½

Spermatogonia-divide to produce spermatids /sperms ½
Leydig cells-synthesis or secretion of androgens/testosterone ½

b) Pituitary hormones– LH/luteinising hormone- acts on Leydig cells and stimulates synthesis and secretion of androgens,

FSH/follicle stimulating hormone- acts on sertoli cells and simulates secration of some factor that help in spermiogenesis ½ + ½

Sex hormone –(Androgen/testosterone) stimulate process of spermatogenesis 1