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FOR KARNATAKA CLASS 12 PREPARATION

Karnataka 2nd PUC Model Question Paper 2027 for Biology (Paper 4)

EXAM	YEAR	TYPE	SUBJECT
Karnataka Class 12	2027	Sample Paper	Biology

GOVERNMENT OF KARNATAKA

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD

6TH CROSS, MALLESHWARAM, BENGALURU – 560 003

2026 -27 II PU MODEL QUESTION PAPER – 4

SUBJECT: BIOLOGY (36) **MAXIMUM MARKS: 70**

TIME: 03 HOURS **NUMBER OF QUESTIONS: 44**

General Instructions:

1. This question paper consists of four parts A, B, C, D and E.
2. Part A consists of I and II and Part D consists of V and VI
3. All the parts are compulsory.
4. The answers for Part A written in the first two pages of the answer booklet are only considered for evaluation.
5. Part E consists of questions for visually challenged students only.

PART – A

I. Select the correct alternative from the choices given below: **15 x 1 = 15**

1. Male and female gametophyte formation in angiosperms involve

a) Only sporogenesis

b) Only gametogenesis

c) Sporogenesis followed by gametogenesis

d) Gametogenesis followed by sporogenesis

2. Match Column I and Column II

Column I		Column II	
A	Insemination	I	Ampulla
B	Fertilization	II	Lactation
C	Fetal ejection reflex	III	Penis
D	Colostrum	IV	Parturition

a) A – I, B – II, C – III, D – IV

b) A – III, B – I, C – IV, D – II

c) A – II, B – IV, C – I, D – III

d) A – IV, B – II, C – I, D – III

3. Amniocentesis procedure can't detect the presence of disorder such as

a) Hemophilia

b) Sickle cell anaemia

c) Emphysema

d) Down's syndrome

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4. Read the following statements with respect to haemophilia that may be true or false.

I. A single protein that is a part of the cascade of proteins involved in the clotting of blood is affected

II. In an affected individual a simple cut will result in non-stop bleeding

III. The possibility of a female becoming a haemophilic is high because mother of such a female must be at least a carrier and the father should be haemophilic

IV. The haemophilic male may transmit the disease to sons

Choose the correct answer with respect to the above statement from the options given below:

a) True, False, True, False

b) False, True, False, True

c) False, False, True, True

d) True, True, False, False

5. RNA can act as;

A. Genetic material B. Messenger C. Adapter molecule
D. Structural molecule E. Catalytic molecule

a) A, B, C, D, E
b) A, B, C, E
c) A, C, D, E
d) A, B, D, E

6. Select the correct matching:

a) Synapsids – Tuataras

b) Synapsids – Turtle

c) Synapsids – Lizards

d) Synapsids – Mammals

7. Which of the following statements is correct regarding AIDS/HIV?

a) It progressively decreases the number of B-lymphocytes in the body of infected person

b) AIDS is caused by HIV, a member of the group of unenveloped retroviruses with RNA genome

c) When HIV enters the cell and multiples within it and get released out of the cell without killing or affecting them as in macrophages.

d) There is always a time lag of few months to few years between the infection and appearance of the symptoms

8. In addition to being a vector, the female Anopheles mosquito also acts as a host for the malarial parasite - Plasmodium. Choose the option that supports the role of the female Anopheles mosquito as a host.

a) Liver cells serve as the site for the multiplication of Plasmodium.

b) Plasmodium completes part of its lifecycle in the female Anopheles.

c) The female Anopheles mosquito lays eggs in stagnant pools of water.

d) The female Anopheles mosquito transmits Plasmodium to humans by biting

9. Select the incorrect match:

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a) Swiss cheese – Propionibacterium sharmanii

b) Citric acid – Acetobacter aceti

c) Ethanol – Saccharomyces cerevisiae

d) Nitrogen enrichment - Azotobacter

10. Statement I: A desired gene introduced into host multiplies itself

Statement II: Any alien piece of DNA multiplies in host only if it becomes part of a chromosome

a) Both Statement I and Statement II are correct

b) Both Statement I and Statement II are incorrect

c) Statement I is correct and Statement II is incorrect

d) Statement I is incorrect and Statement II is correct

11. Read the following statements from A to D.

A. Since DNA is hydrophilic molecule, it cannot pass through cell membrane

B. Bacteria are made competent to uptake DNA by treating with monovalent cations like calcium

C. To enable the bacteria to uptake recombinant DNA, the cells with recombinant DNA are incubated on ice followed by placing at 42^{o} C for long period of time and back on ice

D. In gene gun, plant cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA

Choose the correct statements from the options given below:

a) A and B

b) A, B and D

c) A, C and D

d) A and D

12. Today transgenic models exist for many human diseases which includes;

i) Cancer ii) Cystic fibrosis iii) Rheumatoid arthritis iv) Alzheimer's disease

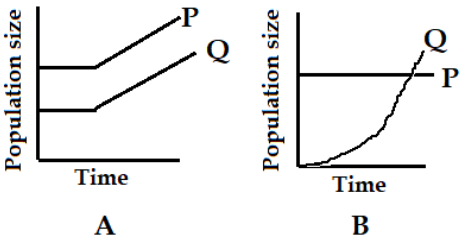
a) i) and ii)

b) ii) and iii)

c) i), ii) and iv)

d) i), ii), iii) and iv)

13. Graph 'A' and 'B' shown below depict interaction of two species P and Q, which graph indicates mutualism?



a) A

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b) B

c) A and B

d) None

14. Consider the following biomes: Tropical rain forest (A), Coastal zone (B), Grassland (C) and Desert (D). Choose the correct option with respect to decreasing order of Net primary production in these biomes.

a) A > B > C > D

b) A < B < C < D

c) A > C > D > B

d) A > D > B > C

15. On non-logarithmic scale the species area relationship equation can be represented as

a) $S = AC^z$

b) $C = SA^z$

c) $C = AS^z$

d) $S = CA^z$

II. Fill in the blanks by choosing the appropriate word/Words from those given below: **5 x 1 = 5**

(Monocytes, Meghalaya, analogy, Fermenter, Neutrophils, Estrogen)

16. The ovarian hormone that attains peak twice in menstrual cycle is ----------

17. Eye of Octopus and of Mammals or the flippers of Penguins and Dolphins are examples of ---------

18. PMNL involved in cellular barrier as innate immunity are ----------

19. Production of an industrial scale requires growing microbes in very large vessels called --------

20. In ---------- the sacred grooves are the last refuges for large numbers of rare and threatened species.

PART - B

III. Answer any FIVE of the following questions in 3 – 5 sentences wherever applicable: **5 x 2 = 10**

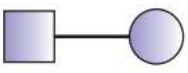
21. Mention the two mandatory processes in artificial hybridization.

22. Name the contraceptive that;

a) prevent physical contact of spermatozoa and ovum and protect from STIs

b) makes cervix hostile to sperms

23. Identify the pedigree symbols.

a)  b) 

24. List the levels of regulation of gene expression that are common to both prokaryotes and eukaryotes.

25. Differentiate *Homo habilis* from *Homo erectus* in relation to brain capacity and food habit.

26. How do biofertilizers enrich the fertility of the soil?

27. Write a note on conserving biodiversity on ethical arguments.

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PART - C

IV. Answer any FIVE of the following questions in 40 – 80 words each wherever applicable: 5 x 3 = 15

28. Draw a diagram of fertilized embryo sac and label three parts.

29. Explain the process of post fertilization event that occur in human female up to blastocyst formation.

30. Identify the ART used in each of the following situations:

a) Use of embryos formed through either *in vitro* or *in vivo* fertilization to help a female conceive.

b) Transfer of donor ova into a female reproductive tract.

c) Introduction of semen into the female reproductive tract, either into the vagina or directly into the uterus.

31. Represent diagrammatically the operation of stabilising, directional and disruptive types of natural selection on different traits in populations.

32. Name the causative organism of the following diseases

a) Pneumonia b) Filariasis c) Ringworm

33. Mention the uses of the bioactive molecules

a) Statin b) Cyclosporin – A c) Streptokinase

34. What are ecological Pyramids? Construct an ecological pyramid with the biomass 4 and 21kg/m^2 at producers and primary consumers respectively.

PART – D

V. Answer any FOUR of the following questions in about 200 – 250 words each wherever applicable: 4 x 5 = 20

35. Answer the following:

a) List the four embryonal parts that are common to both dicot and monocot embryo. 2M

b) Mention the two embryonal parts that are present only in monocot embryo. 1M

c) Write any two differences between dicot and monocot embryo 2M

36. Draw a diagram of spermatozoa and label five parts.

37. Represent schematically the results of a dihybrid cross involving pure line round green and pure line wrinkled yellow pea plants.

38. Outline the sequential steps of DNA fingerprinting in forensic science for DNA profiling.

39. Drug abuse is a common problem faced by countries around the world today due to its impact on the health and well-being of an individual. In context of this answer the following questions.

(a) How is the cocaine consumed? What impact it have on the body?

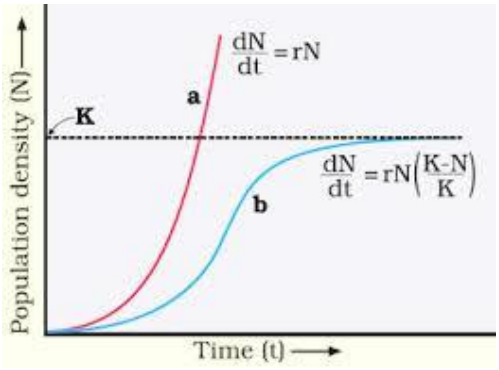
(b) Which drugs bind to receptors of gastrointestinal tract?

(c) What are the characteristics of withdrawal syndrome?

40. Describe the application of biotechnology in the production of pest resistant cotton plants.

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41. Refer to the graphs given below regarding growth patterns in organisms and answer, the questions that follow.



a) Curve 'a' represents which type of growth. 1M

b) Curve 'b' represents which type of growth. 1M

c) Which growth model is considered more realistic one in nature. 1M

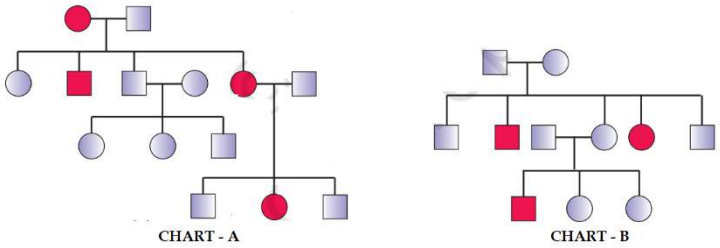
d) What do 'r' and 'K' represent in the equations? 2M

VI. Answer any ONE of the following questions in about 200–250 words each wherever applicable: **1x 5 = 5**

42. Study the two pedigree charts carefully.

Chart A: Myotonic dystrophy in a family

Chart B: Inheritance of sickle cell anaemia in another family



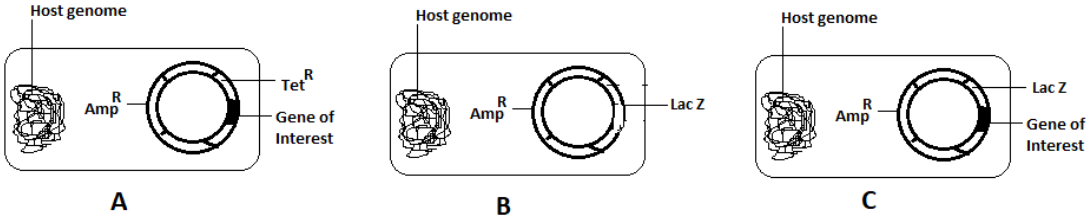
Answer the following questions based on the charts above:

a) Write the genotypes of the affected females and normal males in **Chart A**, and the affected male and normal females in **Chart B**.

b) What type of mutation causes sickle cell anaemia?

43. Tabulate the differences between replication and transcription with respect to product, primer, enzyme, substrates, and time of occurrence.

44. Refer to the given diagrams and answer the questions that follows:



a) Identify the transformant and recombinant host cells among A, B and C. 2M

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b) Based on your answer, how many culture plates you need to prepare to select the recombinant host cells. Substantiate. 3M

PART – E
(FOR VISUALLY CHALLENGED STUDENTS ONLY)

13. Which of the following is not an example for mutualism? 1M

a) Lichens

b) Mycorrhiza

c) Coralloid roots

d) Cuscuta

41. What is population density? Mention any four factors that fluctuate the population density. 5M

42. Write a note on sickle cell anemia. 5M

44. Explain the characteristics of a cloning vector. 5M

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