

GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
MODEL QUESTION PAPER - 2 (2024-25)
II PU SUBJECT - BIOLOGY (36)

DURATION: 3 HOURS

MAX. MARKS: 70

General instructions:

1. The question paper consists of parts -**A, B, C, D** and **E**.
2. Part-**A** consists of **I & II** and Part-**D** consists of **V & VI**.
3. All the parts are compulsory.
4. For part-**A** questions, only the first written answers will be 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:

15 x 1 = 15

1. Select the correct sequence of events in microsporogenesis

- a) Sporogenous tissue → Microspore mother cell → Microspore tetrad → Microspores
- b) Microspores → Microspore mother cell → Microspore tetrad → Sporogenous tissue
- c) Sporogenous tissue → Microspore tetrad → Microspores → Microspore mother cell
- d) Microspores → Sporogenous tissue → Microspore tetrad → Microspore mother cell

2. Statement I: The process of release of sperms from the seminiferous tubule is called spermatogenesis.

Statement II: The spermatids are transformed into spermatozoa by the process called spermiogenesis.

Choose the correct answer from the options given below:

- a) Both statement I and statement II are correct
- b) Both statement I and statement II are incorrect
- c) Statement I is correct but statement II is incorrect
- d) Statement I is incorrect but statement II is correct

3. The function of myometrium layer present in the uterine wall is to

- a) Undergo cyclical changes during menstrual cycle.
- b) Exhibit strong uterine contraction during parturition.
- c) Give protection to the uterus.
- d) Help in the implantation process.

4. The _____ hormone is secreted by the ovary in the later phase of pregnancy.

- a) Androgens
- b) Estrogens
- c) Relaxin
- d) Progestogens

5. Sperms produced by the seminiferous tubules are transported through accessory ducts. Which duct should be tied and cut for male sterilization?

- a) Vas deferens
- b) Vasa efferentia
- c) Rete testis
- d) Epididymis

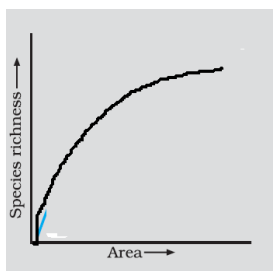
6. Reasons for human population explosion are given below:

- i) Rapid decline in maternal mortality rate.
- ii) Rapid decline in infant mortality rate.
- iii) Rapid increase in death rate.
- iv) Increase in the number of people in reproductive age.

Select the correct answer statements from the options given below:

- a) i), ii) and iii) only
- b) b) i) and ii) only
- c) i), ii) and iv) only
- d) iii) and iv) only

7. In a dihybrid cross in pea plants, Mendel got 9:3:3:1 phenotypic ratio. It denotes that
- The alleles of two genes are interacting with each other.
 - It is a polygenic inheritance.
 - It is a multiple allelic inheritance.
 - The alleles of two genes are segregating independently.
8. A DNA segment has a total of 1000 nucleotides, out of which 240 of them are adenine containing nucleotides. How many pyrimidines bases this DNA segment possesses?
- 480
 - 500
 - 760
 - 260
9. $(p + q)^2 = p^2 + 2pq + q^2$ represents an equation used in:
- Population genetics
 - Mendelian genetics
 - Molecular genetics
 - Biometrics
10. A farmer working in a field was bitten by poisonous snake. Doctor gave him an antivenom treatment that contain preformed antibodies. This type of immunisation is known as
- Autoimmunity
 - Passive immunisation
 - Innate immunity
 - Active immunisation
11. An agriculture labour was spraying some powder mixed with water onto fruit trees to get rid of insect larvae. Which of the following biocontrol agent could have been used here?
- Bacillus thuringiensis*
 - Trichoderma*
 - Dragonflies
 - Ladybird
12. Choose the correct sequence of polymerase chain reaction steps from the following:
- Annealing → Denaturation → Extension
 - Extension → Annealing → Denaturation
 - Denaturation → Extension → Annealing
 - Denaturation → Annealing → Extension
13. Use of bioresources by multinational companies and other organisations without proper authorisation and compensatory payment is referred as
- Biopiracy
 - Biofortification
 - Bioprospecting
 - Bioprocessing
14. An example for *ex situ* conservation is
- National parks
 - Sacred groves
 - Biosphere reserves
 - Zoological parks
15. The graph given below shows species-area relationships.



Which of the following equation correctly represent the curve?

- $S = CA^Z$
- $\log S = \log C + Z \log A$
- $A = CS^Z$
- $\log Z = \log C + S \log A$

II. Fill in the blanks by choosing the appropriate word/words from those given in the bracket. 5x1 = 5

(Primary productivity, Coelacanth, Secondary productivity, *Glomus*, Amniocentesis, Plasmid)

- Statutory ban on _____ is required to check increasing female foeticides.
- A fish thought to be extinct and caught in South Africa in 1938 is _____.
- An example for mycorrhiza forming fungi is _____.
- Autonomously replicating circular extra-chromosomal DNA of bacteria is known as _____.
- Rate of formation of new organic matter by consumers is referred as _____.

PART – B

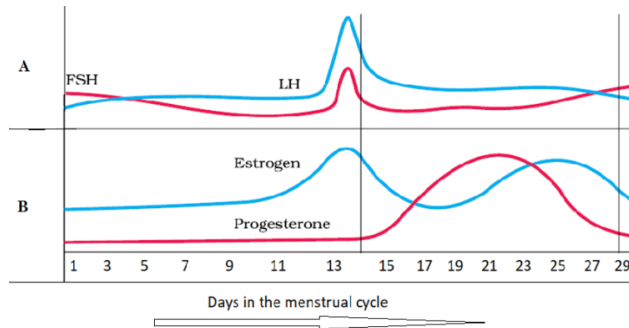
III. Answer any **FIVE** of the following questions in 3-5 sentences each, wherever applicable: 5x2 = 10

21. Differentiate between geitonogamy and xenogamy.
22. Write a short on sex determination method in birds.
23. Mention the levels where gene expression can be regulated in eukaryotes.
24. Write a short note on Neanderthal man.
25. Draw the structure of an antibody molecule.
26. Write the functions of genes *cryIAb* and *cryIIAb*.
27. Briefly explain the significance of David Tilman's long-term ecosystem experiments using outdoor plots.

PART – C

IV. Answer any **FIVE** of the following questions in 40-80 words each, wherever applicable 5x3 =15

28. Draw a L.S. of grass embryo diagram and label the following parts:
a) Scutellum b) Coleoptile c) Shoot apex d) Radicle e) Root cap f) Coleorrhiza
29. In the figure given below, parts A and B show the level of hormones which influence the menstrual cycle. Study the figure and answer the questions that follow:



- a) Name the organs/glands which secrete the hormones represented in labelled parts A and B. (1M)
 - b) State the role of hormones secreted from part B on the uterus of human female during menstrual cycle. (2M)
30. Suggest three simple principles through which we can prevent sexually transmitted diseases.
 31. What is Adaptive Radiation? Give any two examples.
 32. Name of the drugs, its source and nature is given in the table below. Find *a*, *b* and *c*.

Name of the drug	Source plant	Nature
<i>a</i>	<i>Papaver somniferum</i>	Depressant
Cannabinoids	<i>b</i>	Effects on cardiovascular system
Cocaine	<i>Erythroxylum cocoa</i>	<i>c</i>

33. How did an American Company Eli Lilly use the knowledge of rDNA technology to produce human insulin?
34. An example for grazing food chain is given below:
Grass → Grasshopper → Birds → Man
Graphically represent this food chain through pyramid of energy and write different trophic levels with their energy content.

PART- D

V. Answer any **FOUR** of the following questions in 200-250 words each, wherever applicable: 4x5= 20

35. Draw a neat labelled diagram of sectional view of the mammary gland.
36. Schematically represent the inheritance of flower colour in snapdragon and draw conclusions.

37. Give reasons for the following:

- A simple cut result in non-stop bleeding in haemophilia affected individuals.
- Turner's syndrome affected females are usually sterile.
- In Morgan's dihybrid cross experiments on *Drosophila* showed that flies having genes for yellow body and white eyes exhibited less recombination.
- Inheritance of skin colour in the humans shows different phenotypes.
- Accumulation of phenylalanine in the body of phenylketonuria affected individuals.

38. Describe the steps involved in DNA fingerprinting technique.

39. Name the causative agents of the following diseases:

- Malaria
- Filariasis
- Ascariasis
- Amoebiasis
- Pneumonia

40. a) With respect to the microbial products, its source and uses identify the **a**, **b** and **c** in the following table: (3M)

Microbial product	Source	Use
Cyclosporin A	a	Immunosuppressant
b	<i>Monascus purpureus</i>	Blood cholesterol lowering agent
Streptokinase	<i>Streptococcus</i>	c

b) Define the BOD and floccs.

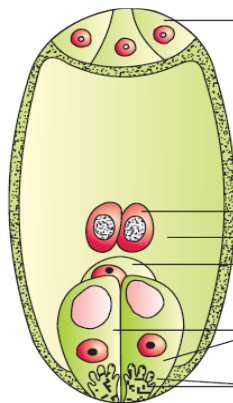
(2M)

41. Mention the population interactions exist among the following:

- Abingdon tortoise and goats
- Tiger and deer
- Sea-anemone and clown fish
- Wasp laying eggs in fig fruit
- Cuscuta* growing on hedge plant

VI. Answer any ONE of the following questions in 200-250 words each, wherever applicable: 1x5 = 5

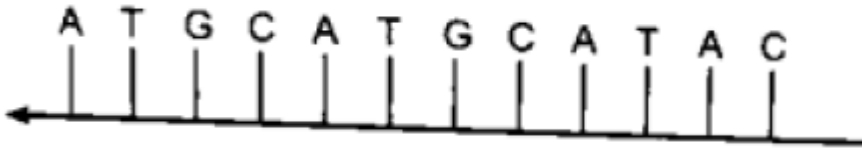
42. Picture of a mature angiosperm embryo sac is given below and answer the question that follows.



- Which cells/nuclei of the embryo sac produce zygote and primary endosperm nucleus? (2M)
- What is the ploidy of antipodal cells and primary endosperm nucleus? (2M)
- Why the endosperm development precedes embryo development? (1M)

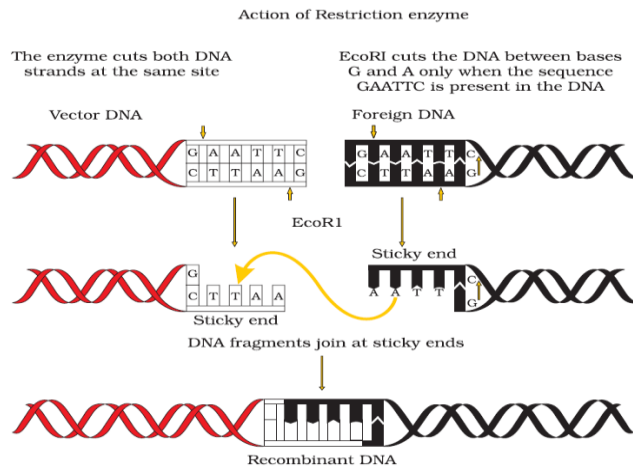
43. Answer the following:

- a) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below. (3M)



- b) Write the RNA strand transcribed from the above transcription unit along with polarity. (2M)

44. Study the diagram given below and answer the questions that follow:



- a) What is EcoRI? (1M)
- b) How is the action of exonuclease different from that of endonuclease? (2M)
- c) How are 'sticky ends' formed on a DNA strand? Why are they so called? (2M)

PART- E

(FOR VISUALLY CHALLENGED STUDENTS ONLY)

15. In relation to species – area relationships, what is the expected 'Z' value for frugivorous birds and mammals in the tropical forests of different continents? (1M)

- a) 0.1 b) 0.4 c) 1.15 d) 0.5

29. Define menopause. Mention the different phases of menstrual cycle. (3M)

42. Answer the following:

- a) Draw a neat labeled diagram of typical anatropous ovule. (3M)
- b) What is the ploidy of nucellus? Write the functions of integuments. (2M)

44. Describe the steps involved in recombinant DNA technology. (5M)
