MODEL QUESTIONS PAPER - 01

(Academic Session : 2020 - 2021)

BIOLOGY

TIME : 3:00 Hrs. **M.M. : 70**

General Instructions:-

1. All questions are compulsory.
2. The question paper has four sections: A, B, C and D. There are 33 questions in the question paper.
3. Section–A has total 16 questions, 10 are very short, 4 A&R based MCQs and 02 case-based question which further have 5 MCQ type of questions, attempt only 4 out of 5 and each question have 1 marks.
4. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.
5. 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.
6. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section	Question Type	Que. Numbering	Marks	No. of Que. × Marks	Total. Marks
A	Very Short Ans. Que. **(VSA)**	**01 to10**	**1**	**10×1**	**10**
	Assertion/ Reason type- **MCQ.**	**11 to 14**	**1**	**4×1**	**4**
	Case-based questions. (Passage - Attempt any 4 out of 5)	**15 -(i) to(v)**	**1**	**4×1**	**4**
	Case-based questions. (Passage - Attempt any 4 out of 5)	**16-(i) to(v)**	**1**	**4×1**	**4**
B	Short Ans. Que. Type -I **(SA-I)**	**17 to 25**	**2**	**9×2**	**18**
C	Short Ans. Que. Type -II **(SA-II)**	**26 to 30**	**3**	**5×3**	**15**
D	Long Ans. Que. **(LA)**	**31 to 33**	**5**	**3×5**	**15**
Total No. of Questions		**33**	**Total Marks**		**70**

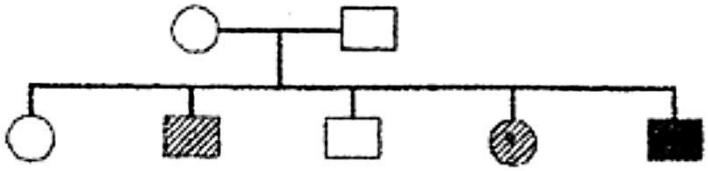
SECTION A

1. Mention the number of cells in the following stages. **[1]**

Embryonic Stage	No. of cells
Zygote	(a)
Morula	(b)
Blastocyst	(c)

2. During reproduction, the chromosome number (2n) reduces to half (n) in the gametes and again resume the original number (2n) in the offspring, what are the processes through which these events take place? **[1]**

3. A pedigree chart given below, present a particular generation which shows a trait irrespective of sexes (i.e., present in both male and female). Neither of the parents of the particular generation shows the trait. Draw your conclusion on the basis of the pedigree. **[1]**



4. What is ectopic pregnancy? **[1]**

5. Pollinating species of wasps show mutualism with specific fig plants. Mention the benefits the female wasps derive from the fig trees from such an interaction. **[1]**

6. Define multiple allelism. **[1]**

7. Suppose two individuals, one have 3 chromosomes of a type while the other have one chromosome of a type, name these phenomena and give example of each type. **[1]**

8. Why sharing of injection needles between two individuals is not recommended? **[1]**

9. For which variety of Indian rice, the patent was filed by a USA Company? **[1]**

10. Name the plant whose sap is used in making Toddy. Mention the process involved in it. **[1]**

11. **Assertion:** An organism with a lethal mutation may not even develop beyond the zygote stage.

Reason: All types of gene mutations are lethal.

a. The assertion is a true statement but the reason is false.

b. Both assertion and reason are true and the reason is the correct explanation of the assertion.

c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

d. Both assertion and reason are false. **[1]**

OR

Assertion : The cross between red and white flower bearing snapdragon plants results in a pink coloured flower.

Reason : Incomplete dominance of red and white flower results into pink coloured flower.

a. Both assertion and reason are correct.

b. The assertion is correct but the reason is incorrect

c. The assertion is incorrect but the reason is correct.

d. Both assertion and reason are incorrect.

12. **Assertion:** LSD and marijuana are clinically used as analgesics.

Reason: Both these drugs suppress brain function.

a. Both assertion and reason are correct.

b. The assertion is correct but the reason is incorrect

c. The assertion is incorrect but the reason is correct.

d. Both assertion and reason are incorrect. **[1]**

13. **Assertion:** UAA codon is a termination codon.

Reason: If in an mRNA, a termination codon is present, the protein synthesis stops abruptly whether the protein synthesis is complete or not.

a. Both assertion and reason are correct.
b. The assertion is correct but the reason is incorrect
c. The assertion is incorrect but the reason is correct.
d. Both assertion and reason are incorrect. **[1]**

14. **Assertion:** Out of every 10 animals on this planet, 7 are insects.

Reason: Among animals, enormous diversification of insects present.

a. Both assertion and reason are correct.
b. The assertion is correct but the reason is incorrect
c. The assertion is incorrect but the reason is correct.
d. Both assertion and reason are incorrect. **[1]**

15. Read the following and answer any four questions : **[4]**

Some organisms are able to maintain homeostasis by physiological means which ensures constant body temperature. All birds and mammals and very few lower vertebrate and invertebrate species are indeed capable of such regulation. The mechanisms used by most mammals to regulate their body temperature are similar to the ones that humans use. An overwhelming majority of animals and nearly all plants cannot maintain a constant internal environment. The osmotic concentration of the body fluids changes with that of the ambient water osmotic concentration. These animals and plants are simply conformers. Thermoregulation is energetically expensive for many organisms. This is particularly true for small animals like shrews and hummingbirds. Heat loss or heat gain is a function of surface area. If the stressful external conditions are localized or remain only for a short duration, the organism has two other alternatives migrate and suspension.

(i) An animal that can survive at $10^{o}C$ and $40^{o}C$ both, can be placed under the category of
a. conformers
b. Regulators
c. migratory organisms
d. modifiers

(ii) Which of the following is an important adaptation of animals to the cold climate?
a. A thin layer of body fat
b. Aestivation
c. Increased tendency to shiver
d. Reduced surface area to volume ratio

(iii) When organisms change their location to escape from a harsh environment, it is called as
a. hibernation
b. vernalization
c. migration
d. aestivation

(iv) Which of the following is an incorrect match?

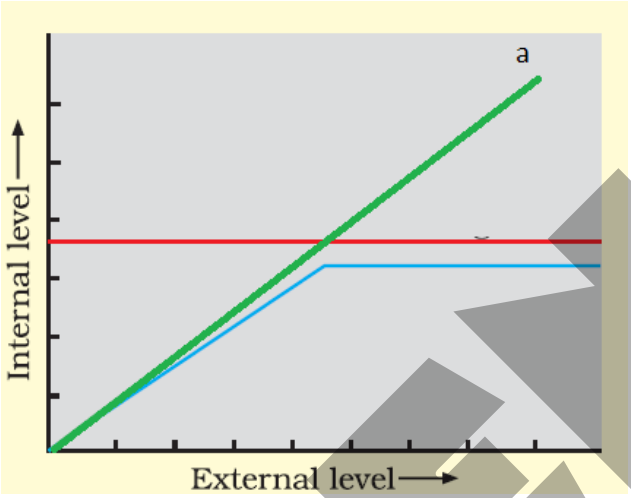
a. Bacteria – Thick-walled resting spores

b. Bear – Hibernation

c. Zooplanktons – Diapause

d. Lizard – Aestivation

(v) In the given diagrammatic representation of the organism, response identify (a)



a. conformer

b. regulator

c. partial regulator

d. none of these

16. Read the following and answer any four questions : **[4]**

All flowering plants show sexual reproduction. In the flowering plant male, the reproductive part is androecium while the female reproduction part is gynoecium. The male reproduction part consists of filament and anther. The proximal end of the filament is attached to the thalamus. A typical end of the filament is attached to the thalamus. A typical angiosperm anther is bilobed. The anther is a four-sided structure consisting of 4 microsporangia appear near-circular in outline. It is surrounded by 4 layers. Cells of the anther mature and dehydrated, the microspores dissociate from each other and develop in the pollen grain. Pollen grain represents the male gametophytes. Pollen grain made up of two-layer.

(i) Each lobe in typical angiosperm anther have _____.

a. two theca

b. three theca

c. four theca

d. one theca

(ii) The innermost layer of microsporangium:
a. epidermis
b. tapetum
c. endothecium
d. middle layer

(iii) The center of the microsporangium is occupied by:
a. epidermis
b. tapetum
c. sporogenous
d. cytoplasm

(iv) The process of formation of microspores from pollen mother cell through meiosis is called
a. microsporangia
b. microsporogenesis
c. megasporangia
d. megasporogenesis

(v) **Assertion-** As the anther mature and dehydrate the microspores disassociate from each other and develop into a pollen grain.
Reasons- As the anther develop, the cell of the sporogenous tissue undergo meiotic division to form microspore tetrads.
a. Both assertion and reason are correct.
b. The assertion is correct but the reason is incorrect
c. The assertion is incorrect but the reason is correct.
d. Both assertion and reason are incorrect

SECTION B

17. What is the significance of progesterone-estrogen combination as a contraceptive measure? **[2]**

18. The following table shows the genotypes for ABO blood grouping and their phenotypes. Fill in the gaps left in the table. **[2]**

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

19. Sangeeta has developed a transgenic crop. She wants to grow this crop directly into the field. Will you allow her to do so? What will you suggest her? **[2]**

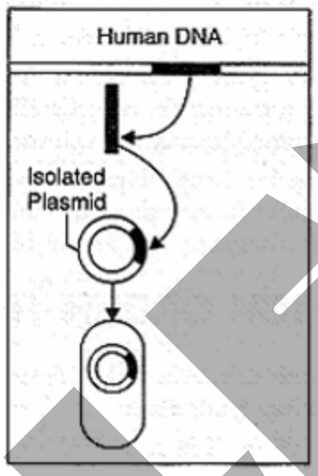
20. Write short notes on the Animals as organ donors for humans. **[2]**

OR

Why has the Indian Parliament cleared the second amendment of the country's patent bill?

21. Name the category of codons UGA belongs to. Mention another codon of the same category. Explain their role in protein synthesis. **[2]**

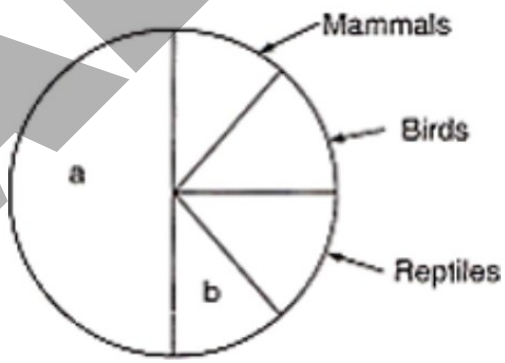
22. Name the particular technique whose steps are shown in the following figure. Use the figure to summarise the technique in three steps. **[2]**



OR

What do you understand by gene cloning?

23.



Name the unlabelled areas 'a' and 'b' of the pie chart representing biodiversity of vertebrates showing the proportionate number of species of major taxa. **[2]**

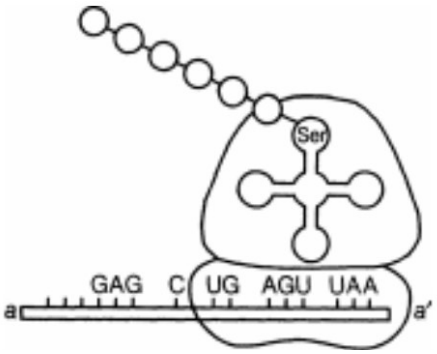
24. List the attributes that populations but not individuals possess. **[2]**

25. Elaborate how invasion by an alien species reduces the species diversity of an area. **[2]**

SECTION C

26. What is a test cross? How it can decipher the heterozygosity of a plant ? **[3]**

27. Study the figure and answer the following questions : **[3]**



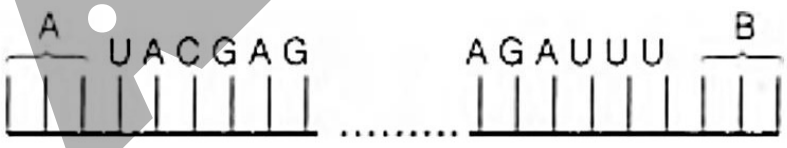
(i) Identify the polarity from a to a', in the diagram below and mention how many more amino acids are expected to be added to this polypeptide chain.

(ii) Mention the DNA sequence coding for serine and the anticodon of tRNA for the same amino acid.

(iii) Why are some untranslated sequence of bases seen in mRNA coding for a polypeptide? Where exactly are they present on mRNA?

28. What is Cancer? How is a Cancer cell different from normal cell? How do normal cells attain Cancerous nature? **[3]**

29. Study the mRNA segment given below, which is complete and to be translated into a polypeptide chain and answer the following questions : **[3]**



(i) Write codons 'A' and 'B'.

(ii) What do they code for?

(iii) How is the peptide bond formed between two amino acids in the ribosome?

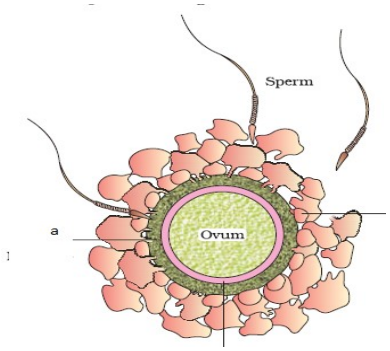
30. Name the cells HIV attacks first when it gains entry into a human body. How does this virus replicate further to cause immunodeficiency in the body? **[3]**

OR

What are the various routes by which transmission of human immuno deficiency virus takes place?

SECTION D

31.



(i) One of the sperms is observed to penetrate 'a' of the ovum, as shown in the above diagram. Name 'a'.

(ii) How is the sperm able to do so?

(iii) Where exactly in the fallopian tube does this occur?

Explain the events thereafter upto morula stage. **[5]**

OR

Describe the female reproductive system.

32. Explain the role(s) of the following in biotechnology

(i) Restriction endonuclease

(ii) Gel-electrophoresis

(iii) Selectable markers in pBR322 **[5]**

OR

Suggest and describe a technique to obtain multiple copies of a gene of interest in vitro.

33. (i) Name the category of microbes naturally occurring in sewage and making it less polluted during the treatment.

(ii) Explain the different steps involved in the secondary treatment of sewage. **[5]**

OR

Given below is a table depicting different organisms and their uses.

Organisms	Uses
Lactobacillus	(a)
Saccharomyces cerevisiae	(b)
Trichoderma polysporum	(c)
Methanobacterium	(d)
Bacillus thuringienesis	(e)
Oscillatoria	(f)

(i) Write the uses of the different organism (a), (b), (c), (d), (e), and (f) as mentioned in the table.

(ii) How do fertilizers enrich the fertility of the soil?