MID-TERM EXAMINATION

Question Paper 2024-25

NCERT BASED SYLLABUS

FOR CBSE AND STATE BOARD
FOLLOWING NCERT

Mid Term Exam Question Paper 2024-25

SET-A

DATE : 19-09-2024
CLASS : XII

FIRST TERM EXAMINATION, 2024
BIOLOGY

Time : 3 Hours
M.M : 70

General Instructions :

1) This question paper contains 33 questions. All questions are compulsory.
2) This question paper is divided into 5 sections – A,B, C, D and E.
3) In Section A – Questions no.1 to 16 are multiple choice (MCQ) type questions, carrying 1 mark each.
4) In Section B – Questions no.17 to 21 are very short answer (VSA) type questions, carrying 2 marks each.
5) In Section C – Questions no.22 to 28 are short answer type (SA) type questions, carrying 3 marks each.
6) In Section D – Questions no.29 and 30 are case-based questions carrying 4 marks each. Each question has subparts with internal choice in one subpart.
7) In Section E – Questions no. 31 to 33 are long answer (LA) type questions carrying 5 marks each.
8) There is no overall choice. However, an internal choice has been provided in 1 question in Section B, 1 question in Section C, 2 questions in Section D and 3 questions in Section E. A candidate has to attempt only one of the alternatives in such questions.
9) Wherever necessary, neat and properly labelled diagram should be drawn.

SECTION A

1) Identify the blank spaces A,B,C and D in the following table and select the correct option. (1)

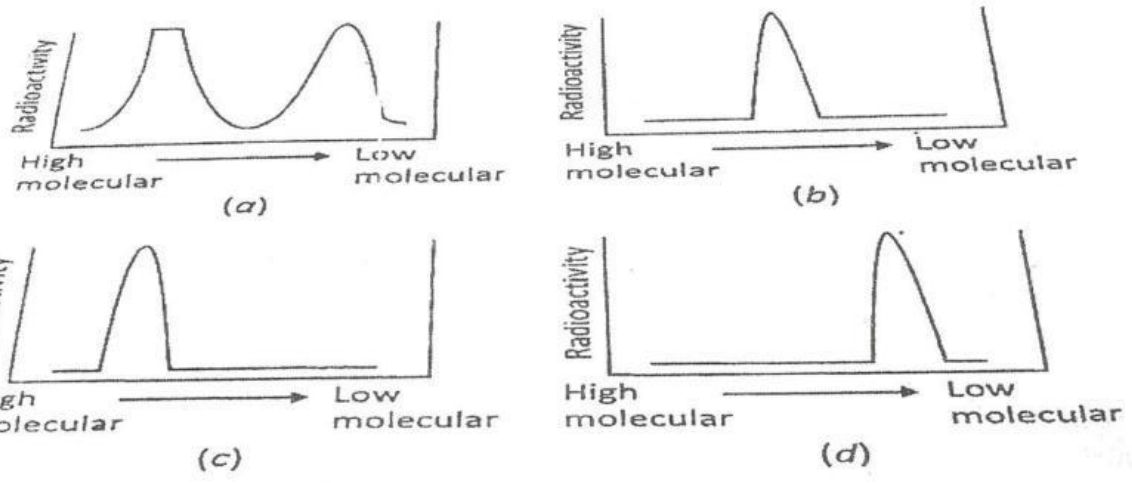
Type of microbe	Scientific name	Commercial product
Bacterium	A	Streptokinase
B	*Aspergillus niger*	Citric acid
Fungus	*Trichoderma polysporum*	C
Bacterium	D	Butyric acid

(a) A-Streptococcus B-Fungus C-Cyclosporin A D- Clostridium butylicum
(b) A-Clostridium butylicum B-Bacterium C-Fungus D- Cyclosporin A
(c) A-Streptococcus B-Yeast C-Cyclosporin A D- Lactobacillus
(d) A-Streptococcus B-Bacterium C-Statins D- Clostridium butylicum

2) A stretch of euchromatin has 200 nucleosomes. How many base pairs will there be in the stretch and what would be the length of the typical euchromatin? (1)
(a) 20,000 bp and $13,000\times10^{-9}$m (b) 10,000 bp and $10,000\times10^{-9}$m
(c) 40,000 bp and $13,600\times10^{-9}$m (d) 40,000 bp and $13,900\times10^{-9}$m

3) Interferons are most effective in making non infected cells resistant against the spread of which of the following diseases in humans? (1)
(a) Ascariasis (b) Ringworm (c) Amoebiasis (d) AIDS

4) Replication was allowed to takeplace in the presence of radioactive deoxynucleotides precursors in E.coli that was a mutant for DNA ligase. Newly synthesized radioactive DNA was purified and strands were separated by denaturation. These were centrifuged using density gradient centrifugation. Which of the followi ıg would be a correct result? (1)



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5) Evolutionary divergence is development of a (1)

a) Common set of functions in groups of different ancestry

b) Dissimilar set of functions in closely related groups

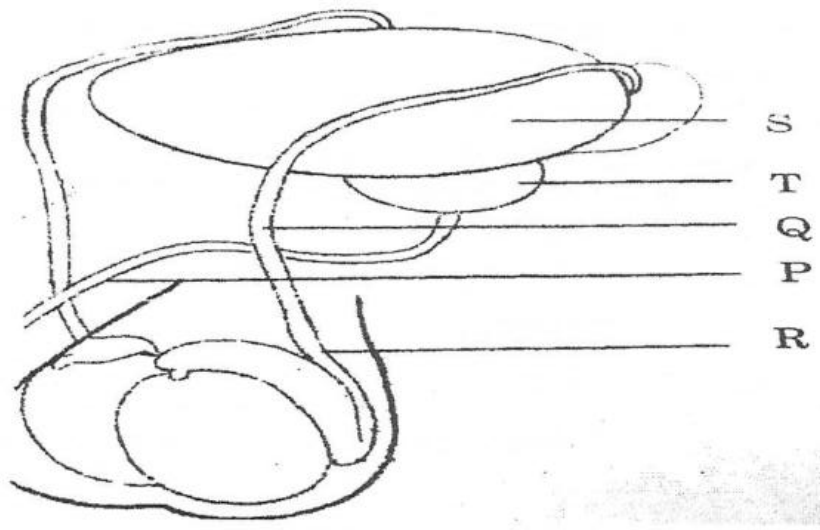
c) Common set of structures in closely related groups

d) Dissimilar set of functions in unrelated groups.

6) Aneuploidy is (1)

(a) 2n+1 (b) n+1 (c) n-1 (d) 3n

7) A human male decides to adopt a surgical method for contraception. Identify the point in the diagram where a cut would be made and tied. (1)



a) Point S (b) Point R (c) Point Q (d) Point P

8) Which of the following exhibit more species diversity? (1)

(a) Gymnosperms (b) Algae (c) Bryophytes (d) Fungi

9) Intensely lactating mothers do not generally conceive due to the ? (1)

(a) Suppression of gonadotropins (b) Hyper secretion of gonadotropins

(c) Suppression of gametic transport (b) Suppression of fertilisation

10) Seminal plasma, the fluid part of semen, is contributed by

(i) Seminal vescile (ii) Prostate (iii) Urethra (iv) Bulbourethral gland

(a) (i) and (ii) (b) (i), (ii) and (iv) (c) (ii), (iii) and (iv) (d) (i) and (iv)

11) Complete linkage has been reported in (1)

(a) Maize (b) Human female (c) Female Drosophila (d) Male Drosophila

12) It is said that Mendel proposed that the factor controlling any character is discrete and independent. His proposition was based on the : (1)

(a) Results of F_3 generation of a cross

(b) Observations that the offspring of a cross made between the plants having two contrasting characters shows only one character without any blending.

(c) Self pollination of F_1 offsprings

(d) Cross pollination of F_1 generation with recessive parents.

In each of the following questions, a statement of Assertion (A) is given followed by corresponding statement of Reason (R). Of the statements, mark the correct answer as (1)

(a) If both A and R are true and R is the correct explanation of A.

(b) If both A and R are true, but R is not the correct explanation of A.

(c) If A is true, but R is false.

(d) If both A and R are false.

13) Assertion (A) : tRNA acts as an adapter molecule (1)

Reason (R) : tRNA recognizes codon sequence in mRNA during translation.

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14) Assertion (A) : In a monohybrid cross, F_1 generation indicate dominant characters. (1)
Reason (R) : Dominance occurs only in heterozygous state.

15) Assertion (A) : S.L. Miller created electric discharge in a closed flask containing CH_4, H_2, NH_3 and H_2O (1)
Reason (R) : He observed the formation of DNA and RNA.

16) Assertion (A) : Zona pellucida is a cellular layer of ovum in human female. (1)
Reason (R) : Corona radiata is a non cellular layer of ovum.

SECTION B

17) (a) How is placenta formed in the human female. (2)
(b) Name any two hormones which are secreted by it and are also present in a non-pregnant woman.

18) By using Punnett square depict the genotypes and phenotypes of test crosses where green pod colour (G) is dominant over yellow pod colour (g) in garden pea with unknown genotype (2)

19) How did Dr. David Tilman relate experimentally the stability of a community and its species richness. (2)

20) (a) Identify any two marsupials from the list given below (2)
(i) Lemur (ii) spotted cuscus (iii) Flying phalanger (iv) Bobcat (v) Mole
(b) When can adaptive radiation be referred to as convergent evolution? Give an example.

21) Identify A,B,C and D in the following table (2)

	Scientific name of the plant	Drug	Effect on the human body
(a)	Papaver somniferum	A	Depressant/slows down body function
(b)	Cannabis sativa	Cannabinoids	B
(c)	Erythroxylum coca	C	D

(OR)

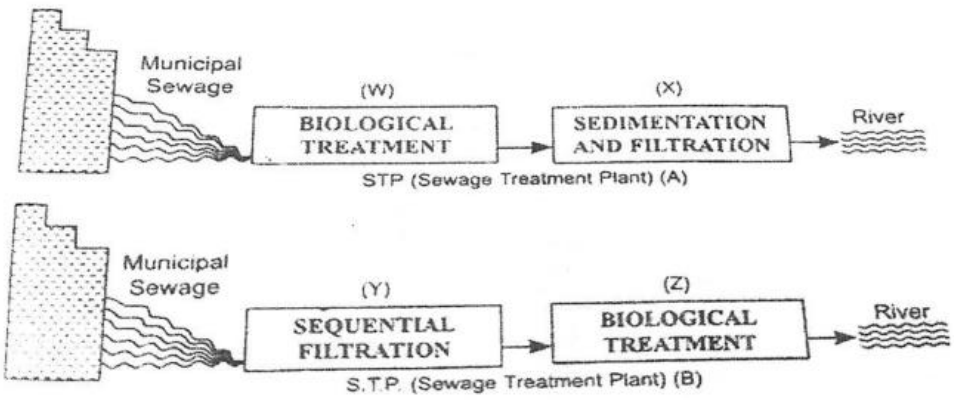
How do cytokine barriers and monocyte provide immunity in humans?

SECTION C

22) Expand and explain the following techniques used in the 'Test Tube Baby' programme. (3)
(a) GIFT (b) ZIFT (c) IUI

23) Frogs, Toads, salamanders and newts are not as prevalent as they once were. Researchers say amphibians are facing a rapid decline across the world. As a biology student what method would you suggest that can protect such endangered species from getting extinct? (3)

24) Study given diagram of Sewage Treatment Plant (STP) and answer the questions that follow : (3)



(a) Which one of the two 'S.T.P'. (A) or (B) will be more effective in treating the human excreta in the municipal waste?
(b) Write the steps followed in carrying the treatment of the sewage in step(z), once the BOD of sewage is reduced significantly till it is passed on to the "anaerobic sludge digesters".

25) a) Name the infective state of Plasmodium which Anopheles mosquito take in along with the blood meal from an infected human. (3)
b) Why does the infection cause fever in humans?
c) Give a flow chart of the part of the lifecycle of this parasite passed in the insect.

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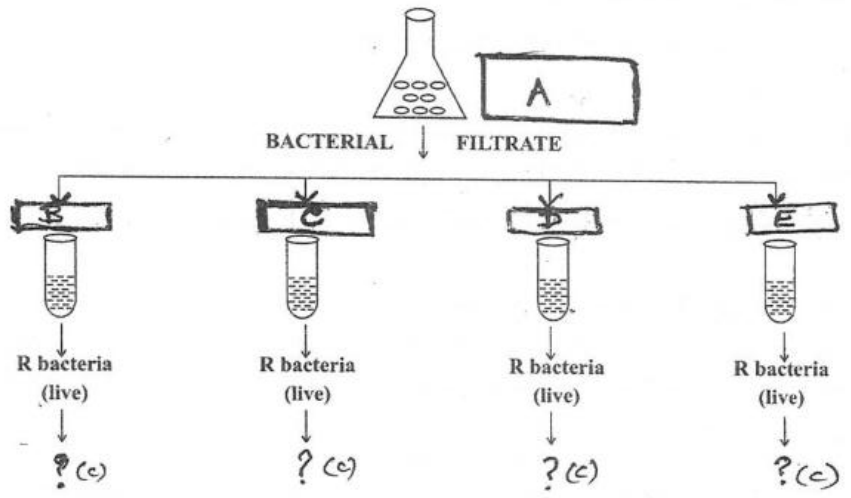
26) a) State any three phenomena in which the Hardy-Weinberg theorem may not hold true (3)

b) A population of 100 individuals has a frequency of allele 'A' 0.3 and a frequency of allele 'a' of 0.7. The frequency of heterozygous genotype (Aa) is 0.49. Is this population in Hardy-Weinberg equilibrium? Justify.

27) Explain the mechanism of sex determination in honey bee. (3)

(OR)

Given below are the illustration of the different steps of experiments conducted by Macleod, McCarty and Avery.



(a) Identify the label A and the chemicals used in B,C,D and E,

(b) Explain how the biochemical nature of the molecule was determined.

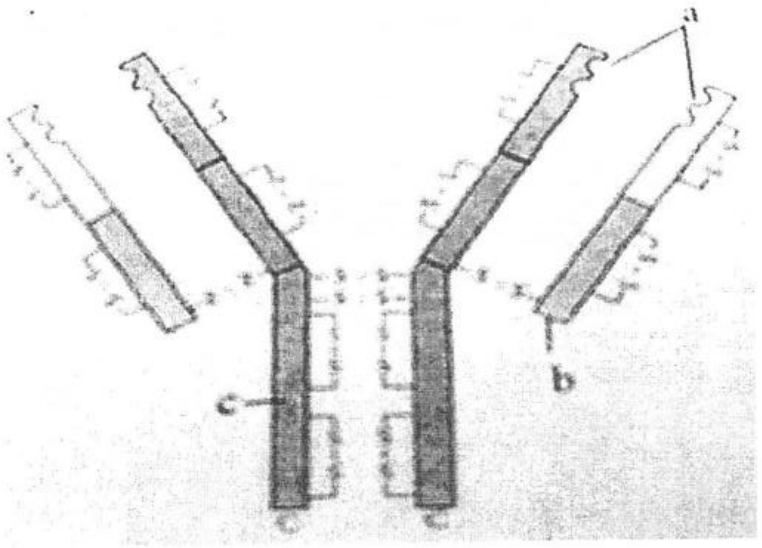
(c) What was the conclusion they arrived at after the experiment.

28) How is hnRNA processed to form mRNA? (3)

SECTION D

Question no. 29 and 30 are case based questions. Each question has subparts with internal choice in one support.

29) Refer to the given figure of antibody and answer the following questions. (4)



(a) Identify a,b and c in the given diagram

(b) Write the chemical nature of an antibody.

(c) Mention the type of immune response provided by an antibody.

(OR)

(c) Name the cells that produce antibodies in humans

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30) Study the two cases carefully regarding the pattern of inheritance of disease. (4)

Case	Mother	Father	Children
Case I	With disease	Normal	Sons always with diseases
Case II	With disease	Normal	Sons and daughters could show disease

(a) Give two examples of case I diseases.

(b) On which chromosome case I disease are present on?

(c) If inheritance pattern of disease is as case II and both parents are carrier of disease then what are chances of pregnancy resulting in an affected child?

(OR)

(c) The possibility of a human female suffering from a hemophilia disease is rare. Why is it so?

SECTION E

31) (a) Classify the following scenarios as active/passive immunity and justify your answer. (5)

(i) A fetus receives antibodies from its mother through the placenta.

(ii) A person accidentally gets cut by a blade receives a tetanus shot.

(iii) A person receives a blood transfusion from a donor who has been vaccinated against a disease

(b) Zoya is bitten by an infected Anopheles mosquito in the morning. In the evening, another non-infected Anopheles mosquito bites Zoya and then bites Zaheer immediately. How likely is Zaheer to get malaria? Justify your answer.

(OR)

A patient is suffering from fatigue, high fever, and weight loss, and has been observing an increasing number and size of lumps in various regions of her body over a very short time.

(a) What could she be suffering from?

(b) Mention FOUR ways in which the disease identified in (a) is caused and FOUR techniques that can be used to diagnose it.

32) Shown below is a nucleotide sequence and the genetic code. **5-ATGCGTAGACTCGTA-3′** (5)

First Base	Second Base: U	Second Base: C	Second Base: A	Second Base: G	Third Base
U	UUU Phe, UUC Phe, UUA Leu, UUG Leu	UCU Ser, UCC Ser, UCA Ser, UCG Ser	UAU Tyr, UAC Tyr, UAA Stop, UAG Stop	UGU Tyr, UGC Tyr, UGA Stop, UGG Trp	U C A G
C	CUU Ieu, CUC Ieu, CUA Ieu, CUG Ieu	CCU Pro, CCC Pro, CCA Pro, CCG Pro	CAU His, CAC His, CAA Gln, CAG Gln	CGU Arg, CGC Arg, CGA Arg, CGG Arg	U C A G
A	AUU Ile, AUC Ile, AUA Ile, AUG Met	ACU Thr, ACC Thr, ACA Thr, ACG Thr	AAU Asn, AAC Asn, AAA Lys, AAG Lys	AGU Ser, AGC Ser, AGA Arg, AGG Arg	U C A G
G	GUU Val, GUC Val, GUA Val, GUG Val	GCU Ala, GCC Ala, GCA Ala, GCG Ala	GAU Asp, GAC Asp, GAA Glu, GAG Glu	GGU Gly, GGC Gly, GGA Gly, GGG Gly	U C A G

(a) Identify the protein sequence formed by this sequence.

(b) Draw the tRNA molecule for the third codon with its polarity labeled. Give a reason to support the polarity identified.

(c) The first genuine base in the nucleotide sequence changes to cytosine. Identify the type of mutation caused by this change.

(d) Will the mutated sequence form a mRNA and protein? Justify.

(OR)

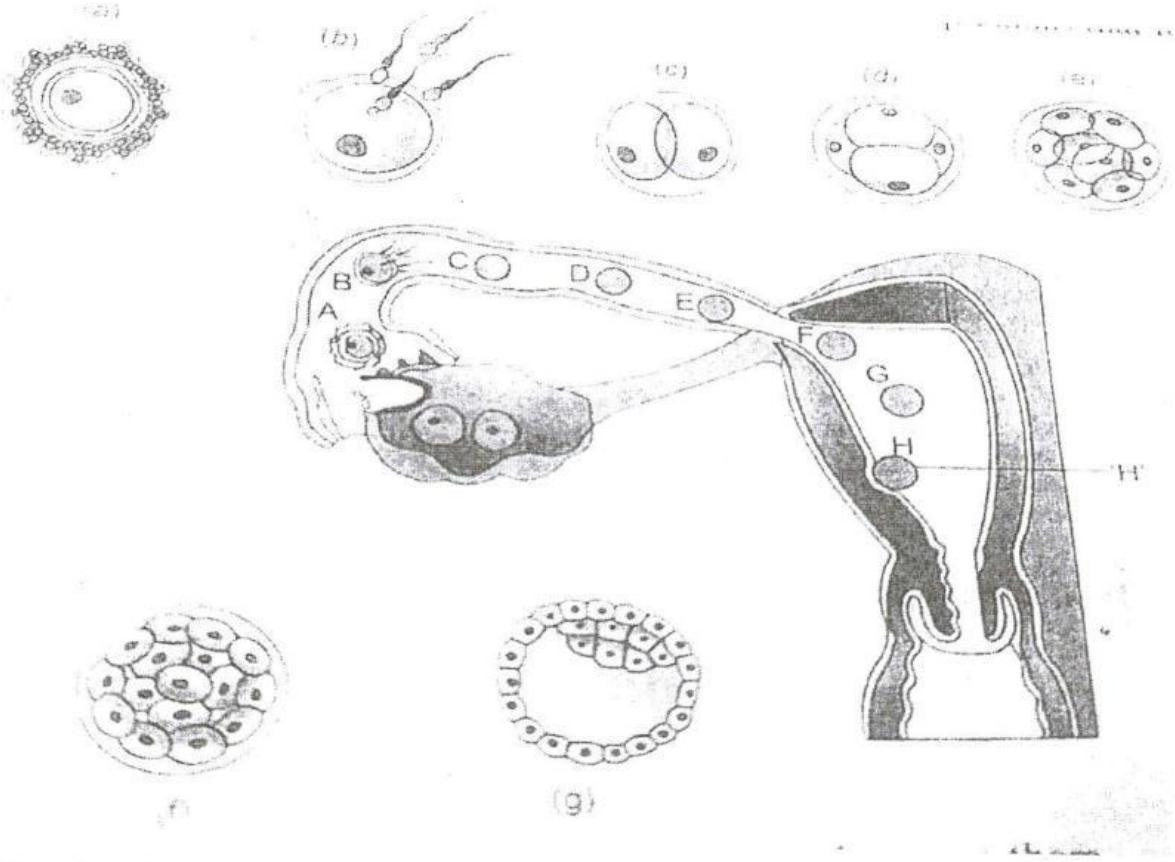
(a) Draw a schematic representation of the genes involved in the lac operon. Regulation of lac operon can be visualized as regulation of enzyme synthesis by its substrate. Explain the statement.

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XII

33) Study the figure given below of a human female reproductive tract showing the transport of ovum, its fertilization and answer the questions that follow. (5)



(i) Identify the embryonic stages 'e' and 'g' and differentiate between them.

(ii) Describe the process of implantation as shown in figure 'H'.

(OR)

(i) Differentiate between Follicular phase and Luteal phase of the Menstrual cycle in human females on the basis of the following criteria :

(a) Days of their occurrence in the cycle.

(b) Stage of the follicle.

(c) Hormones influencing the phases

(d) State of endometrium

(ii) Write the effect of high concentration of LH on a mature Graafian follicle.

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