

MODEL QUESTION PAPER 2027

BIOLOGY

Std. XII (H.S.C.) · Maharashtra State Board

Time: 3 Hours

Max. Marks: 70

General instructions:

- (1) All questions are compulsory.
- (2) The numbers to the right indicate full marks.
- (3) For each MCQ (Q. 1), only the first attempt will be evaluated.
- (4) Draw well-labelled diagrams wherever necessary.
- (5) Use of a calculator is not allowed.

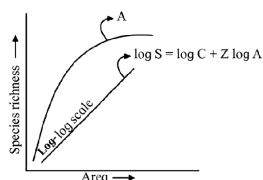
SECTION A

Q. 1. Select and write the correct answer of the following (each 1 mark):

10

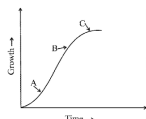
- (i) When food is translocated from phloem to pith, it is called _____ translocation. (a) radial (b) tangential (c) upward (d) downward
- (ii) Identify 'A' from the graph given below showing species area relationship : [species-area relationship graph]

(iv) Identify 'A' from the graph given below showing species area relationship :



- (iii) Rivet Popper Hypothesis explains (a) loss of biodiversity (b) biomagnification (c) species area relationship (d) significance of diversity
- (iv) [figure of population growth curve] Choose the correct name of phases A, B and C in the given figure : (a) Stationary, Log, Lag (b) Log, Lag, Stationary (c) Log, Stationary, Lag (d) Lag, Log, Stationary

given figure :



- (v) The microorganism used for production of beverages like wine, whisky, etc. is _____. (a) *Streptomyces venezuelae* (b) *Saccharomyces cerevisiae* (c) *Aspergillus niger* (d) *Streptomyces griseus*
- (vi) Which of the following is NOT a Day Neutral Plant (DNP)? (a) Cucumber (b) Tomato (c) Cotton (d) Tobacco
- (vii) Extinction of a host fish leads to extinction of unique parasites of it. This is an example of _____. (a) Over exploitation (b) Invasion of alien species (c) Co-extinction (d) Habitat loss
- (viii) Flavr savr tomato is genetically modified variety for improving _____. (a) shelf life (b) disease resistance (c) iron content (d) yield
- (ix) A petridish containing nutrient medium shows tremendous increase in number of bacteria in short time. It is _____ growth. (a) slow (b) exponential (c) logistic (d) linear
- (x) Weight loss, increased BMR and protruding eyeballs are the characteristics of _____. (a) Cretinism (b) Exophthalmic goitre (c) Myxedema (d) Simple goitre

Q. 2. Answer the following (each 1 mark):

8

- (i) Name the causative agent of typhoid.
- (ii) How many meiotic divisions are required to produce 80 male gametes in Angiosperms?
- (iii) Name the process in which swelling of hydrophilic colloids occur due to adsorption of water.
- (iv) Which biological tool in rDNA technology is also called molecular scissors?

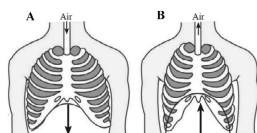
- (v) When turgor pressure is equal to wall pressure of a turgid cell, then what would be the diffusion pressure deficit?
- (vi) What are Long Day Plants (LDP)?
- (vii) Which part of human brain is responsible for maintaining body balance?
- (viii) What is the approximate volume of blood pumped out during one cardiac cycle in adult human?

SECTION B

Q. 3 to Q. 14. Attempt any EIGHT of the following (each 2 marks):

16

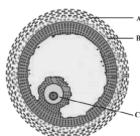
- (i) Interpret the given diagrams A and B. Enlist the changes occurring during inspiration and expiration. [diagrams A and B of breathing mechanism]



♦♦♦

- (ii) Match the following from Column-A and Column-B. Write the correct pairs. Column A: (i) Anaemia (ii) Atherosclerosis (iii) Parturition (iv) Blood clots (v) Cancer (vi) Diabetes. Column B: (1) Platelet derived growth factor (2) Relaxin (3) Insulin (4) Erythropoietin (5) Tissue plasminogen activator (TPA) (6) Interferons, tumour necrosis factor interleukins.
- (iii) With the help of a labelled diagram, describe the structure of root-hair.
- (iv) Give the skeletal features of Homo erectus.
- (v) Identify A, B and C from the given diagram of Graafian follicle and mention their significance : [diagram of Graafian follicle]

and mention their significance :



- (vi) Match the respiratory surface to the organism in which it is found : Organisms: (1) Limulus (2) Protists (3) Tadpoles of frog (4) Fishes (5) Reptiles (6) Spiders. Respiratory surface/organs: (a) Lungs (b) Internal gills (c) Book lungs (d) External gills (e) Plasma membrane (f) Book gills (g) Cloaca.
- (vii) (a) What is DNA profiling? (b) Arrange the following steps of DNA profiling in correct sequence: (i) Selection of DNA probe (ii) Isolation of DNA (iii) Gel electrophoresis (iv) Hybridization (v) Southern blotting (vi) Restriction digestion
- (viii) Mention any four factors affecting water absorption.
- (ix) Enlist the names of VI, VII, VIII and IX cranial nerves.
- (x) Mention any six symptoms of disorder caused by trisomy of 21st chromosome.
- (xi) Enlist any four uses of gene therapy.
- (xii) Identify the disorders showing following symptoms : (a) Constriction of bronchioles, mucus build up in bronchioles, periodic wheezing, difficulty in breathing. (b) Inflammation of sinuses and mucous discharge.

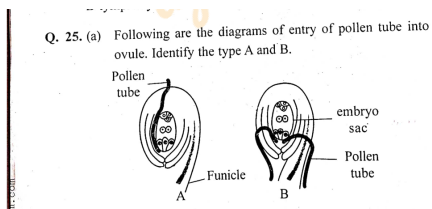
SECTION C

Q. 15 to Q. 26. Attempt any EIGHT of the following (each 3 marks):

24

- (i) Explain leaching, humification and mineralization as the steps of decomposition process.
- (ii) Give location and function of any four valves present in human heart.
- (iii) (a) Enlist any four mineral deficiency symptoms seen in plants. (b) Give the function of molybdenum as mineral nutrient.
- (iv) What is transpiration? Explain stomatal opening and closing mechanism with reference to starch-sugar interconversion theory.

- (v) Define : (a) Siphonogamy (b) Parthenocarp (c) Polyembryony
- (vi) Write any three characters each of Archaeopteryx showing Reptilian and Avian features.
- (vii) (a) Give the composition of biogas. (b) Enlist the benefits of biogas.
- (viii) Describe the transcription and processing of hnRNA to mRNA in Eukaryotes.
- (ix) (a) Following are the diagrams of entry of pollen tube into ovule. Identify the type A and B. [diagrams of pollen tube entry into ovule] (b) Give any four points of significance of double fertilization.



- (x) Explain different steps involved in PCR technique.
- (xi) Give an account of cutting and grafting as vegetative reproduction methods.
- (xii) Describe commensalism giving two examples.

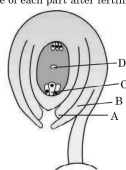
SECTION D

Q. 27 to Q. 31. Attempt any THREE of the following (each 4 marks):

12

- (i) Explain nuclear and helobial type of endosperm with suitable examples.
- (ii) With the help of labelled diagram describe the structure of human sperm.
- (iii) With the help of a suitable diagram describe histology of testis.
- (iv) Identify A, B, C and D parts in the given diagram of an Angiospermic ovule and give the fate of each part after fertilization: [diagram of angiosperm ovule]

Q. 29. Identify A, B, C and D parts in the given diagram of an Angiospermic ovule and give the fate of each part after fertilization:



Q. 30. Give an account of different functional areas of cerebrum.

- (v) Give an account of different functional areas of cerebrum.