PRACTICE PAPER

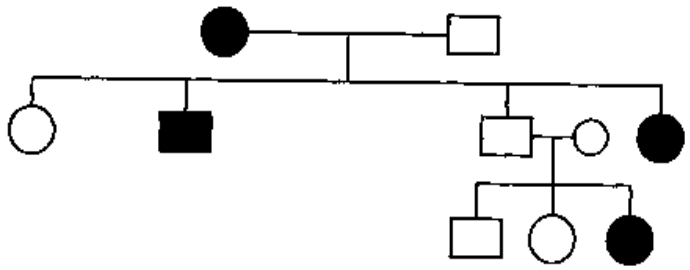
BIOLOGY (Theory)

CLASS-XII

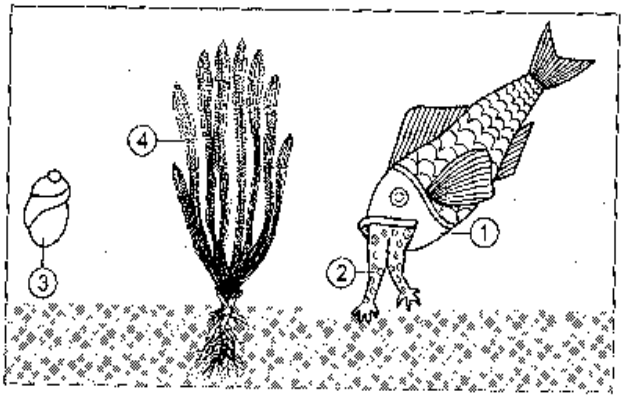
Time Allowed: 3 Hours **Max. Marks: 70**

SECTION–A

1. In the whiptail lizards, only females are born generation after generation. There are no males. How is this possible?
2. After a successful *in vitro* fertilisation, the fertilised egg begins to divide. Where is this egg transferred before it reaches the 8-cell stage and what is this technique named?
3. Pick out the ancestral line of Cycads from the list given below:
   Ferns, herbaceous lycopods, seed ferns, and horsetails
4. In the following pedigree chart, state if the trait is autosomal dominant, autosomal recessive or sex linked. Give a reason for your answer.



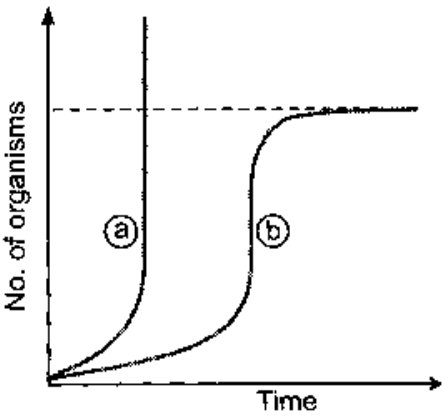
5. State the use of:
   (*i*) *Trichoderma* with respect to organ transplant, and
   (*ii*) Nucleopolyhedrovirus with respect to pest management.
6. In the picture provided, what is the relationship between (1) and (2) with respect to population interaction and between (3) and (4) with respect to trophic levels.



7. Provide one word or one sentence information about 'plasmid' with respect to its (*i*) chemical nature and (*ii*) its duplication.
8. Expand the following: (*i*) PCR (*ii*) Bt

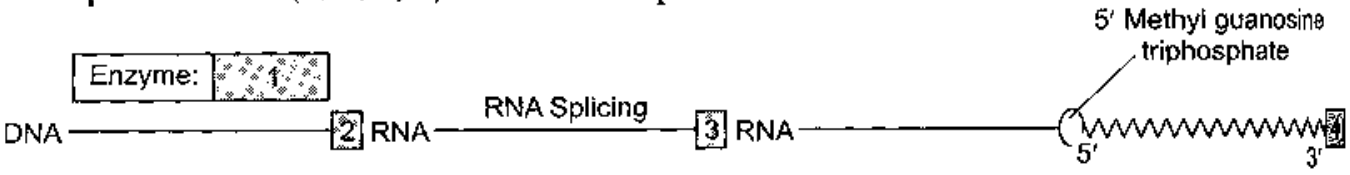
SECTION–B

9. In the adjacent population growth curve, (*i*) What is the status of food and space in the curves (*a*) and (*b*)? (*ii*) In the absence of the predators, which curve (*a*) or (*b*) would appropriately depict the prey population?



10. If the chromosome number of a plant species is 16, what would be the chromosome number and the ploidy level of the (*i*) microspore mother cell and (*ii*) the endosperm cells?
11. Given below is a sequence of steps of transcription in a eukaryotic cell.

    Fill up the blanks (1, 2, 3, 4) left in the sequence.

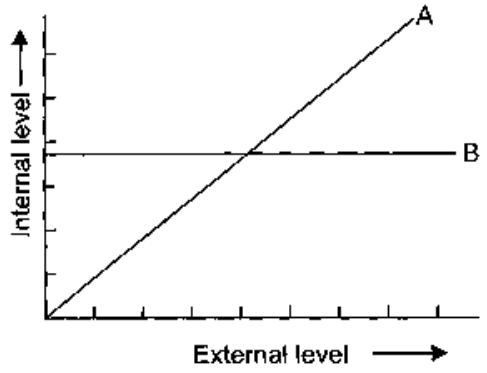


OR

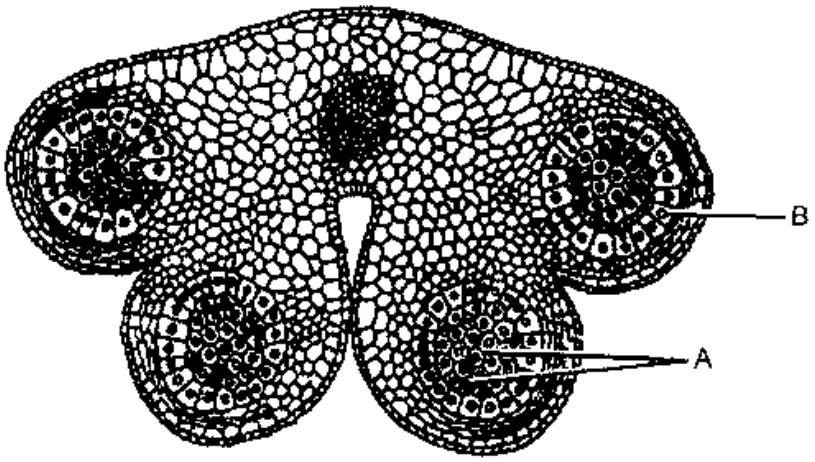
The following table shows the genotypes for ABO blood grouping and their phenotypes. Fill in the gaps left in the table.

S.No.	Genotype	Blood Group
1.	$I^A I^A$	A
2.	—	A
3.	$I^B I^B$	B
4.	—	B
5.	$I^A I^B$	—
6.	—	O

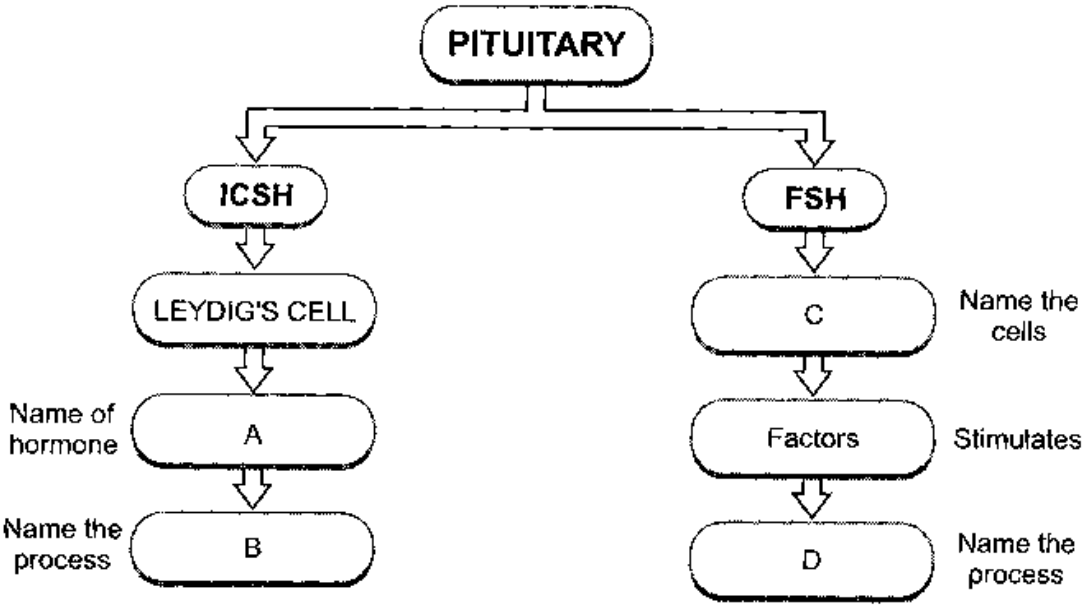
12. Given below is a graph depicting organismic response to changing external conditions. According to their response, the organisms are grouped into two types. Name the type which will show (*i*) pattern A and (*ii*) pattern B.



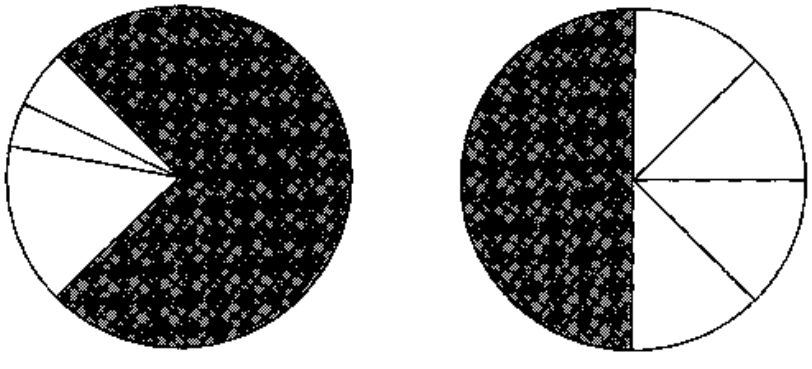
13. In the T.S. of a mature anther given below, identify "A" and "B" and mention their functions.



14. Given below is an incomplete flow chart showing influence of hormones on gametogenesis in males. Observe the flow chart carefully and fill in the blanks A, B, C, and D.

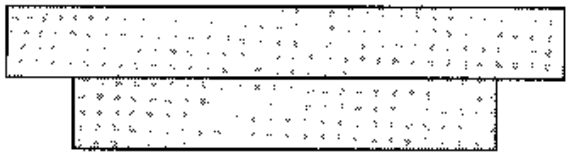


15. In the pie charts (A) and (B) drawn below to show the global animal diversity, which groups of animals would you name and write on the areas shaded black in (A) and (B). In which kind of habitat would you find these groups of animals?



(A) Invertebrates (B) Vertebrates

16. In the pyramid of biomass drawn below, name the two crops: (*i*) one which is supported and (*ii*) the one which supports. In which ecosystem is such a pyramid found?



17. Give reason:
    (*a*) Bottled fruit juices bought from the market are clearer as compared to those made at home.
    (*b*) Large holes are found in "Swiss cheese".
18. What is measured in BOD test? BOD level of three samples of water labelled as A, B and C are 30 mg/L, 10 mg/L and 500 mg/L, respectively. Which sample of water is most polluted?

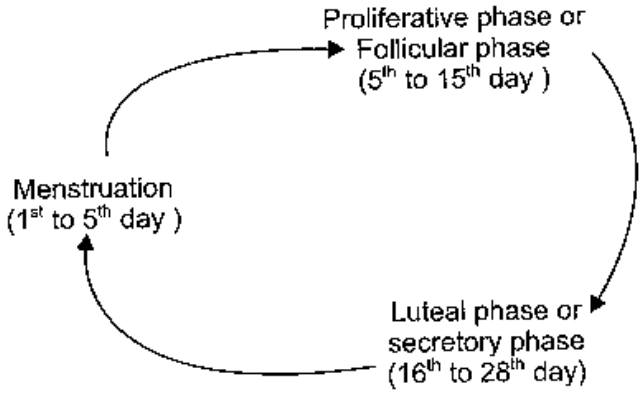
SECTION–C

19. How are biofertilisers different from fertilisers such as NPK that we buy in the market? Justify the role of *Rhizobium* as a biofertiliser.
20. (*a*) In which part of the human female reproductive system do the following events take place?
    I — Release of 1st polar body.
    II — Release of 2nd polar body.
    III — Fertilisation
    IV — Implantation
    (*b*) from where do signals for parturition originate and what does maternal pituitary release for stimulating uterine contractions for child birth?
21. "A population has been exhibiting genetic equilibrium."
    Answer the following with regard to the above statement:
    (*i*) Explain the above statement.
    (*ii*) Name the underlying principle.
    (*iii*) List any two factors which would upset the genetic equilibrium of the population.
    (*iv*) Take up any one such factor and explain how the gene pool will change due to that factor.

OR

In the 1950s, there were hardly any mosquitoes in Delhi. The use of the pesticide DDT on standing water killed their larvae. It is believed that now there are mosquitoes because they evolved DDT resistance through the interaction of mutation and natural selection. Point wise, state in a sequence how that could have happened.

22. The events of the menstrual cycle are represented below. Answer the questions following the diagram.



(*i*) State the levels of FSH, LH and progesterone simply by mentioning high or low, around 13th and 14th day and 21st to 23rd day.

(*ii*) In which of the above mentioned phases does the egg travel to the fallopian tube?

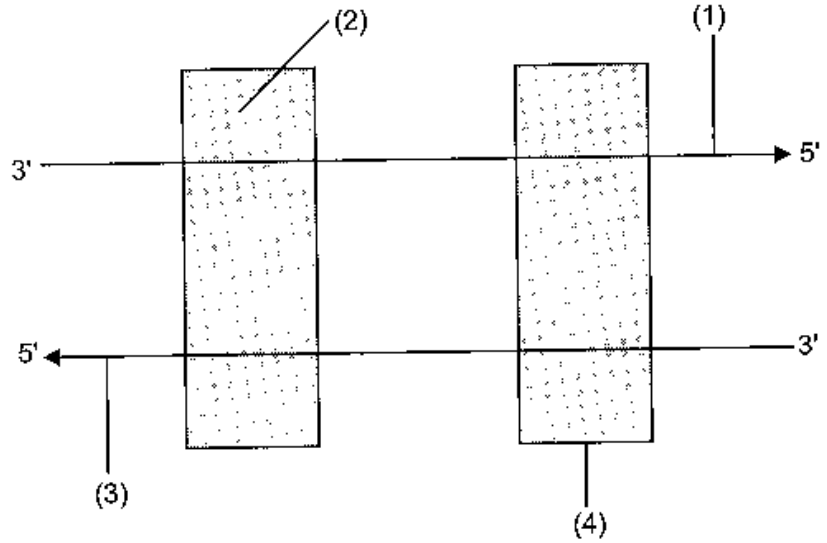
(*iii*) Why is there no menstruation upon fertilisation?

23. In a bacterial culture some of the colonies produced blue colour in the presence of a chromogenic substrate and some did not due to the presence or absence of an insert (*r*DNA) in the coding sequence of β-galactosidase.

(*a*) Mention the mechanism and the step involved in the above experiment.

(*b*) How is it advantageous over simultaneous plating on two plates having different antibiotics?

24. In the following diagram, the two DNA strands represented are ready for transcription.



(*i*) Label the parts marked 1 to 4 and state their functions in transcription.

(*ii*) Which one of the two strands of DNA has nucleotide sequence similar to the *m*RNA that will be transcribed and why?

25. A thallasemic child that needed repeated blood transfusions got infected by HIV.

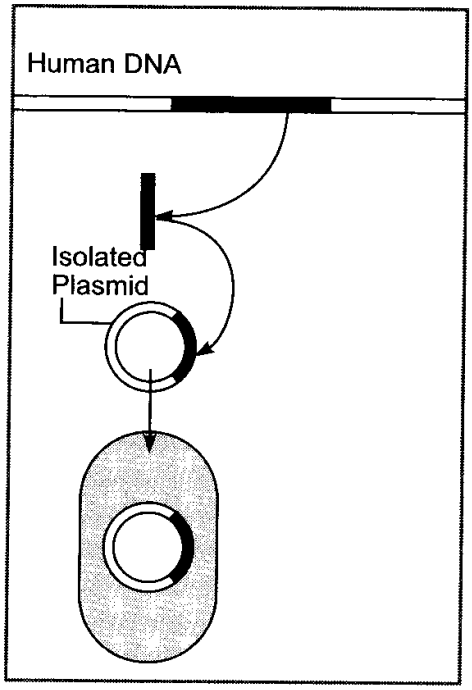
(*i*) Use a rough diagrammatic sketch and arrows to show how the virus increased in number.

(*ii*) Why did the increased number of the HIV virus deteriorate the child's immunity?

(*iii*) Which diagnostic test showed that the infective virus was HIV?

26. Microbes play a dual role when used for sewage treatment as they not only help to retrieve usable water but also generate fuel. Write in points how this happens.

27. Name the particular technique in biotechnology whose steps are shown in the figure. Use the figure to summmarise the technique in three steps.



SECTION–D

28. With an example, explain how biotechnology has been applied in each of the following:

(*i*) In curing *Diabetes mellitus*

(*ii*) In raising pest-resistant plants

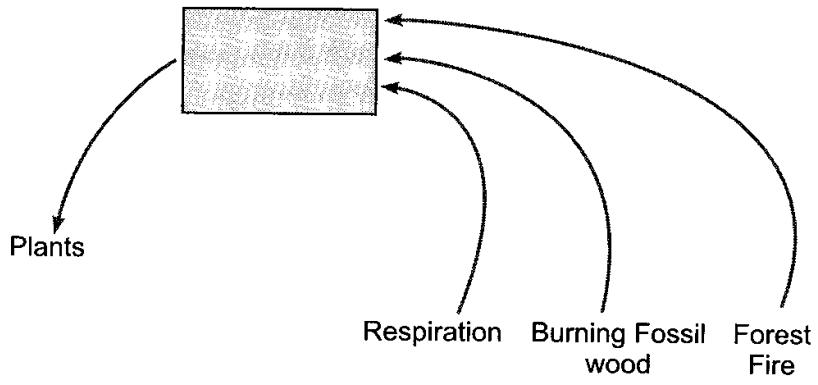
(*iii*) In producing more nutritionally balanced milk.

Do you think it is ethical to manipulate organisms for human benefits? Justify your answer.

OR

Name any two cloning vectors. Describe the features required to facilitate cloning into a vector.

29.



The above diagram shows a simplified biogeochemical cycle

(*i*) Name the compound whose cycle is depicted.

(*ii*) In what way do vehicles add this compound to the atmosphere?

(*iii*) What adverse effect does its excess have on the environment?

(*iv*) Cite an event which depicts this effect in the modern times.

(*v*) Suggest two ways of reducing this effect.

OR

Create an aquatic food chain in a water body into which effluents flow from a pesticide factory. Diagrammatically represent biomagnification in this food chain.

Explain why a decline in the predator bird population is expected, when it feeds on the tertiary consumers of this food chain.

30. **A group of doctorate students were replicating Miller's experiment to study origin of life. Mistakenly, one of the students added sulphur dioxide (SO_2) to the reaction mixture. As a result, instead of amino acids and sugars they obtained some new compounds.**

Answer the following questions based on the above information:

(*i*) Should the students note down the results obtained as such or manipulate them to obtain the expected results? What values will the students promote?

(*ii*) Should the students repeat the experiment in the same manner to get the same result or leave the experiment and start working on their original experiment?

(*iii*) What is the need of repeating the experiment?