



Series SQR1P/1



SET-3

प्रश्न-पत्र कोड
Q.P. Code

57/1/3

रोल नं.

Roll No.

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परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Q.P. Code on the title page of the answer-book.

नोट

(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित (I) पृष्ठ 23 हैं ।

(II) कृपया जाँच कर लें कि इस प्रश्न-पत्र में (II) 33 प्रश्न हैं ।

(III) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए (III) प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।

(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से (IV) पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का (V) समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

NOTE

Please check that this question paper contains 23 printed pages.

Please check that this question paper contains 33 questions.

Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

Please write down the serial number of the question in the answer-book before attempting it.

15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक)

BIOLOGY (Theory)

निर्धारित समय : 3 घण्टे

अधिकतम अंक : 70

Time allowed : 3 hours

Maximum Marks : 70



General Instructions :

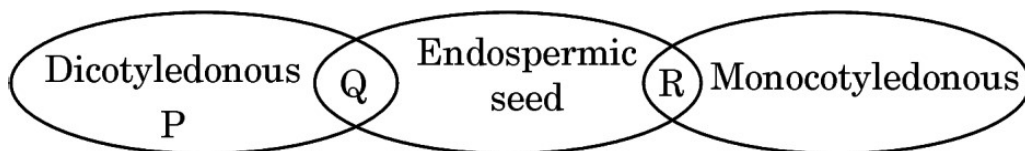
Read the following instructions carefully and follow them :

- (i) This question paper contains **33** questions. **All** questions are **compulsory**.
- (ii) Question paper is divided into **five** sections – Sections **A, B, C, D** and **E**.
- (iii) **Section A** – questions number **1** to **16** are multiple choice type questions. Each question carries **1** mark.
- (iv) **Section B** – questions number **17** to **21** are very short answer type questions. Each question carries **2** marks.
- (v) **Section C** – questions number **22** to **28** are short answer type questions. Each question carries **3** marks.
- (vi) **Section D** – questions number **29** and **30** are case-based questions. Each question carries **4** marks. Each question has subparts with internal choice in one of the subparts.
- (vii) **Section E** – questions number **31** to **33** are long answer type questions. Each question carries **5** marks.
- (viii) There is no overall choice. However, an internal choice has been provided in Sections B, C and D of the question paper. A candidate has to write answer for only **one** of the alternatives in such questions.
- (ix) Kindly note that there is a separate question paper for Visually Impaired candidates.
- (x) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A

Questions no. **1** to **16** are Multiple Choice Type Questions, carrying **1** mark each. **16×1=16**

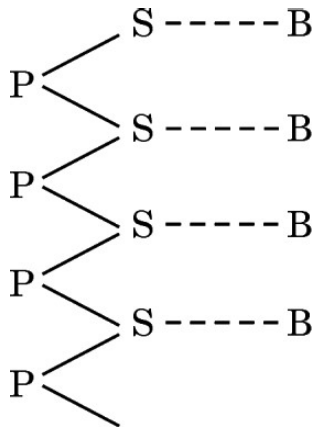
1. Refer to the Venn diagram given below. Select the option with correct examples P, Q, and R :



	P	Q	R
(A)	Castor	Onion	Wheat
(B)	Bean	Castor	Maize
(C)	Pea	Gram	Barley
(D)	Coconut	Rubber	Groundnut



2. The type of bond represented by the dotted line '-----' in a schematic polynucleotide chain is :



- (A) Hydrogen bond (B) Peptide bond
(C) N-glycosidic linkage (D) Phosphodiester bond
3. *Lactobacillus* that sets milk into curd is categorised as :
- (A) Cyanobacteria (B) Archaeobacteria
(C) Chemosynthetic bacteria (D) Heterotrophic bacteria
4. Which one of the following transgenic animals is being used to test the safety of the polio vaccine ?
- (A) Sheep (B) Goat
(C) Pig (D) Mice
5. The scientist who proposed that “embryos of all vertebrates including humans develop a row of vestigial gill slits behind the head but it is a functional organ only in fish and replaced by lungs in all other vertebrates” is :
- (A) Darwin (B) Lamarck
(C) Ernst Haeckel (D) Mendel
6. Which one of the following hormones is secreted by the human placenta that helps in the maintenance of pregnancy ?
- (A) Relaxin (B) Human Chorionic Gonadotropin
(C) Oxytocin (D) Human Placental Lactogen



7. During an allergic reaction, the binding of antigen to IgE antibodies initiates release of :

- (A) Interferon (B) Histamine
(C) Heparin (D) Acetylamine

8. Select the *incorrect* match from the following :

<i>Human Karyotype</i>	<i>Characters</i>
(A) 45 + XX	– Broad palm with characteristic palm crease
(B) 44 + XXY	– Overall feminine development
(C) 44 + XO	– Sterile females as ovaries are rudimentary
(D) 44 + XY	– Normal male

9. Restriction Endonuclease – Hind II always cuts DNA molecules at a particular point by recognising a specific sequence of :

- (A) Six base pairs (B) Four base pairs
(C) Seven base pairs (D) Three base pairs

10. The periodic abstinence by a couple for family planning should be from :

- (A) Day 5 to 10 of menstrual cycle
(B) Day 13 to 15 of menstrual cycle
(C) Day 10 to 17 of menstrual cycle
(D) Day 16 to 20 of menstrual cycle

11. Which one of the following bacteria were used by Stanley Cohen and Herbert Boyer to accomplish the construction of the first rDNA ?

- (A) *Agrobacterium tumefaciens*
(B) *Mycobacterium* sp.
(C) *E. coli*
(D) *Salmonella typhimurium*

12. The organism that occupies more than one trophic level in a pond ecosystem is :

- (A) Fish (B) Frog
(C) Zooplankton (D) Phytoplankton



For Questions number **13** to **16**, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

13. Assertion (A) : Indian Government has set up an organisation known as GEAC to decide the validity of GM research.

Reason (R) : Genetic modification of organisms has no effect when such organisms are introduced in the ecosystem.

14. Assertion (A) : Gene flow increases genetic variations.

Reason (R) : The random introduction of new alleles into a recipient population and their removal from donor population affects allele frequency.

15. Assertion (A) : The laws of our country permit legal adoption and it is as yet, one of the best methods for childless couples looking for parenthood.

Reason (R) : Emotional, religious and social factors are no deterrents to the legal adoption of orphaned and destitute children in India.

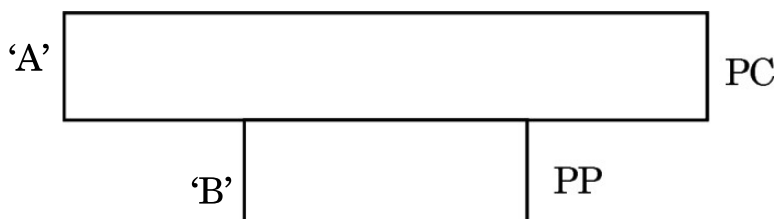
16. Assertion (A) : *Agrobacterium tumefaciens* is a pathogen of several monocot plants.

Reason (R) : It is able to deliver a piece of DNA known as 'T-DNA' to transform normal plant cells into a tumor.

SECTION B

17. Study the diagram of a pyramid of biomass given below. Name the two standing crops that could be occupying level 'A' and level 'B' in it. Name this type of pyramid and the ecosystem in which it is found.

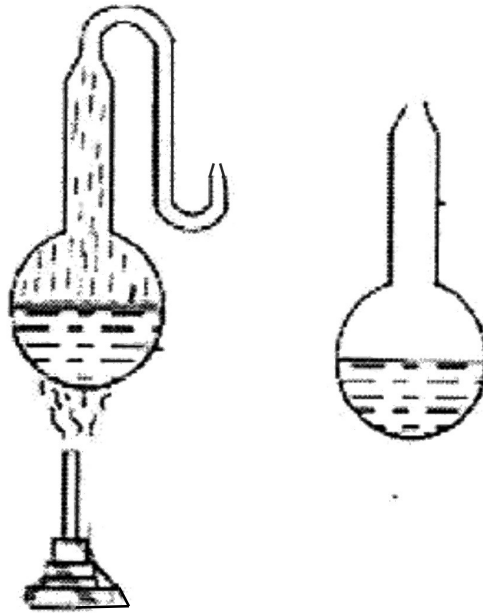
2





18. Given below is an illustration of the experiment performed by Louis Pasteur. Explain the experiment and its conclusion.

2



19. Identify A, B, C and D in the table given below :

$$4 \times \frac{1}{2} = 2$$

<i>Terms</i>	<i>Part of the plant it represents</i>
Pericarp	'A'
'B'	Cotyledon in seed of grass family
Embryonal axis	'C'
'D'	Remains of nucellus in a seed

20. (a) "Different varieties of cheese are known by their characteristic texture, flavour and taste, the specificity coming from the microbes used." Support this statement with the help of two suitable examples.

2

OR

- (b) Identify A, B, C and D in the following table :

2

	Scientific name of source plant	Drug	Harmful effects / Body part affected
1.	<i>Papaver somniferum</i>	A	Depressant/slows down body functions
2.	<i>Cannabis sativa</i>	B	C
3.	<i>Erythroxylum coca</i>	Cocaine	D



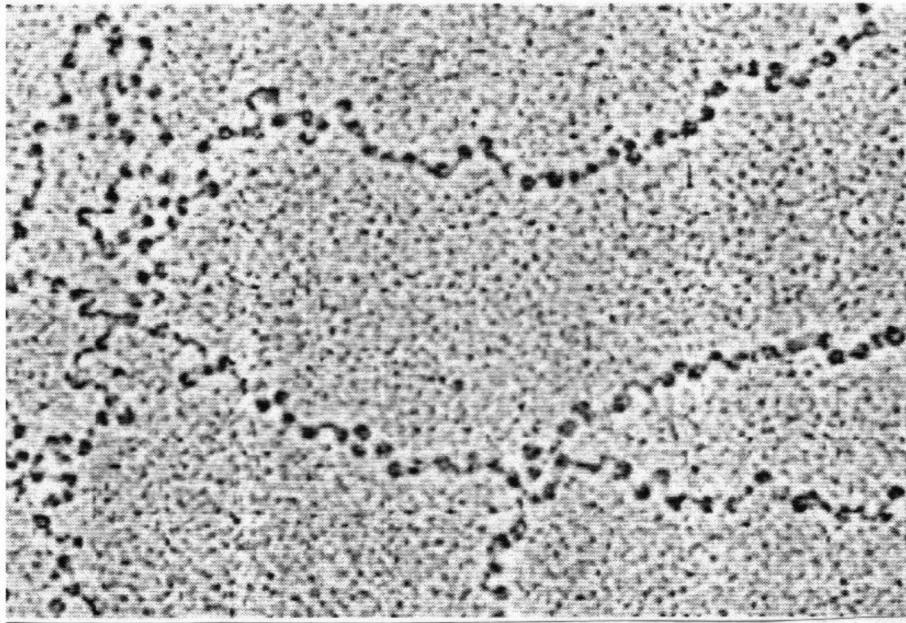
- 21.** Write the basic steps followed in the Assisted Reproductive Technologies (ART) programme to help childless couples. Why is it also known as test tube baby programme ? 2

SECTION C

- 22.** (a) Explain the significance of the experiment carried out by S.L. Miller. Name the scientists whose hypothesis prompted him to carry out this experiment. $2\frac{1}{2}$

- (b) How does meteorite analysis favour this hypothesis ? $\frac{1}{2}$

- 23.** (a) Identify the picture given below and name the tool under which it was viewed. 1



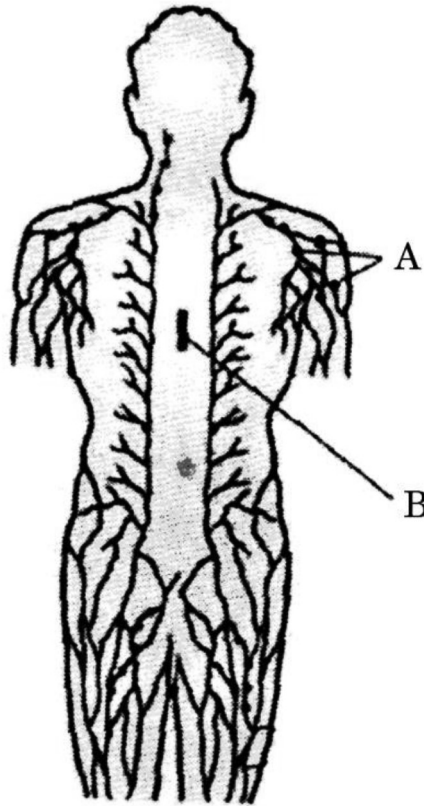
- (b) What do the dark spots represent in the picture ? Explain how and why are they formed. 2

- 24.** In a family, the father, the daughter and the son are colour blind, whereas the mother has normal vision. Do you think the son and the daughter have inherited the disease from their father ? Work out a cross to justify your answer. 3



25. Identify A and B in the diagram below.
Explain their role in the immune system of the body.

3



26. (a) Explain how it is ensured that the orchid *Ophrys* is pollinated by a specific species of bee.

2

- (b) Describe co-evolution with the help of this example.

1

27. Explain the mode of action of contraceptive pills taken by human females. Mention the schedule to be followed for effective outcome.

3

28. (a) (i) What are transgenic animals ?

1

- (ii) Name the first transgenic cow and state its importance.

2

OR

- (b) (i) Explain the convention for naming EcoRI.

2

- (ii) With the help of an illustration only, show the action of EcoRI on a DNA Polynucleotide.

1



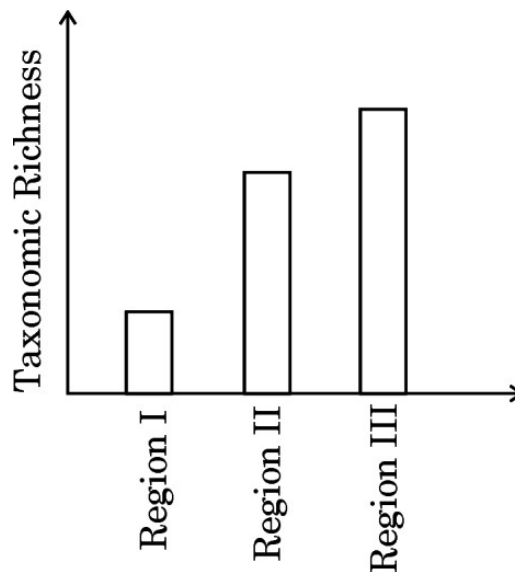
SECTION D

Questions No. 29 and 30 are case-based questions. Each question has 3 sub-questions with internal choice in one sub-question.

29. Read the following passage and answer the questions that follow. 4

Isn't it incredible that India's land area is only 2.4 per cent of the world's total land area whereas its share of the global species diversity is an impressive 8.1 per cent ! However, in these estimates of species, prokaryotes do not figure anywhere.

Biologists are always keen on collecting data with respect to species diversity observed in different regions of the world. The data collected based on the survey conducted for species richness of groups of mammals in three different regions of the world is shown in the bar graph given below :



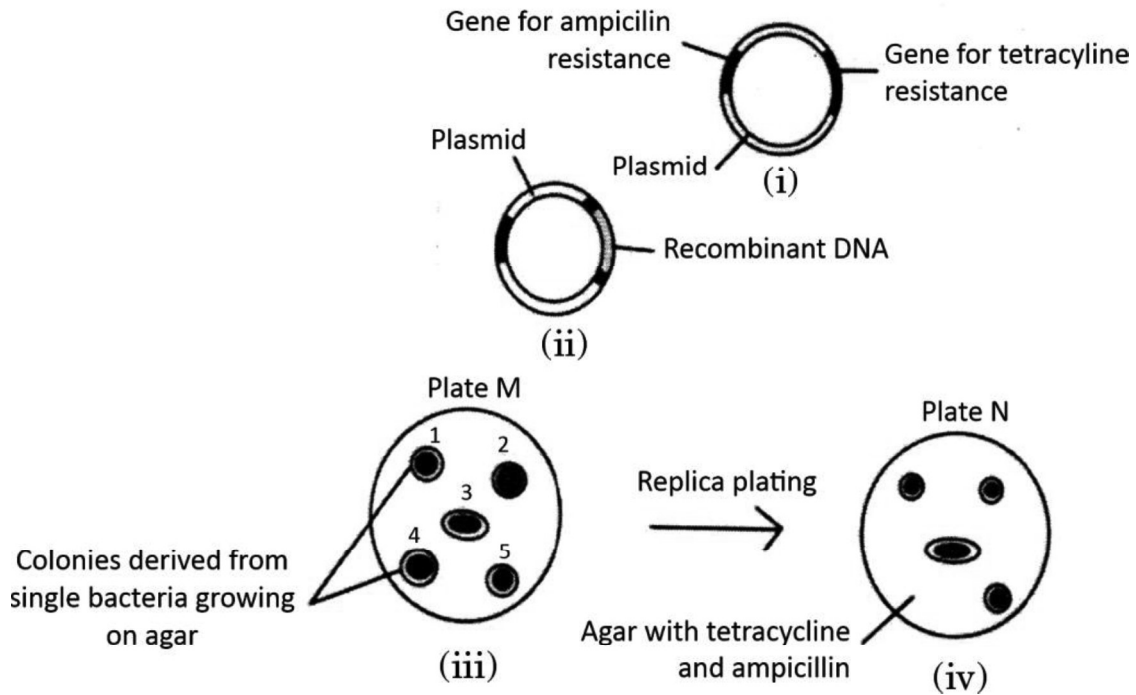
- (a) Why is the species richness maximum in Region III in the bar graph ? 1

OR

- (a) Why is the species richness minimum in Region I in the bar graph ? 1
- (b) Plants and animals do not have uniform diversity in the world but show rather uneven distribution. Mention what this kind of diversity is referred to as. 1
- (c) Why is it that prokaryotes do not have an estimated number of their species diversity as seen in plants and animals ? Explain. 2



30. Study the diagram given below that shows the steps involved in the procedure of selecting transformed bacteria and answer the questions that follow :



- (a) Identify the colony that has got transformed. Justify your answer. $\frac{1}{2} + \frac{1}{2}$
- (b) What are the sites in a plasmid called where ampicillin and tetracycline resistance genes are inserted ? State their role in genetic engineering. 2
- (c) Name two enzymes playing an important role in genetic engineering. 1

OR

- (c) State the role of β -galactosidase in insertional inactivation. 1



SECTION E

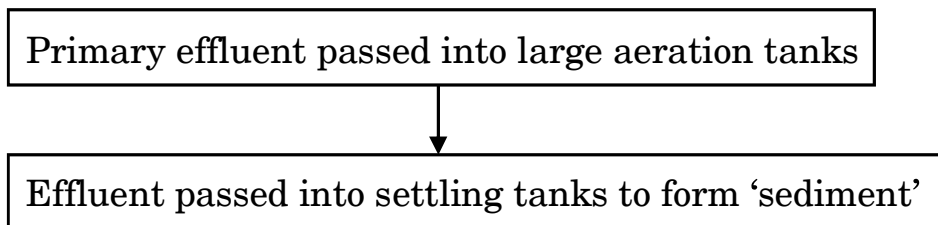
- 31.** (a) (i) Draw a labelled diagram of the embryonic stage that gets implanted in the human female leading to pregnancy. $1\frac{1}{2}$
- (ii) Explain the changes that the different parts of the embryo undergo after implantation up till (1) Placenta formation and (2) formation of three germ layers. 2
- (iii) Mention the role of the following : $1\frac{1}{2}$
- (1) Placenta
- (2) Three germ layers
- OR**
- (b) (i) Why do plants like *Viola* and *Oxalis* give assured seed sets even in the absence of pollinators ? When an orange seed is squeezed, many embryos of different shapes and sizes are observed. Why ? 1
- (ii) Mention four advantages of seed formation to angiosperms. 2
- (iii) Draw a diagram of a fertilized embryo sac of an angiosperm and label any four parts. 2
- 32.** (a) (i) Name and explain the property present in normal cells but is lost in cancer cells. $1\frac{1}{2}$
- (ii) All normal human cells have genes that may become cancerous under certain conditions. Name them and explain how. 1
- (iii) State the role of the following techniques in detection and diagnosis of cancer :
- (1) Biopsy and Histopathology 1
- (2) Magnetic Resonance Imaging $1\frac{1}{2}$

OR



- (b) Large quantities of sewage are generated every day in cities as well as in towns and are treated in Sewage Treatment Plants (STPs) to make them less polluting. Given below is the flow diagram of stages of STP.

Study the flow diagram and answer the questions that follow :



- (i) (1) Why is primary effluent passed into large aeration tanks ? 1
- (2) What is the 'sediment' formed, referred to as ? Mention its significance. 1
- (3) Explain the final step in the settling tank before the treated effluent is released into water bodies. 1
- (ii) Name any two organisms commonly used as biofertilisers, belonging to different kingdoms. Write how each one acts as a biofertiliser. 2

33. (a) Stability, as one of the properties of genetic material, was very evident in one of the very early experiments in genetics. Name the scientist and describe his experiment. State the conclusion he arrived at. 5

OR

- (b) A tall pea plant bearing violet flowers with unknown genotype is given. Find the genotype by working out different crosses only by selfing the plants. Write the genotypic and phenotypic ratios of each cross shown by you. 5