Dated
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Subjective Test for XII

Biology

Time allowed : 2 hrs. **Maximum marks : 50**

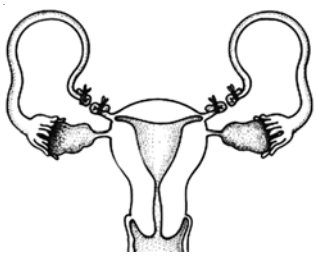
General Instructions

1. There are 20 questions in all. All questions are compulsory.
2. The question paper has five sections: Section A, Section B, Section C, section D & section E
3. a. Section–A has 7 multiple questions of one (1) mark each.
   b. Section–B has 4 questions of two (2) marks each.
   c. Section–C has 4 questions of three (3) marks each.
   d. Section–D has 2 case study based questions of four (4) marks.
   e. Section–E has 3 questions of five (5) marks each.
4. There is no overall choice. However internal choice is provided. You have to attempt only one of the choices in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn

All questions are compulsory. In case of internal choices, attempt any one of them.

Section – A

1. Fruit juices obtained from market are clearer due to treatment with **(1)**
   (a) lipase and cellulase (b) lipase and pectinase
   (c) pectinase and protease (d) cellulase and pectinase
2. In a dihybrid cross, AaBb × AaBb, what fraction of the offsprings will be homozygous for both recessive traits?
   a. $\frac{4}{16}$ b. $\frac{2}{16}$
   c. $\frac{1}{16}$ d. $\frac{3}{16}$
3. Classify the following statements as true or false and choose the correct option. **(1)**
   a. Formation of herbicides resistant varieties and industrial melanism are examples of evolution by anthropogenic action.
   b. Natural selection and branching descent are two key concepts of Darwinism.
   c. According to Hugo de Vries, mutations are large, directionless and continuous variations.
   d. Sudden change in the gene frequency by chance is called genetic drift.
   (a) a–T, b–F, c–T, d–T (b) a–F, b–F, c–T, d–T
   (c) a–T, b–T, c–F, d–T (d) a–T, b–F, c–T, d–F
4. Which of the following is true for the given diagram? **(1)**



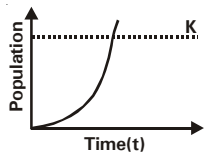
   (a) Vasectomy (c) Ova formation is prevented
   (b) Easily reversible (d) Tubectomy

5. The presence of both a leading and lagging strand is observed during DNA replication. This is because
   a. RNA primers are not sufficient enough to facilitate replication of both strands
   b. Only one DNA template is available for reading at a time
   c. DNA polymerase can catalyse synthesis of one strand at a time
   d. DNA polymerase reads only in $5' \rightarrow 3'$ direction

6. **Assertion-A :** Migration may enhance or blurr the effect of natural selection. **(1)**

   Reason-R : Migration may cause enrichment of the gene pool of such alleles that are being selected or it can null the effect of selection through replenishment of alleles that were selected against by nature.
   (a) Both Assertion and Reason are true and the reason is the correct explanation of the assertion.
   (b) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (c) Assertion is true statement but Reason is false
   (d) Assertion is false

7. Study graph given below and answer the appropriateness of the Assertion (A) and Reason (R). **(1)**



Assertion : Growth of population can be expressed as $\frac{dN}{dt} = rN$

Reason : The population is existing in a habitat with unlimited resources.
   a. Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   b. Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   c. Assertion is true statement but Reason is false
   d. Assertion is false

Section – B

8. Fill in the blanks a, b, c and d in different columns of the table given below **(2)**

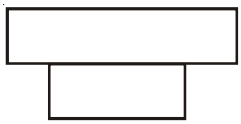
Disease	Organism	Mode of transfer	Symptoms
Pneumonia	*Streptococcus*	(a)	Fever, chills, cough, headache
Typhoid	(b)	Contaminated food & water	Sustained high fever, weakness
(c)	*Entamoeba*	Contaminated food & water	Constipation, cramps, abdominal pain
Ringworm	*Microsporum*	Using towels of infected person	(d)

9. i. Which food chain is the major conduit of energy flow in an aquatic ecosystem? **(1)**
   ii. A food chain cannot be longer than 4-5 trophic levels. Justify statement. **(1)**

OR

If the sequence of nitrogen bases in the coding strand of DNA in a transcription unit is 5'–ATGAATG–3' what would be the sequences of bases in its RNA transcript? Explain the changes that occur in the transcript. **(2)**

10. i. Given below is an ecological pyramid where each bar represents a trophic level. Identify the type of ecological pyramid **(1)**



ii. Give one example each of pyramid of number and pyramid of biomass in such case. **(1)**

11. i. Name the three steps of PCR in sequence. **(1)**

ii. For what purpose PCR is used? **(1)**

OR

Differentiate between active and passive immunity.

Section – C

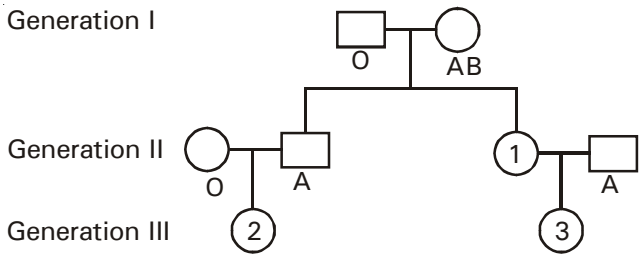
12. Explain the functions of the following structures in the mature embryo sac. **(3)**

i. Synergids

ii. Central cell

iii. Egg cell

13. Study the following pedigree chart of a family starting with mother with AB blood group and father with O blood group



i. Mention the blood group as well as its genotype of the offspring numbered 1 in generation II. **(1)**

ii. Write the possible blood group as well as its genotype of the offspring numbered 2 in generation III. **(1)**

iii. Explain the phenomenon of multiple allelism taking ABO blood group as an example. **(1)**

OR

i. Explain what do you understand by the term death rate in a population by taking a suitable example. **(2)**

ii. Write the other two characteristics, which only a population shows but an individual cannot? **(1)**

14. ii. What is inbreeding depression? **(1)**

ii. Name the breed of sheep developed in Punjab by cross breeding? **(1)**

iii. What is the advantage of Multiple Ovulation and Embryo Transfer (MOET) Technology ? **(1)**

15. What are IUDs? What are different types of IUDs, give examples? Explain the working of IUDs. **(3)**

OR

i. Name two hormones secreted exclusively by placenta. **(1)**

ii. What is foetal ejection reflex? **(1)**

iii. Name the peptide hormone which can be used to induce parturition. **(1)**

Section – D

Question 16 and 17 are Case Study Based Question. Each question has an internal choice and carries four (4) marks each.

16. The process of fusion of a sperm with an ovum is called fertilisation. During fertilisation, a sperm comes in contact with the *zona pellucida* layer of the ovum and induces changes in the membrane that block the entry of additional sperms. Thus, it ensures that only one sperm can fertilise an ovum. The secretions of the acrosome help the sperm enter into the cytoplasm of the ovum through the zona pellucida and the plasma membrane. This induces the completion of the meiotic division of the secondary oocyte. The second meiotic division is also unequal and results in the formation of a second polar body and a haploid ovum (ootid). Soon the haploid nucleus of the sperms and that of the ovum fuse together to form a diploid zygote. **(4)**

i. Second polar body produced is

(a) haploid and corresponds to ootid

(b) haploid and corresponds to 2° oocyte

(c) diploid and corresponds to 2° oocyte

(d) diploid and corresponds to ootid

ii. Polyspermy at the time of fertilization is prevented by contact of sperm with

(a) corona radiata

(b) zona pellucida

(c) nucleus of egg

(d) cellular cover of ovum

iii. Meiosis-II during oogenesis is completed

(a) after the entry of sperm in ovum but before the completion of fertilization

(b) after karyogamy

(c) before ovulation

(d) one week after ovulation

iv. Which of the following is a correct match of structure with number of chromosomes it has?

(a) Sperm – 23 + X

(b) 2° occyte – 22 + X

(c) Second polar body – 44 + XX

(d) First polar body – 44 + XX

OR

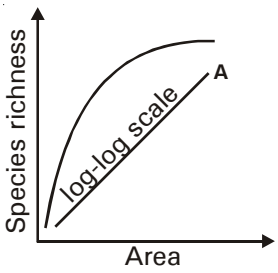
In case of humans, cleavage begins in

(a) Oviduct (b) Uterus

(c) Vagina (d) Ovary

17. Read the following and answer question from (i) to (iv) given below: **(4)**

Within a region, species richness increases with increasing explored area, but only upto a limit. The given graph explains this relationship



i. Who gave this concept of increase in species richness with increasing explored area?
   (a) Humboldt (b) Odum
   (c) Edward Wilson (d) Paul Ehrlich

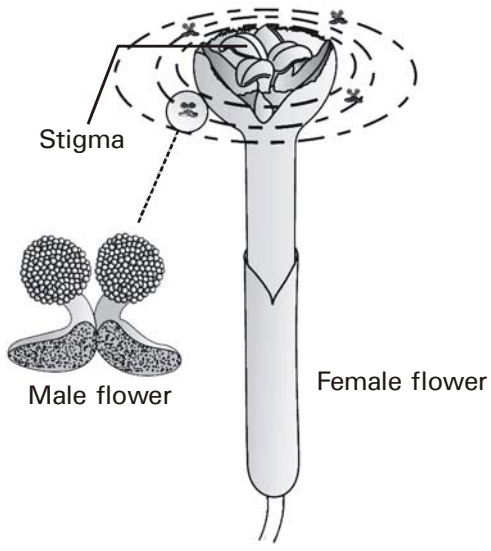
ii. Equation for relationship (A) between species richness and area is
   (a) $\log S = \log C + Z \log A$
   (b) $\log C = \log S + Z \log A$
   (c) $Z \log A = \log S + \log C$
   (d) $\log S = \log C + \log A$

iii. What is the value of slope of line or regression coefficient Z for frugivorous birds?
   (a) 0.1-0.2 (b) 1.15
   (c) 0.01-0.1 (d) 0.6-1.2

iv. The shape of curve for relationship between species richness and areas for wide variety of taxa is
   (a) straight line
   (b) parabola
   (c) rectangular hyperbola
   (d) bell shaped

OR

Study the figure of a floating hydrophyte plant that grows in water bodies.



(i) On the basis of your knowledge about pollination, identify the mechanism of pollination in this plant

(ii) If a plant has pollen grains, small, light dry, dusty and non-sticky and winged, will they use a similar mechanism of pollination?

(iii) Is this type of pollination mechanism is common?

(iv) Mention the characteristics, this plant must exhibit to show this type of pollination

Section – E

18. Write a note on goal and salient features of HGP (Human Genome Project) **(5)**

OR

i. When the Air (Prevention and Control of Pollution) Act in India came into force?

ii. Write a note on ESP (electrostatic precipitator)

iii. According to CPCB, what diameter of particles are responsible for causing harm to human health?

19. Explain the process of separation of desirable DNA fragment by gel electrophoresis. If a student runs gel electrophoresis to separate DNA bands but DNA bands are not visible. What can be the possible reasons for non observation of DNA bands? **(5)**

OR

Give advantages and disadvantages of Genetically modified plants / food.

20. i. Discuss different phases of menstrual cycle in a human female. **(3)**

ii. In which phase of menstrual cycle, there is highest peak of progesterone hormone? **(1)**

iii. Which is the longest phase of menstrual cycle? **(1)**

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