ISC · CLASS 12 · BIOLOGY

# ISC Class 12 Biology Guess Paper 2027

Time: 3 hours · Maximum marks: 70 · 37 questions

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## Section A

Compulsory. Question 1 has eighteen sub-parts; every answer carries one mark (twenty one-mark answers in all, as sub-parts xvi and xviii each have parts (a) and (b)): seven are MCQ-type (five four-option MCQs and two assertion-reason) and thirteen are very-short-answer (name/expand/analogy/reason/calculate/construct). No internal choice.

**Q1.** A retroviral RNA undergoes reverse transcription to produce a double-stranded DNA molecule containing a six-nucleotide-long palindromic sequence. A partial segment of this double-stranded DNA is shown below: 1 mark
5′– GGA --- – 3′
3′– --- --- --- – 5′
Obtain the six nucleotide long palindromic DNA sequence on the 3′ – 5′ strand of DNA.

**Q2.** A survey was conducted to study the age structure of a human population. The data obtained is shown below: Adults 60,000; Children 35,000; Old 50,000. Based on the above data, identify the MOST appropriate shape of the age pyramid for this population. 1 mark
(a) Pyramidal
(b) Triangular
(c) Urn-shaped
(d) Bell-shaped

**Q3.** In a single-stranded segment of a DNA molecule, the base ratio (A+T):(G+C) is found to be 0·3:1. What will be the ratio (A + G):(T + C) for the entire double-stranded DNA molecule? 1 mark
(a) 1:1
(b) 3:10
(c) 10:3
(d) 13:3

**Q4.** Construct an ecological pyramid of biomass for the following food chain: Grass → Deer → Fleas 1 mark

**Q5.** If a person shows the production of interferons in his body, then he is suffering from: 1 mark
(a) Malaria
(b) Ring worm
(c) Dengue
(d) Typhoid

**Q6.** Stuti ate a cake containing nuts and immediately developed swelling of the lips and difficulty in breathing. Identify the chemical responsible for Stuti's condition. 1 mark
(a) Insulin
(b) Histamine
(c) Interferon
(d) Adrenaline

**Q7.** Identify the vectors used for cloning genes into eukaryotic organisms. 1 mark
(P) BAC
(Q) Bacteriophages
(R) Ti plasmid
(S) Disarmed retroviruses
(a) Only (P) and (Q)
(b) Only (P) and (R)
(c) Only (Q) and (S)
(d) Only (R) and (S)

**Q8.** A research scholar isolated a novel restriction enzyme from Bacillus anthracis strain ZT4. It was the third restriction enzyme to be extracted from this specific strain. Derive the scientific name for this enzyme by applying the standard rules of biological nomenclature. 1 mark

**Q9.** If the number of chromosomes in the cells of the calyx is 16, how many chromosomes will be formed in the endosperm after double fertilisation? 1 mark

**Q10.** A forest has a GPP of 20,000 kcal/$m^2$/year, and 40% of this energy is used for respiration. Calculate the amount of energy available as NPP. 1 mark

**Q11.** A rural area has a population density of 150 individuals per sq. km. If the area is 250 sq. km, what will be the total population of the rural area? 1 mark

**Q12.** State the underlying principle of ELISA test. 1 mark

**Q13.** In the year 2021, the population of fish in a lake was 500. After one year, a biologist found that the population had an average natality of 120, average mortality of 65, immigration was 25 and emigration was 30. Calculate the total number of fish that were present in the lake in 2022. 1 mark

**Q14.** Give a reason: The period of lactational amenorrhoea is marked by the absence of menstruation. 1 mark

**Q15.** Ravi wanted to grow rice in his field. He was very concerned about environment degradation, so he did not want to use chemical fertilisers. Suggest a suitable biological method to Ravi. 1 mark

**Q16.** Name the bond which exists between chain-A and chain-B of human insulin. 1 mark

**Q17.** A patient was found to have a mass of pancreatic cells in the liver producing large amounts of amylase. Further medical tests revealed a tumor in the pancreas. What type of tumour had developed in the pancreas? 1 mark

**Q18.** In a particular plant with bilobed dithecous anther, there were 50 Pollen Mother Cells. Only 25% could develop their pollen tubes. Calculate the number of pollen grains that would proceed for fertilisation. 1 mark

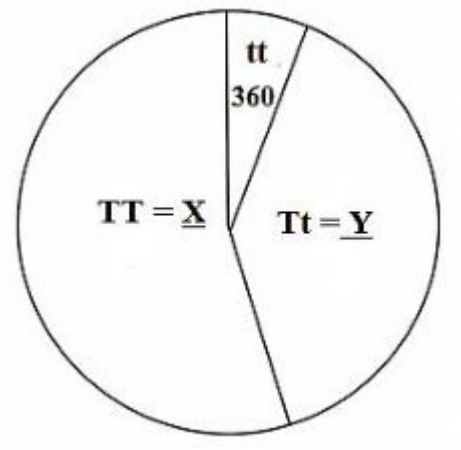
**Q19.** Construct a pyramid of numbers for an ecosystem in which a single large aquatic plant supports a population of small herbivorous fish, which are consumed by a larger population of predatory fish such as kingfish. 1 mark

**Q20.** Why are tendrils of vine (Vitis) and pea (Pisum) considered to be analogous organs? 1 mark

## Section B

Seven questions (Q2-Q8), each carrying two marks. Internal choice is provided in two questions.

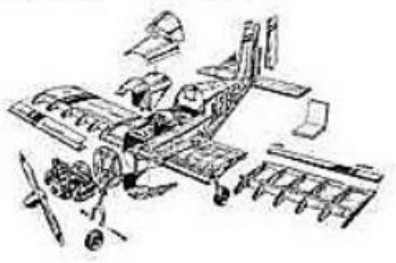
**Q21.** The given pie chart shows the distribution of genotypes in a population of 9000 pea plants (TT = X, Tt = Y, tt = 360). The population is in Hardy-Weinberg equilibrium. It is known that 360 plants are homozygous recessive (tt). Using this information, calculate the following: (a) Frequency of the dominant allele (T) (b) Number of heterozygous pea plants 2 marks



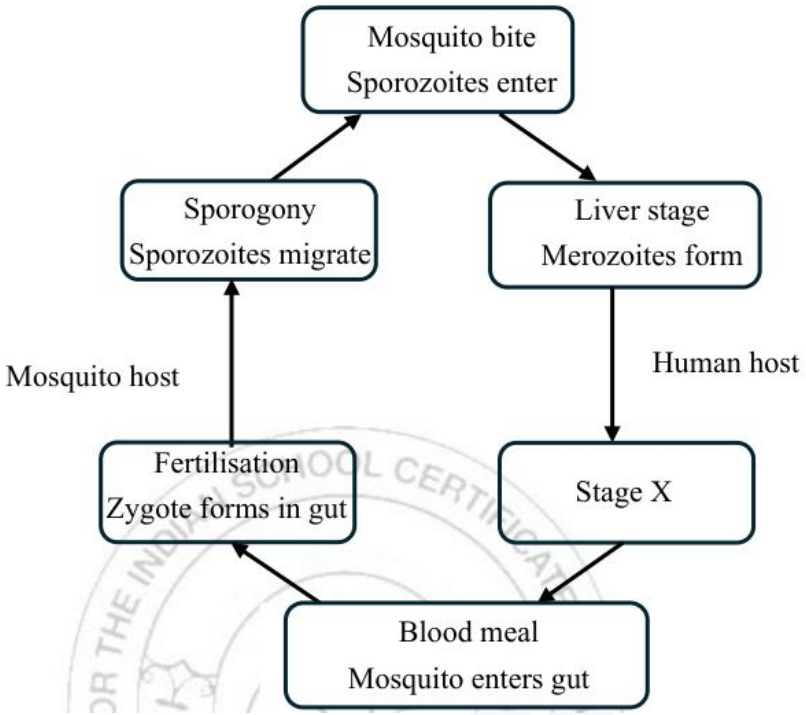

**Q22.** The amount of energy at the fourth trophic level in the food chain given below is 4 J. Grass -> Zebra -> Crocodile -> Vulture. What will be the amount of energy available at the sunlight and transducer level? 2 marks

**Q23.** The image shown below represents an ecological hypothesis proposed by Paul Ehrlich. Study it carefully and answer the following question. Identify and explain this ecological hypothesis. 2 marks





**Q24.** The flowchart provided below represents the life cycle of Plasmodium, alternating between its human host and the female Anopheles mosquito. (a) Identify Stage 'X'. (b) Name the toxin directly responsible for the recurring chills and fever experienced by a patient suffering from malaria. 2 marks




**Q25.** An alien gene was ligated by a research scholar at Sal I site of pBR322 plasmid. It affected a selectable marker. (i) Name the selectable marker which was affected. (ii) State the underlying principle due to which the selectable marker was affected. 2 marks

**Q26.** Name any two factors responsible for the loss of biodiversity in a geographical region. 2 marks

**Q27.** The diagram given below represents a specific stage of human embryonic development. (a) Name the stage of human embryo represented by the given diagram. (b) Identify the part labelled 'A' and mention its function. (c) What happens to the inner cell mass after implantation? 2 marks

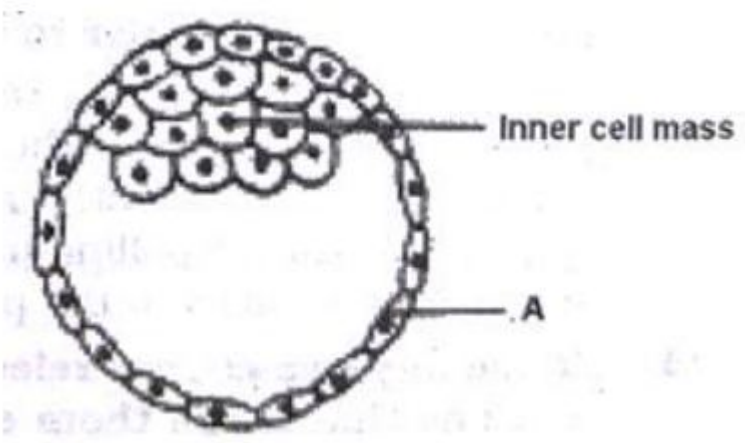



*Figure 6*

## Section C

Seven questions (Q9-Q15), each carrying three marks. Internal choice is provided in two questions.

**Q28.** Study the two figures shown below that represent two growth models (Figure A, Figure B). (i) Which one of the two figures represents an unlimited supply of nutrients? Give a reason. (ii) Which figure depicts a challenge to population growth? (iii) Explain the term reproductive fitness. (iv) Give the mathematical expressions for Figure A and Figure B. 3 marks

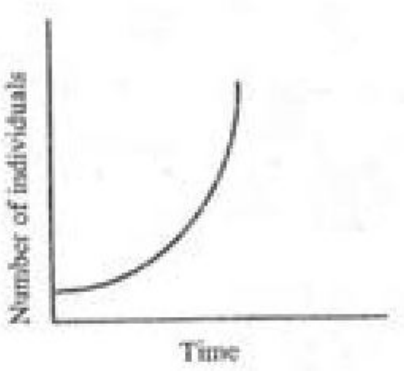



Figure A

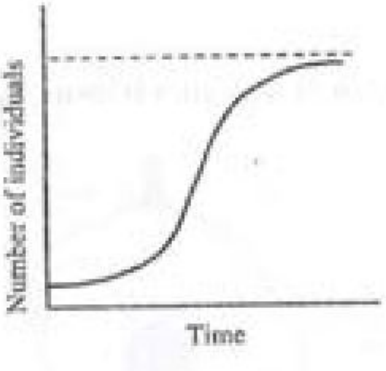
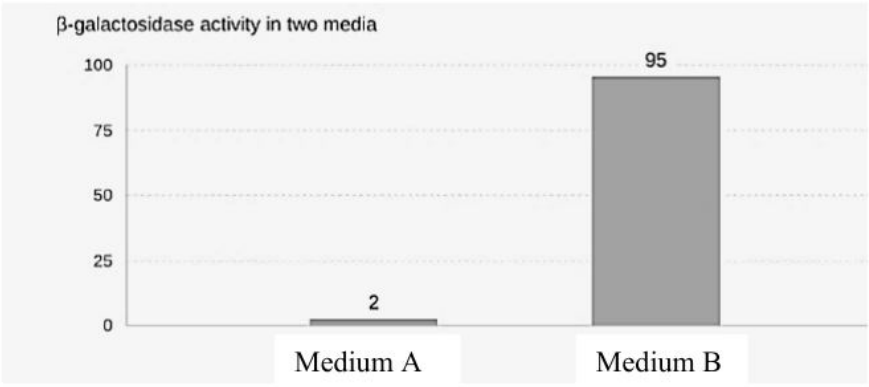



Figure B

**Q29.** The bar graph given below shows the growth of E. coli in two different media (Medium – A and Medium – B), along with the corresponding β-galactosidase activity (Medium A: 2; Medium B: 95) and the state of the lac operon in each case. Based on the above graph, answer the following questions: (a) Why is the operon switched OFF in one medium? (b) The lac operon is described as an example of negative regulation of gene expression. Explain the statement with reference to the role of the operator site. 3 marks




**Q30.** The red panda has been listed as an endangered species on the IUCN Red List since 2015. Regional captive breeding programmes have been established in the zoos around the world to protect the red panda from extinction. (i) Classify the biodiversity conservation programme referred to above. (ii) Mention any other two methods of conservation which belong to the same category. 3 marks

**Q31.** Draw a neat, labelled diagram of the L.S. of an anatropous ovule. 3 marks

**Q32.** The diagram given below shows various phases of the menstrual cycle in human beings. (i) Identify the plotlines that represent the following: (a) Progesterone (b) Luteinizing hormone. (ii) Give any two differences between Menstrual cycle and Estrus cycle. 3 marks

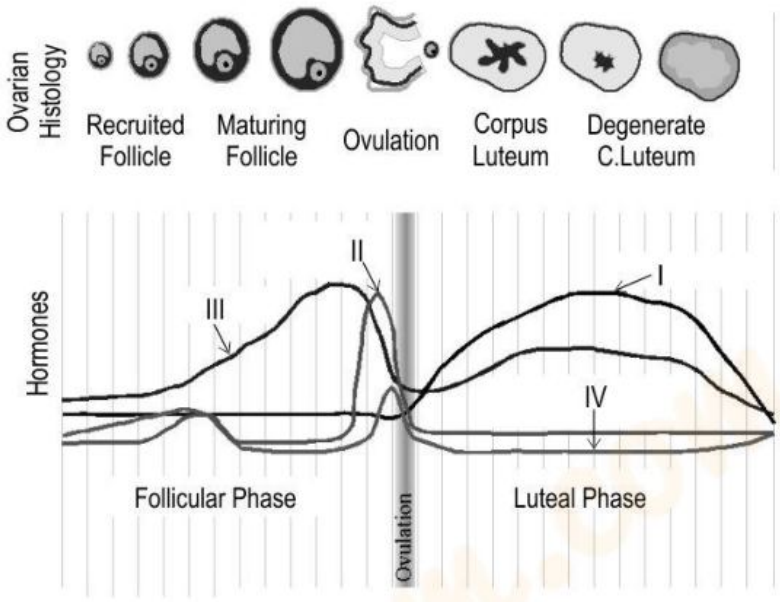



*Figure 8*

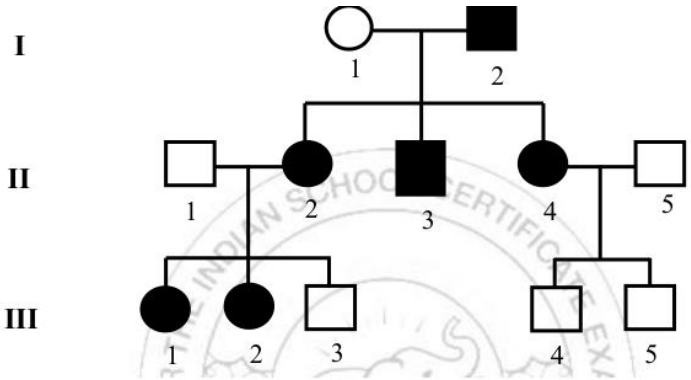
**Q33.** Name the category of microorganisms that aid in biogas production. Provide an example of this category. Mention any four benefits of biogas compared to other energy sources. 3 marks

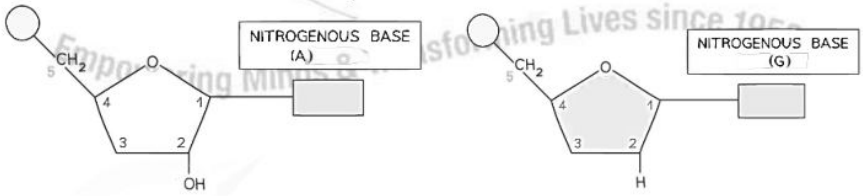
**Q34.** Draw a neat, labelled diagram of the Graafian follicle. 3 marks

## Section D

Three questions (Q16-Q18), each carrying five marks (long-answer, often with pedigree/graph/table interpretation). Internal choice is provided in two questions.

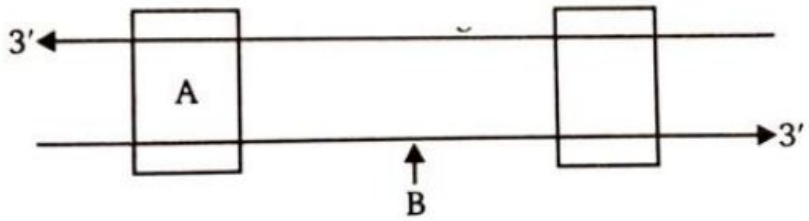
**Q35.** (i) Marfan Syndrome is a human genetic disorder caused by a mutation in the FBN1 gene. This gene codes for fibrillin – 1, a protein that gives connective tissues strength and flexibility. People suffering from Marfan Syndrome show symptoms like dislocation of the eye lens, flat feet, unusually tall height and rupturing of aorta. The following pedigree chart represents the pattern of inheritance of Marfan Syndrome in a family. (a) Identify the type of inheritance from the given pedigree chart. (b) If the parents of a child are heterozygous for this particular trait, calculate the probability of the child being unaffected using a Punnett square. (ii) Prisha is provided with two nucleotides as shown below. Which of these nucleotides should she choose to make an ideal genetic material? Give a reason. 5 marks




(1) (2)

**Q36.** (a) Write a brief note on Griffith's experiment. What was the conclusion drawn from this experiment? (b) Name the parts 'A' and 'B' of the transcription unit shown below. 5 marks




**Q37.** (a) Why are the biocontrol agents preferred over the chemical pesticides? (b) Explain the role of any two biocontrol agents by mentioning their target pests. 5 marks

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