

Series AAB2/4



SET-1

प्रश्न-पत्र कोड
Q.P. Code **57/4/1**

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.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **15** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **13** प्रश्न हैं ।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का 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 ।
- Please check that this question paper contains **15** printed pages.
- 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 check that this question paper contains **13** questions.
- **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 : 2 घण्टे

Time allowed : 2 hours

अधिकतम अंक : 35

Maximum Marks : 35

57/4/1

1



P.T.O.

General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) *This question paper consists of **13** questions.*
- (ii) ***All** questions are compulsory.*
- (iii) *The question paper has **three** sections – **Section A, B and C.***
- (iv) ***Section A** has **6** questions of **2** marks each.*
- (v) ***Section B** has **6** questions of **3** marks each.*
- (vi) ***Section C** has a case-based question of **5** marks.*
- (vii) *There is no overall choice in the question paper. However, internal choices have been provided in some questions. Attempt only one of the alternative in such questions.*
- (viii) *Wherever necessary, neat, proportional and properly labelled diagrams should be drawn.*

SECTION A

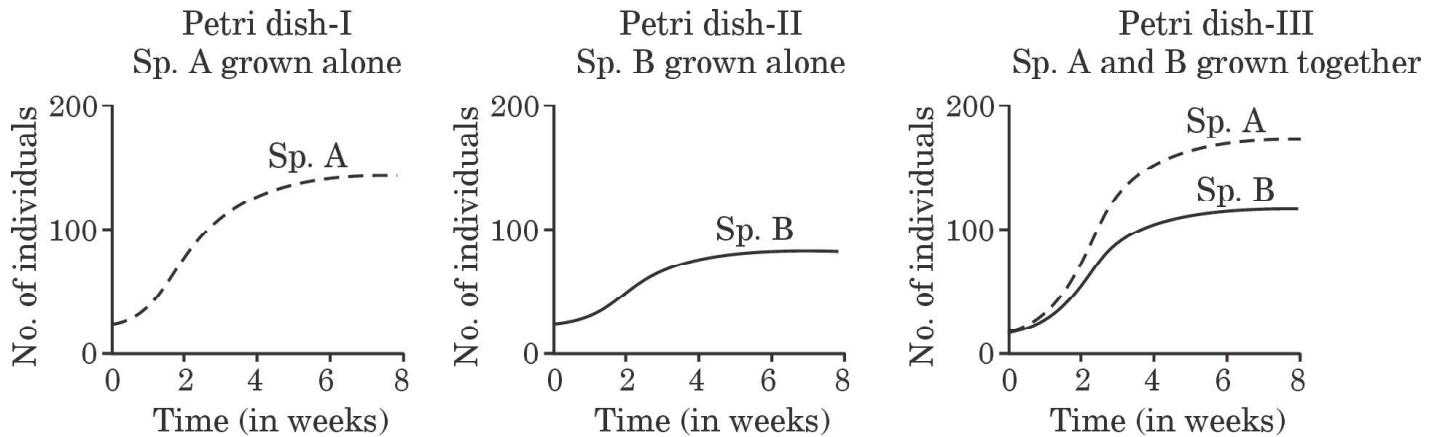
- 1. Explain, giving two reasons, how immune response by “vaccine” is different from that by “antitoxin” in humans. 2
- 2. (a) Mention the common bacterium found in the anaerobic sludge during sewage treatment and also in the rumen of cattle. How is this bacterium commercially useful ? 2

OR

- (b) Name the effective biocontrol agents of several plant pathogens belonging to group of viruses. Also write about the ways they support the environment. 2
- 3. Some of the microbes used as biofertilizers are prokaryotes. Name the taxonomic group they come under. With the help of an example, mention how they act as biofertilizers. 2
- 4. Different species belonging to genus *Trichoderma* are useful to humans as well as to plants. Justify their roles by giving one instance of each. 2



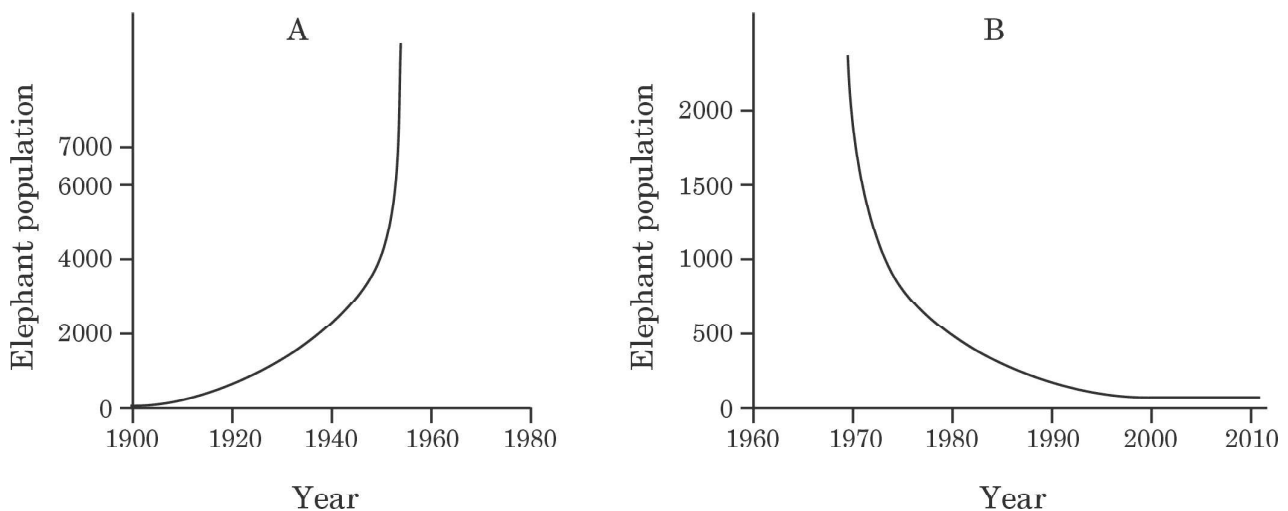
5. The figures given below show the results of a lab experiment in which two microbial species A and B belonging to same genus were grown in three petri dishes having same culture medium. In Petri dish-I, Species-A was grown alone for 8 weeks. In Petri dish-II, Species-B was grown alone for 8 weeks. In Petri dish-III, both the species were grown together with the same number as Petri dish-I and Petri dish-II for 8 weeks.



What conclusion will you draw from the graphs in terms of impact of interaction on growth ? Explain, giving reason.

2

6. (a) The graphs given below, A and B, represent population of elephants in two different National Parks (a hypothetical situation) at different times.



Study the graphs and comment upon the pattern of growth observed. Mention the possible reason for such patterns seen in nature.

2

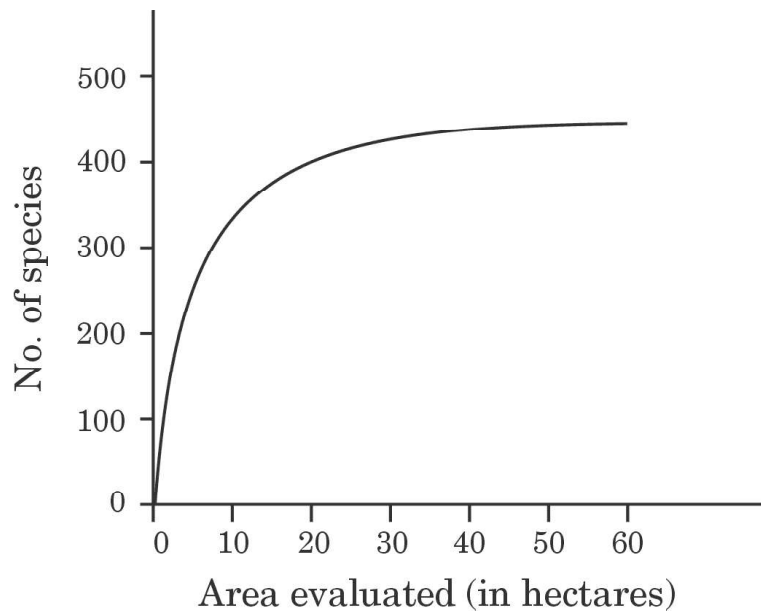
OR



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- (b) As per a recent newspaper report, a particular country showed declining population growth rate. According to you, what could be the two most possible reasons for this decline and why ? 2

SECTION B

7. (a) The graph given below shows species-area relationship of a certain region.



- (i) Study the graph and explain what it represents.
- (ii) After a while, a small area was taken for constructing a road which divided the region into two. Write the impact this construction would have on species richness of the region. 3

OR

- (b) How did Dr. David Tilman relate experimentally, the stability of a community and its species richness ? Explain. 3

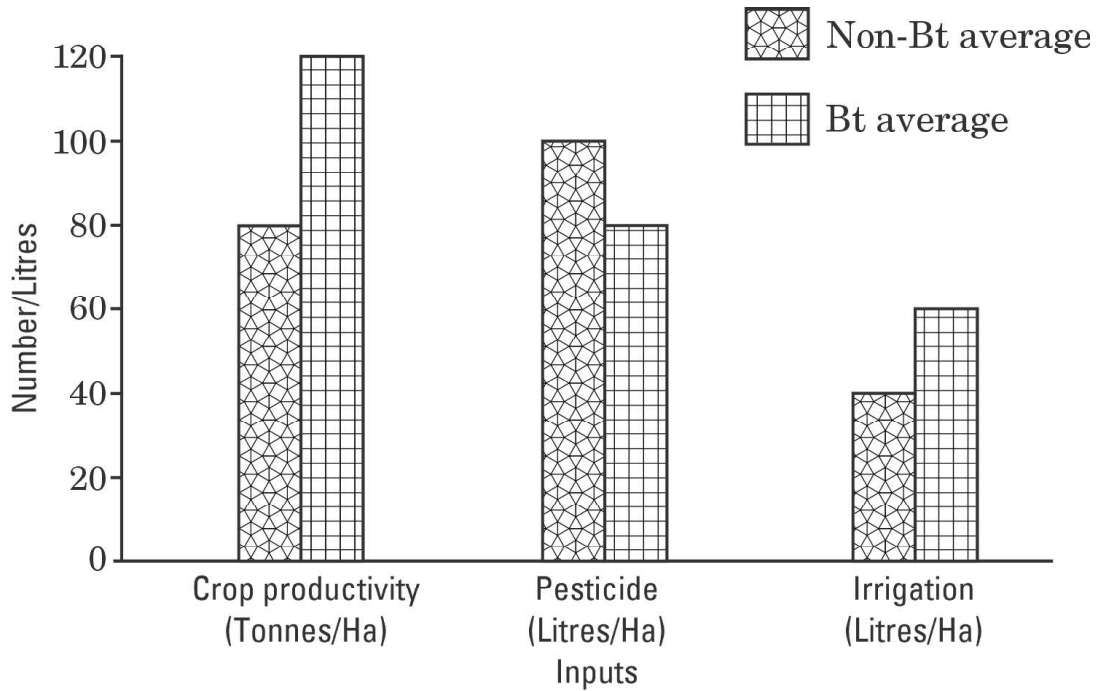


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8. What are the consequences of loss of biodiversity in a region ? Explain. 3
9. *Bacillus thuringiensis* plays an important role in Integrated Pest Management strategy. Explain how. Name any two crops that are protected efficiently from pests. 3
10. With the help of a storyboard or a flowchart only, explain all the stages of how human insulin is produced through r-DNA technology. 3
11. (a) Explain the roles of (i) primary, and (ii) secondary lymphoid organs that are responsible for developing defence to combat the action of pathogens/foreign antigens which enter our body.
- (b) Doctors generally advise not to undergo surgery of tonsils. Why ? 3
12. Causative agents of HIV-AIDS and COVID-19 belong to the same group of viruses. To diagnose and amplify the genetic material for further study of COVID-19 virus, 'RT-PCR' test is carried out.
- (a) What does 'RT-PCR' stand for ?
- (b) Explain the various steps of PCR technique. 3



SECTION C

13. (a) There are two different farm lands, one where Bt-cotton crop was cultivated and the other where non Bt-cotton crop (indigenous) was cultivated. Farmers responsible for this experimental cultivation were free to use the farming practices of their choice. During the cultivation period, the data was collected with respect to the amount of pesticide used, water required for irrigation and at harvesting time, the crop productivity. Based on the data collected, a bar graph was plotted which is shown below.



Answer the following questions :

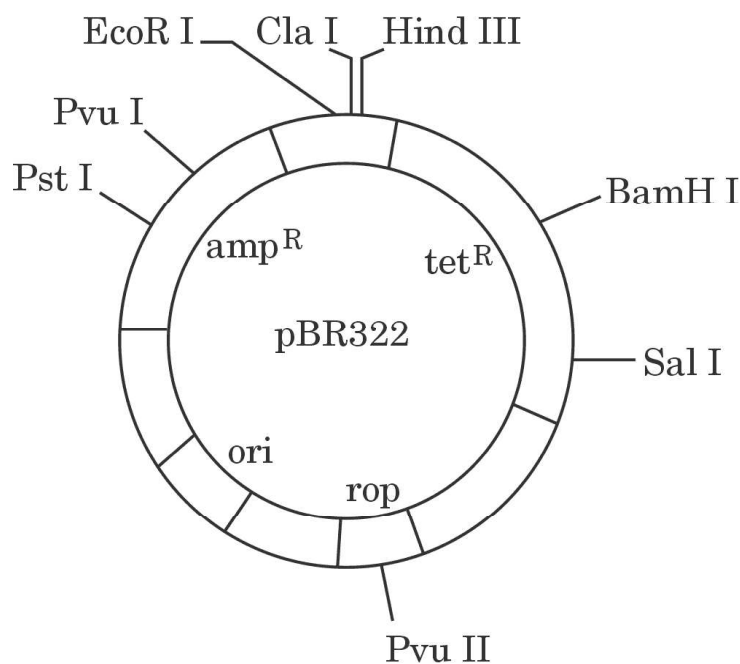
5

- Write your interpretation, with reason, on the basis of the three parameters plotted in the graph.
- Which one of the crops would you like to cultivate in your farm and why ?
- Which one out of these two crops would a farmer from Rajasthan like to cultivate and why ?

OR



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- (b) Gene of interest/alien gene is introduced by a cloning vector into a host cell to bring about a desired phenotypic expression in a host cell. The cloning vectors used are plasmid and bacteriophages. Biotechnologists in their labs, for desired results engineered specialised cloning vectors. One such vector is pBR322. Study the diagram carefully and answer the questions that follow. 5×1=5



- (i) What do 'EcoR I', 'BamH I' and 'Hind III' represent ? State their functions.
- (ii) Identify the gene you would select for the role of a selectable marker in pBR322. Explain why.



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- (iii) Write the property/characteristic of plasmid and bacteriophage that makes them efficient cloning vectors.
- (iv) Biotechnologists always insert 'ori' gene in their engineered cloning vector. Justify the statement.
- (v) Will the experiment be successful if the alien DNA is ligated at Hind III restriction site ? Give reason in support of your answer.

