

PRE BOARD / XII / BIOLOGY / 2020-21

TIME: 3 Hrs

M.M:70

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.
- (iii) Section–A has 14 questions of 1 mark each and 02 case-based questions.
- (iv) Section–B has 9 questions of 2 marks each
- (v) Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION A

- | | | |
|------------|--|---|
| Q1 | Pea flowers produce assure seed sets .Give reason | 1 |
| Q2 | State the function of filiform apparatus found in mature embryo sac of an angiosperm. | 1 |
| Q3 | How many microspore mother cells would be required to produce one hundred pollen grains in a pollen sac and why? | 1 |
| Q4 | Males in whom testis fail to descend to the scrotum are generally infertile. Why? | 1 |
| Q5 | Write the percentage of F ₂ -homozygous and heterozygous populations in a typical monohybrid cross. | 1 |
| Q6 | Mendel's law of independent assortment was based on which observations. | 1 |
| Q7 | When and at what end the tailing of hnRNA does takes place? | 1 |
| Q8 | Why does Bt toxin not kill the bacillus? | 1 |
| Q9 | Give the name of compound which is used to stain DNA. | 1 |
| Q10 | Which species of fungi produces Roquefort cheese? | 1 |
| Q11 | Assertion: The t RNA molecules possess anticodons.
Reason: It needs the message in form of codons. | 1 |
- a Both assertion and reason are true, and reason is the correct explanation of assertion.
 - b Both assertion and reason are true, but reason is not the correct explanation of assertion.
 - c Assertion is true but reason is false.
 - d Both assertion and reason are false.

OR

Assertion: The human genome comprise of a large amount of repetitive sequences.

Reason: The repetitive sequences in the genome do not have direct coding functions.

- a Both assertion and reason are true, and reason is the correct explanation of assertion.
- b Both assertion and reason are true, but reason is not the correct explanation of assertion.
- c Assertion is true but reason is false.
- d Both assertion and reason are false

Q 12

Assertion: Plasmids are extra-chromosomal DNA.

1

Reason: Plasmids are found in bacteria and is used in genetic engineering.

- a Both assertion and reason are true, and reason is the correct explanation of assertion.
- b Both assertion and reason are true, but reason is not the correct explanation of assertion.
- c Assertion is true but reason is false.
- d Both assertion and reason are false

Q13

Assertion: In Ophrys one petal of the flower bears an uncanny resemblance to the female bee.

1

Reason: Two closely related species competing for the same resource can coexist simultaneously.

- a Both assertion and reason are true, and reason is the correct explanation of assertion.
- b Both assertion and reason are true, but reason is not the correct explanation of assertion.
- c Assertion is true but reason is false.
- d Both assertion and reason are false

Q14

Assertion: Primary treatment of sewage is called biological treatment.

1

Reason: Primary sewage treatment depends only on density of materials in sewage.

- a Both assertion and reason are true, and reason is the correct explanation of assertion.
- b Both assertion and reason are true, but reason is not the correct explanation of assertion.
- c Assertion is true but reason is false.
- d Both assertion and reason are false

Q15

Read the following and answer any four questions from 15 (1) to 15(5)

Given below:

Transformation of normal cells into cancerous neoplastic cells may be induced by physical, chemical and biological agents .These agents are called carcinogens .Ionizing radiations like X-rays and gamma rays and non ionizing radiations like UV cause DNA damage leading to neoplastic transformation .The chemical carcinogens present in tobacco smoke have being identified as a major source of lung cancer .Cancer causing viruses called oncogenic viruses have genes called viral oncogenes. Furthermore several genes called cellular oncogenes or proto-oncogenes have been identified in normal cells which, when activated under certain conditions ,could lead to oncogenic transformation of the cells.

1. Cancer is : 1
 - a) Unrestrained division of cells.
 - b) Controlled division of cells.
 - c) Non-malignant tumor.
 - d) Microbial infection
- 2 Leukaemia is due to: 1
 - a) Excess of RBC.
 - b) Excess of WBC
 - c) Platelets
 - d) All of these
- 3 Genes involved in cancer are: 1
 - a) Oncogenes
 - b) Cancer genes
 - c) Tumor genes
 - d) Regulator genes
- 4 Oncology is study of: 1
 - a) dead cells
 - b) living cells
 - c) cancer cells
 - d) dividing cells
- 5 Assertion: Agents causing cancer are called carcinogens. 1
Reason: These agents transform the normal cells into cancerous neoplastic cells.
 - a Both assertion and reason are true, and reason is the correct explanation of assertion.
 - b Both assertion and reason are true, but reason is not the correct explanation of assertion.
 - c Assertion is true but reason is false.
 - d Both assertion and reason are false

Q16

Read the following and answer any four questions from 16(1) to 16(5) given below:

Broadly, genetic disorders may be grouped into two categories – Mendelian disorders and Chromosomal disorders. Mendelian disorders are mainly determined by alteration or mutation in the single gene. These disorders are transmitted to the offspring on the same lines as we have studied in the principle of inheritance. The pattern of inheritance of such Mendelian disorders can be traced in a family by the pedigree analysis. Most common and prevalent Mendelian disorders are Haemophilia, Cystic fibrosis, Sickle cell anaemia, colour-blindness, Phenylketonuria, Thalassemia etc. It is important to mention here that such Mendelian disorders may be dominant or recessive. By pedigree analysis, one can easily understand whether the trait is dominant or recessive. Similarly, the trait may also be linked to the sex chromosome as in case of Haemophilia.

- 1 Mendelian disorders are mainly due to: 1
 - a) Loss of chromosome
 - b) Alteration or mutation in the single gene.
 - c) Non disjunction
 - d) Disjunction
- 2 Mendelian disorders can be detected by 1
 - a) Pedigree analysis
 - b) Karyotype
 - c) Idiogram
 - d) Aminocentesis
- 3 An example of sex linked disease in human is : 1
 - a) Haemophilia
 - b) Cancer
 - c) AIDS
 - d) Syphilis
- 4 Mendelian disorders are transmitted to next generation according to: 1
 - a) Law of dominance
 - b) Principle of inheritance
 - c) Principle of segregation
 - d) Incomplete dominance
- 5 Haemophilia is a.....disease. 1
 - a) Sex-linked
 - b) Recessive,sex-linked
 - c) Autosomal
 - d) Autosomal dominant

SECTION B

Q17 Name any two copper related IUD's. Explain how it acts as a contraceptive. 2

Q18 How will you find out whether a given plant is homozygous or heterozygous. 2

- Q19** Given below is the information depicting population interactions between species A and species B. 2
- | Type of interaction | Species A | Species B |
|---------------------|-----------|-----------|
| (a) | (-) | (0) |
| (b) | (+) | (-) |
- Name the two types of population interactions (a) and (b) are depicting. Justify giving reason, how the type of interaction (b) is important in an ecological context.
- Q20** Why is the insertional inactivation method to detect recombinant DNA preferred to antibiotic resistance procedure? 2
- Or
- Write the uses of the following in biotechnology:
- Microinjection
 - Chilled ethanol
- Q21** Write the role of ori and restriction site in a cloning vector pBR322. 2
- Q22** Explain the events that occur in the host cell on introduction of nematode resistant gene into the tobacco plant by using *Agrobacterium* vectors. 2
- Or
- While cloning vectors, which of the two will be preferred by biotechnologists - bacteriophages or plasmids? Justify with reason.
 - Name the first transgenic cow developed and state the improvement in the quality of the product produced by it.
- Q23** Differentiate between in-situ and ex-situ approaches for conserving biodiversity. Give an example for each. 2
- Q24** Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with any two examples. 2
- Q25** Biodiversity must be conserved as it plays an important role in many ecosystem services that nature provides. Write any two services of the ecosystem. 2
- SECTION C**
- Q26** Mention the name and role of hormones which are involved in regulation of gamete formation in human male. 3
- Q27** How does gain or loss of chromosome(s) takes place in humans? Describe one example each of chromosomal disorder along with the symptoms involving an autosome and a sex chromosome. 3
- Q28**
- How does activated sludge get produced during sewage treatment? 3
 - Explain how this sludge is used in biogas production.
- Q29** Explain three steps involved in polymerase chain reaction. 3
- Q30** Name the type of interaction seen in each of the following examples: 3
- Ascaris worm living in the intestine of human.
 - Wasp pollinating fig's inflorescence.
 - Clown fish living among the tentacles of sea anemone.

- (iv) Mycorrhizae living on the roots of higher plants.
- (v) Orchid growing on a branch of mango tree.
- (vi) Disappearance of smaller barnacles when Balanus dominated in the coast of Scotland.

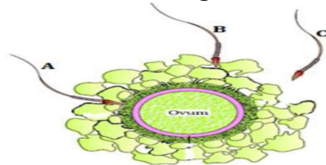
SECTION D

Q31

Given below is the diagram of a human ovum surrounded by a few sperms.

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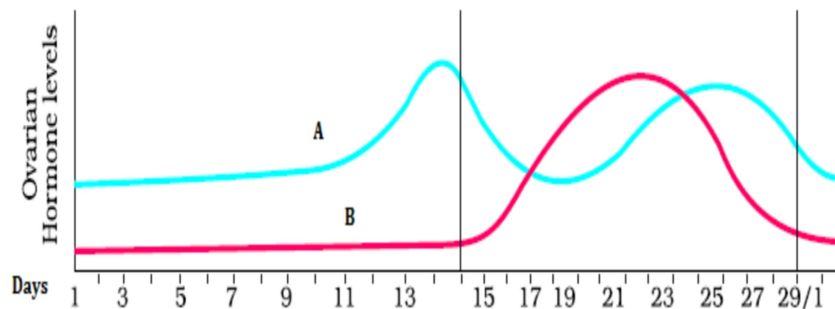
Observe the diagram and answer the following questions:



- (a) Compare the fate of sperms shown in the diagram.
- (b) What is the role of zona pellucida in this process?
- (c) Analyze the changes occurring in the ovum during the process.
- (d) How is the entry of sperm into the ovum facilitated?
- (e) Specify the region of female reproductive system where the event represented in the diagram takes place.

OR

The graph given below shows the variation in the levels of ovarian hormones during various phases of menstrual cycle:



- (a) Identify 'A' and 'B'.
- (b) Specify the source of the hormone marked in the diagram.
- (c) Reason out why A peaks before B.
- (d) Compare the role of A and B.
- (e) Under which condition will the level of B continue to remain high on the 28th day?

Q32

Explain the process of protein synthesis from processed m-RNA.

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OR

Which methodology is used while sequencing the total DNA from a cell? Explain it in detail.

Q33

The pathogen of a disease depends on RBCs of human for growth and reproduction. The person with this pathogen suffers with chill and high fever.

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- a Identify the disease.
- b Name the pathogen.
- c What is the cause of fever?
- d Represent the life cycle of the pathogen diagrammatically.

or

The immune system of a person is suppressed. He was found positive for a pathogen in the diagnostic test ELISA.

- a Name the disease, the patient is suffering from.
- b Which pathogen is identified by ELISA test?
- c Which cells of the body are attacked by the pathogen?
- d Suggest any four preventive measure of the infection.