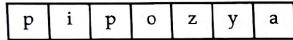


Or

Study the schematic representation of the genes involved in the *lac* operon given below and answer the questions that follows :



- (i) The active site of enzyme permease present in the cell membrane of a bacterium has been blocked by an inhibitor, how will it affect the *lac* operon ?
- (ii) The protein produced by the *i* gene has become abnormal due to unknown reasons. Explain its impact on lactose metabolism stating the reason.
- (iii) If the nutrient medium for the bacteria contains only galactose; will operon be expressed ? Justify your answer.

Q.33. (a) Why are thalassemia and haemophilia categorized as Mendelian disorders ? Write the symptoms of these diseases. Explain their pattern of inheritance in humans.

(b) Write the genotypes of the normal parents producing a haemophilic son.

Or

Given below is a table showing the genotypes and the phenotypes of blood groups in the human population.

Genotype	Phenotype
W	Y
I ^B I ^O	Z
I ^A I ^B	O
X	O

- (i) Identify the genotype W and X, and the phenotype Y and Z.
- (ii) How is codominance different from incomplete dominance and dominance ?
- (iii) Name the pattern of inheritance exhibited by the phenotypes Y and Z in the table.

SECTION - IV

EVERGREEN MOCK TEST PAPER

CLASS - 12

BIOLOGY (Code No. 044)

Maximum Marks : 70

Time Allowed : 3 hours

General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each; Section - D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.
- (iv) 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.
- (v) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION - A

- Q.1. In a typical complete, bisexual and hypogynous flower, the arrangement of floral whorls on the thalamus from the outermost to the innermost is :
- (a) Calyx, corolla, androecium and gynoecium
 - (b) Calyx, corolla, gynoecium and androecium
 - (c) Gynoecium, androecium, corolla and calyx
 - (d) Androecium, gynoecium, corolla and calyx
- Q.2. During human embryonic development the heart in the embryo is formed after
- (a) 15 days
 - (b) 30 days
 - (c) 45 days
 - (d) 60 days
- Q.3. Match the Column I with Column II and select the correct option from the codes given below.

Column I (Time periods in geological time scale)	Column II (Related to)
A. Mesozoic	1. First amphibians
B. Devonian	2. Proliferation of reptiles
C. Palaeocene	3. 160 million years
D. Permian	4. Rediation of primitive mammals

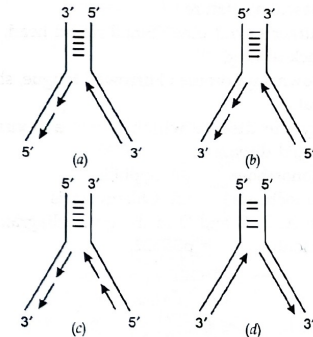
Codes :

- | | | | | | | | | | |
|-----|---|---|---|---|-----|---|---|---|---|
| A | B | C | D | A | B | C | D | | |
| (a) | 1 | 4 | 3 | 2 | (b) | 3 | 1 | 4 | 2 |
| (c) | 4 | 1 | 2 | 3 | (d) | 2 | 1 | 4 | 3 |

Q.4. Glomus form a symbiotic relationship with plant

- (a) leaves
- (b) stem
- (c) root
- (d) stem and root

Q.5. Which one of the following diagram correctly represents DNA replication in eukaryotes ?



Q.6. C-peptide of human insulin is :

- (a) a part of mature insulin molecule.
- (b) responsible for formation of disulphide bridges.
- (c) removed during maturation of pro-insulin to insulin.
- (d) responsible for its biological activity.

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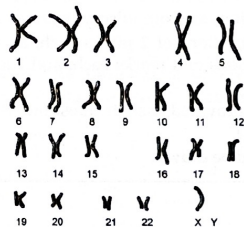


Note : Solution of this paper will be available on 15th November 2023.

Q.7. *Apis mellifera* are killer bees possessing toxic bee venom. Identify the treatment and the type of immunity developed from the given table to treat a person against the venom of this bee.

Remedy	Immunity
(a) Inactivated proteins	Active
(b) Proteins of the venom	Passive
(c) Pre-formed antibodies	Active
(d) Dead microorganisms	Passive

Q.8. Given below is a karyotype of a human foetus obtained for screening to find any probable genetic disorder.



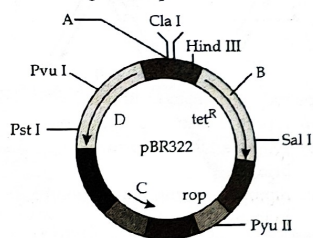
Based on the karyotype, the chromosomal disorder detected in unborn foetus and the consequent symptoms the child may suffer from are :

- Turner's syndrome : Sterile ovaries, short stature
- Down's syndrome : Gynaecomastia, overall masculine stature
- Turner's syndrome : Small round head, flat back of head
- Down's syndrome : Furrowed tongue, short stature

Q.9. Identify the disease which is not a sexually transmitted disease ?

- Gonorrhoea
- Syphilis
- Amoebiasis
- Chlamydia

Q.10. Identify A, B, C and D in the given diagram of *E. coli* cloning vector pBR322.



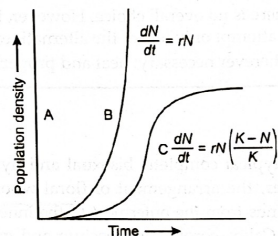
- A-EcoRI, B-BamHI, C-ori, D-amp^R
- A-amp^R, B-ori, C-BamHI, D-EcoRI
- A-ori, B-BamHI, C-EcoRI, D-amp^R
- A-BamHI, B-EcoRI, C-amp^R, D-ori

Q.11. Which of the following would necessarily decrease the density of a population in a given habitat ?

- Natality > mortality
- Immigration > emigration
- Mortality and emigration
- Natality and immigration

Q.12. Which is correctly labelled as per the given diagram ?

- B - Logistic curve
- C - Carrying capacity
- C - Exponential curve
- A - Carrying capacity



Question No. 13 to 16 consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true and R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

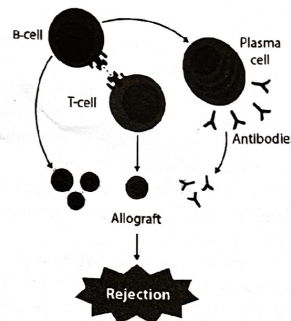
Q.13. **Assertion** : Interstitial spaces outside the seminiferous tubule have blood vessels & sertoli cells.

Reason : Sertoli cell provides nutrition to the germ cells.

Q.14. **Assertion** : The fusion of sperm and ovum to form zygote is called fertilization.

Reason : It occurs at ampullary isthmic junction of the fallopian tube.

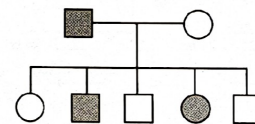
Q.15. Given below is the schematic representation of transplant rejection. When a person receives an organ from someone else, his body may recognise this foreign organ and attacks them. Study the figure given below and comment upon the appropriateness of the Assertion and Reason.



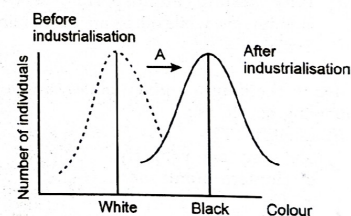
SECTION - B

Q.17. When are the non-flowering plants said to be homothallic and monoecious, and heterothallic and dioecious ? Give an example of each.

Q.18. The pedigree chart given below shows a particular trait which is absent in parents, but present in the next generation irrespective of sexes. Draw your conclusion on the basis of the pedigree.



Q.19. Study the graph and answer the questions that follows :



- Describe the phenomenon showing in the above graph.
- What proves the above process as observed in pepper moths.

Q.20. Water samples were collected at points, A, B and C in a segment of a river near a sugar factory and tested for BOD level. The BOD levels of samples A, B and C were 4000 mg/L, 480 mg/L and 8mg/L respectively. What is this indicative of ? Explain

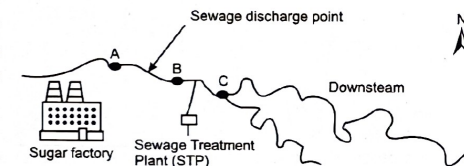
Assertion : In organ transplantation, donor and recipient should be genetically as close as possible.

Reason : Cell-mediated immune response is responsible for such graft rejection.

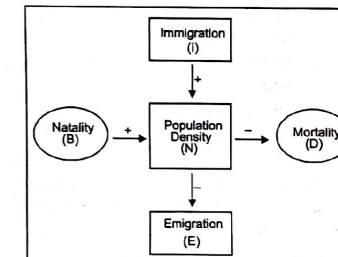
Q.16. **Assertion** : In a terrestrial ecosystem, detritus food chain is a major conduct for energy flow.

Reason : Solar energy is a direct source of energy supply in the detritus food chains.

why the BOD level gets reduced considerably at the collection point C ?



Q.21. (i) Study the flowchart given below and complete the equation that follows by identifying 1,2,3 and 4.



$$N_{t+1} = N_t + [(1 + 2) - (3 + 4)]$$

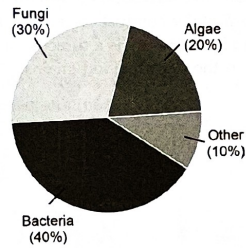
(ii) Mention the different ways by which the population density of different species can be measured.

Or

Substantiate by giving two reasons as to why a holistic understanding of the flora and fauna of cropland is required before introducing an appropriate biocontrol method.

SECTION - C

Q.22. Consider the given pie chart that shows different microorganisms which aid humans with their day-to-day living.



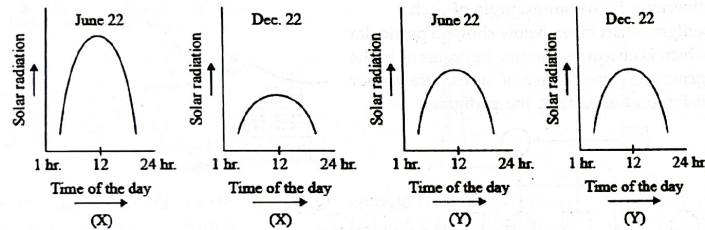
Refer to the given pie chart and answer the following questions :

- (a) In our lives, microbes contribute major role and are beneficial to us in many ways. On the other hand, a few microorganisms cause infections as well. Comment.
- (b) Statins are used as cholesterol lowering agents. Where are these obtained from ? Give reason.

Q.23. Why are certain animals called 'transgenic'? Give an example of such animals that is being used for testing the vaccine safety for a specific human disease. Name the disease.

Q.24. STDs can be considered as self-invited diseases. Comment.

Q.25. The graphs (X) and (Y) given below depict the diurnal variations in the solar radiations in the month of the (Summer) and in December (Winters) :



- (i) Which of the two graphs depicts tropical region and temperate regions respectively ?
- (ii) Which of the two regions (X) or (Y) will show high biological diversity and why ?

Q.26. The population of a metro city experiences fluctuations in its population density over a period of time.

- (a) When does the population in a metro city tend to increase ?
- (b) When does the population in metro city tend to decline ?
- (c) If 'N' is the population density at the time 't', write the population density at the time 't + 1'.

Q.27. A flower of brinjal has 520 ovules in its ovary. However, it produces a fruit with only 480 viable seeds.

- (i) What could have prevented the rest of the 40 ovules from maturing into viable seeds? Explain giving a reason.
- (ii) Describe the development of a dicot embryo in a viable seed.

(iii) Why certain angiospermic seeds are albuminous, while others are exalbuminous? Explain.

Or

Refer to the diagram given below, answer the following questions :

- (i) Identify 'A'.
- (ii) State any one property of flowers mentioned in (i).
- (iii) How do flowers denoted by A and B differ in carrying out pollination ?



Q.28. Organisms at a higher trophic level have less energy available. Comment.

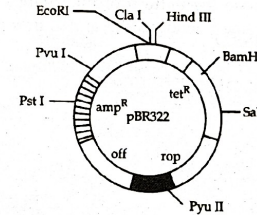
SECTION - D

Q.No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

Q.29. Gene of interest/alien gene is introduced by a cloning vector into a host cell to bring about a desired phenotypic expression in a host cell. The cloning vectors used are plasmid and bacteriophages. Biotechnologists in their labs for desired results engineered specialised cloning vectors. One such vector is pBR322.

Study the diagram carefully and answer the questions that follow.

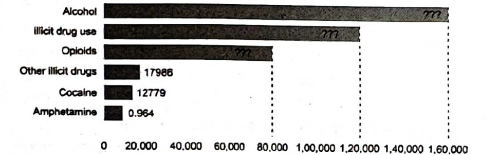
- (i) What do 'EcoRI', 'BamHI' and 'Hind III' represent ? State their functions.
- (ii) Identify the gene you would select for the role of a selectable marker in pBR322. Explain why.



Or
Biotechnologist always insert 'ori' gene in their engineered cloning vector. Justify the statement.

Q.30. The graph given below is showing smoking, alcohol consumption and use of illicit drugs by people.

- (i) Why did the alcohol consumption increase rapidly than the other drugs ?



- (ii) Will the adverse effects of opioids be more harmful than alcohol ?
- (iii) Why do athletes use amphetamines ?

Or

What measures can be taken to decrease the drug and alcohol abuse ?

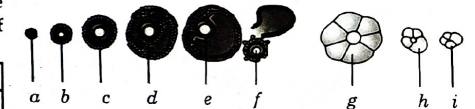
SECTION - E

Q.31. Given below are components of the male reproductive system. Write function of each of the following :

Organ	Function
1. Scrotum	—
2. Testes	
3. Epididymis	
4. Vas deferens	
5. Ejaculatory	
6. Penis	
Accessory Sexual glands	
* Seminal vesicles	
Prostate gland	
Bulbourethral glands	

Or

Refer to the figure given below and answer the questions that follows :



- (i) Which hormone is responsible for the process occurring in stage labelled a, d and f ?
- (ii) Describe the role of the ovarian hormone and pituitary hormone responsible for the above given process.
- (iii) Why is there a decrease in size of g in further stages ?
- (iv) What will be the conclusion, if the label marked as h and i contain their size same as g ?

Q.32. (a) Describe the series of experiments of F. Griffith. Comment on the significance of the results obtained.

- (b) State the contribution of Macleod, McCarty and Avery.