Series : AABB3/1

SET-1

प्रश्न–पत्र कोड
Q.P. Code **57/1/1**

रोल नं.
Roll No.

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 **12** हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को छात्र 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 **12** 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 candidates 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***

सामान्य निर्देश :

(i) *इस प्रश्न-पत्र में **13** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *प्रश्न-पत्र में **तीन** खंड हैं – खंड **अ, ब** और **स** हैं ।*

(iii) ***खंड – अ** में **6** प्रश्न हैं, प्रत्येक के **2** अंक हैं । **खंड – ब** में **6** प्रश्न हैं, जिसमें प्रत्येक प्रश्न के **3** अंक हैं तथा **खंड – स** में एक प्रकरण आधारित प्रश्न है जिसका मान **5** अंक है ।*

(iv) *सामान्यतः कोई विकल्प नहीं है । परन्तु कुछ प्रश्नों में अंतर्निहित विकल्प दिए गए हैं । ऐसे प्रश्नों में विद्यार्थी को **केवल एक** विकल्प का ही उत्तर लिखना है ।*

(v) *जहाँ आवश्यक हो, वहाँ स्वच्छ, आनुपातिक तथा नामांकित चित्र बनाइए ।*

*

खंड – अ

1. न्यूमोनिया तथा सामान्य सर्दी-जुकाम से मानव शरीर के प्रभावित होने वाले भागों का उल्लेख कीजिए । इन दो रोगों के रोगकारक के नाम लिखिए । **2**

2. वाहितमल के जैविक उपचार के दौरान वायुवीय टैंकों में वाहितमल को यांत्रिक रूप से लगातार हिलाने तथा इसमें वायु को पंप करने के प्रभाव का वर्णन कीजिए । **2**

अथवा

(क) घरेलू ईंधन के उत्पादन में मवेशियों के अपशिष्ट महत्त्वपूर्ण स्रोत हैं । इससे बनने वाले ईंधन का नाम लिखकर इसके प्रमुख घटकों के नाम लिखिए ।

(ख) उस जैविक प्रक्रम का नाम लिखिए जो इस ईंधन के उत्पादन के लिए उत्तरदायी है ।

3. (क) विषाणु जैवनियंत्रण कारक का एक उदाहरण लिखिए ।

(ख) किसी पारिस्थितिक सुग्राही क्षेत्र के उपचार के लिए उन्हें वांछनीय क्यों माना जाता है ? **2**

4. मलेरिया परजीवी *प्लैज्मोडियम* के जीवन में मादा *एनोफेलीज* मच्छर का क्या महत्त्व है ? **2**

General Instructions :

(i) *This question paper contains* ***13*** *questions. All questions are compulsory.*

(ii) *The question paper has* ***three*** *Sections –* ***Section A, B*** *and* ***C****.*

(iii) ***Section – A*** *has* ***6*** *questions of* ***2*** *marks each.* ***Section – B*** *has* ***6*** *questions of* ***3*** *marks each, and* ***Section – C*** *has a case-based question of* ***5*** *marks.*

(iv) *There is no overall choice. However, internal choices have been provided in some questions. A candidate has to attempt* ***only one*** *of the alternatives in such questions.*

(v) *Wherever necessary, neat and properly labelled diagrams should be drawn.*

SECTION – A

1. Mention the parts of human body that get affected by Pneumonia and common cold infections. Write the causative agents of the two diseases. **2**

2. State the impact of constant mechanical agitation and pumping of air in the aeration tank on the sewage during the biological treatment. **2**

OR

(a) Cattle excreta is important source for producing a domestic fuel. Name the fuel and write its main components.

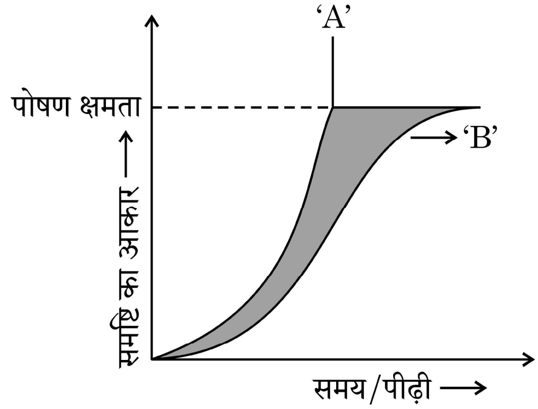
(b) Write the biological process that is responsible for the production of this fuel.

3. (a) Give an example of viral biocontrol agent.

(b) Why are they considered to be desirable when an ecologically sensitive area is being treated ? **2**

4. What is the importance of female *Anopheles* mosquitoes in the life of a malarial Parasite *Plasmodium* ? **2**

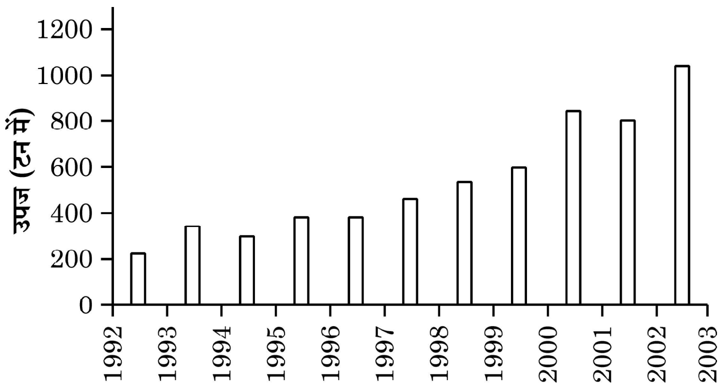
5. नीचे दिए गए ग्राफ में समष्टि वृद्धि वक्र 'A' तथा 'B' को दर्शाया गया है । इसका अध्ययन करके संबद्ध निम्नलिखित प्रश्नों के उत्तर लिखिए :



(क) वक्र 'B' के संदर्भ में पोषण क्षमता किसका द्योतक है ?

(ख) उन संभावित प्राकृतिक बलों के प्रभाव का उल्लेख कीजिए जिसके कारण वक्र 'B' बना । **2**

6. नीचे दिए गए दंड ग्राफ (हिस्टोग्राम) में ऑस्ट्रेलिया के क्वींसलैंड के पूर्वी-तट पर अवस्थित ग्रेट बैरियर रीफ/कोरल रीफ से शार्क के वार्षिक उपज के आँकड़ों को दर्शाया गया है । दंड ग्राफ का अध्ययन करके संबंधित निम्नलिखित प्रश्नों के उत्तर लिखिए :



स्रोत : Fijisharkdiving.blogspot.com

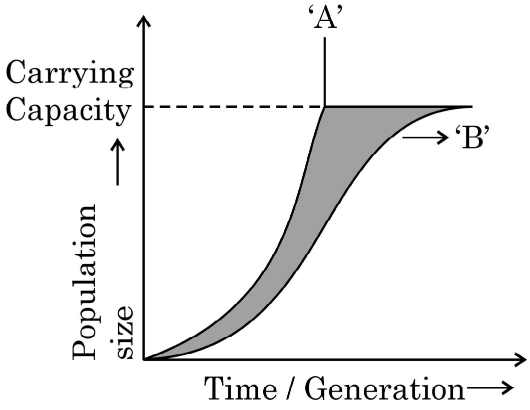
(क) दिए गए आँकड़ों का अर्थ निर्वचन कीजिए ।

(ख) दिए गए आँकड़ों के आधार पर उस क्षेत्र की जैव-विविधता पर पड़ने वाले प्रभाव की व्याख्या कीजिए । **2**

अथवा

"किसी समुदाय का स्थायित्व उसकी जातीय समृद्धि पर निर्भर करता है ।" डेविड टिलमैन ने प्रयोग द्वारा इसे किस प्रकार दर्शाया ?

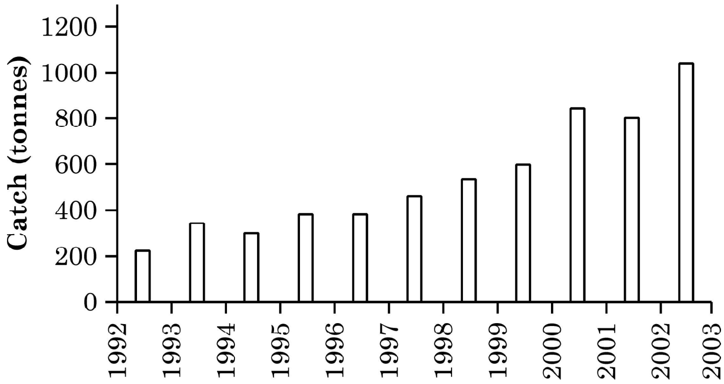
5. Study the graph given below, showing the population growth curves 'A' and 'B' respectively. Answer the following questions :



(a) What is 'Carrying Capacity' in respect of Curve 'B' indicative of ?

(b) Mention the action of possible natural forces that could have lead to curve 'B'. **2**

6. The histogram given below representing the data for annual shark harvest in the great barrier reef / coral reef located on the east coast of Queensland, Australia. Study the histogram and answer the questions that follow.



Source : Fijisharkdiving.blogspot.com

(a) Write your interpretation of the data given.

(b) Write the impact on the biodiversity of the area that you can interpret on the basis of given data. **2**

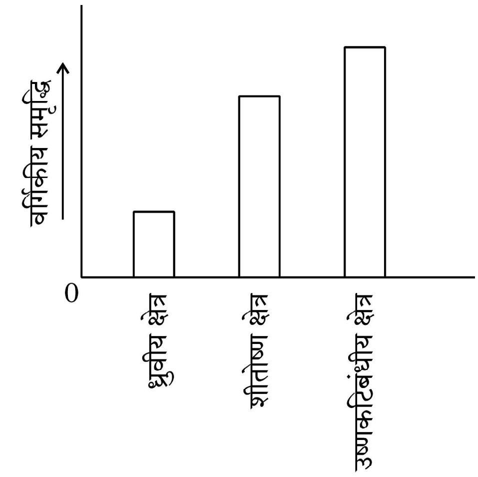
OR

"Stability of community depends upon its species richness." How did David Tilman show this experimentally ?

खंड – ब

7. विश्व के तीन विभिन्न जलवायु वाले क्षेत्रों से स्तनधारियों के समूह की जातीय समृद्धि के सर्वेक्षण के आधार पर संग्रहित आँकड़ों को दंड ग्राफ द्वारा नीचे दर्शाया गया है ।

पनामा में स्तनधारियों की लगभग 560 प्रजातियाँ हैं, कनाडा में स्तनधारियों की लगभग 301 प्रजातियाँ है तथा डेनमार्क में स्तनधारियों की लगभग 67 प्रजातियाँ हैं ।



(क) जातीय (स्पीशीज़) समृद्धि के आधार पर इन देशों के संबद्ध जलवायु क्षेत्रों को पहचान कर लिखिए ।

(ख) विश्वभर में पौधों एवं जन्तुओं की जैव-विविधता का प्रतिरूप (पैटर्न) एकसमान नहीं होता । इस प्रकार की जैव-विविधता का नाम लिखिए तथा यह भी बताइए कि ऐसा क्यों होता है ? **3**

8. जीवों में जैवविविधता का प्रारंभ लगभग 3 बिलियन वर्ष पहले हुआ था । तब से आज तक पृथ्वी पर नई-नई जातियों का विकास (उद्भव) हो रहा है और साथ ही साथ इनका व्यापक सामूहिक विलोपन भी हो रहा है ।

(क) पृथ्वी पर व्यापक विलोपन की कितनी परिघटनाएँ घट चुकी हैं तथा वर्तमान काल में कौन सा विलोपन प्रगति पर है ?

(ख) विलोपन की वर्तमान परिघटना पहली परिघटनाओं से किस प्रकार भिन्न है और क्यों ? व्याख्या कीजिए । **3**

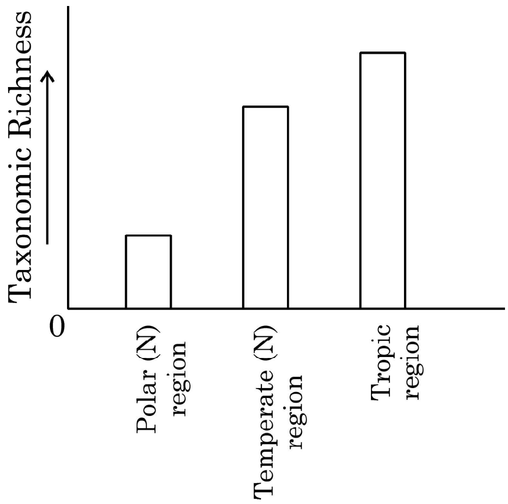
9. प्राकृतिक रूप से पाये जाने वाले ऐसे स्रोत का नाम लिखिए जो पादप कोशिकाओं में उपयोगी रोगकारक जीन को स्थानांतरित कर सकता है । इसी प्रकार एक अन्य स्रोत का नाम लिखिए जिसका उपयोग मानव के लाभ के लिए प्राणीकोशिका में रोगकारक जीन के स्थानांतरण के लिए किया जाता है । मानव जाति के लाभ के लिए जैव-वैज्ञानिक इन प्राकृतिक स्रोतों का उपयोग किस प्रकार कर रहे हैं ? **3**

10. प्रत्येक के एक-एक समुचित उदाहरण का उल्लेख करते हुए जैव-उर्वरकों के मुख्य स्रोतों का वर्णन कीजिए । **3**

SECTION – B

7. The data collected based on the survey conducted for species richness of group of mammals, in three different climatic regions of the world is shown in the bar graph given below.

   Panama has nearly 560 species of mammals, Canada has nearly 301 species of mammals and Denmark has 67 species of mammals.



   (i) Based on the species, richness, identify the location of these countries in the respective climatic regions given.

   (ii) Plants and animals do not have a uniform diversity in the world. Write the term given to this pattern of diversity and why ? **3**

8. Bio-diversification of life started to occur almost 3 billion years ago. Since then new species have been evolving and then disappearing en masse from earth.

   (a) How many episodes of mass extinctions of species have already taken place and which one is in progress in the current era ?

   (b) How is current episode in progress different from the previous episodes and why ? Explain. **3**

9. Name two naturally occurring sources, one that transfers pathogenic genes into a plant cells and the other into an animal cell respectively, for their benefit. Write how have these naturally occurring sources been used for the benefit of human race by the biotechnologists. **3**

10. Enumerate the main sources of bio-fertilisers giving one example of each. **3**

11. "जैव-विविधता फसल पौधों के स्वास्थ्य को सुदृढ़ (मजबूत) बनाते हैं ।" कारण सहित कथन की व्याख्या कीजिए तथा एक कार्य योजना प्रस्तुत कीजिए जिससे जैव खेती करने वाले किसानों की मुख्य धारणा (विश्वास) का समर्थन होता हो । **3**

12. (क) r-डीएनए तकनीक में वरणयोग्य चिह्नक की भूमिका का वर्णन कीजिए ।

(ख) ई. कोलाई के लिए उपयोगी माने जाने वाले ऐसे ही एक वरणयोग्य चिह्नक का नाम लिखिए ।

(ग) एक कारण लिखिए कि इसे लाभकारी वरणयोग्य चिह्नक क्यों माना जाता है । **3**

अथवा

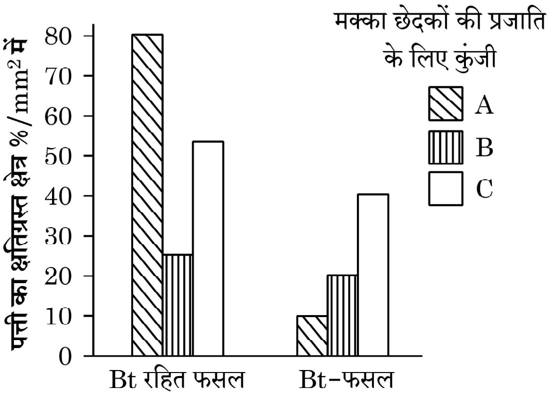
प्लैज्मिड क्या हैं ? यह क्लोनिंग संवाहकों से किस प्रकार भिन्न हैं । क्लोनिंग संवाहक के एक विषाणु संवाहक तथा एक जीवाणु संवाहक का नाम लिखिए ।

खंड – स

(प्रकरण आधारित)

13. विभिन्न कीट पीड़कों के आक्रमण से फ़सली पौधों की सुरक्षा के लिए जैव प्रौद्योगिकी वैज्ञानिकों ने अनेक पीड़करोधी पौधों को विकसित किया है । Bt-मक्का का पौधा ऐसा ही एक उदाहरण है । इस पौधे में 'क्राई' 'जीन' प्रविष्ट कराया गया जो पौधों में 'क्राई-प्रोटीन' का निर्माण करता है जो पीड़क (मक्का छेदक/कार्न बोरर) पर मारक प्रभाव डालता है । यह मक्का के पौधे की मक्का छेदक नाम पीड़क से सुरक्षा करता है । Bt-मक्का का मक्का छेदक पीड़क पर प्रभाव क्षमता के परीक्षण हेतु वैज्ञानिकों ने एक परीक्षणार्थ क्षेत्र अध्ययन किया । तीन विभिन्न प्रकार के मक्का छेदकों यथा 'A', 'B' तथा 'C' को एकत्र करके उन्हें Bt-मक्का पौधे तथा Bt-रहित (सामान्य) मक्का के पौधों के अलग-अलग खेतों में डाल दिया गया ।

पौधों की पत्तियों को हुई क्षति का प्रेक्षण कर क्षति का आंकलन किया गया और नोट किया । प्रेक्षणों तथा एकत्र किए आँकड़ों के आधार पर नीचे दिया गया दंड ग्राफ बनाया गया । ग्राफ का अध्ययन करके संबंधित निम्नलिखित प्रश्नों के उत्तर लिखिए :



11. Explain giving reason the action plan followed by organic farmers that support their key belief "biodiversity furthers health of crop lands". **3**

12. (i) State the role of a selectable marker in r-DNA technology.

(ii) Name one such selectable marker which is considered to be useful for <u>E.coli</u>.

(iii) Give one reason why is it considered to be a useful marker. **3**

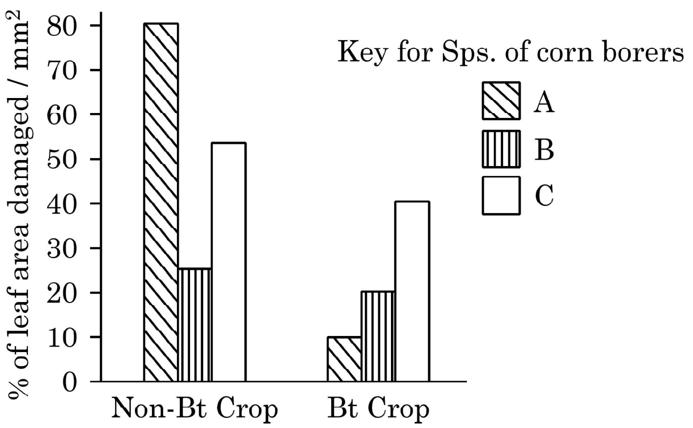
OR

What are plasmids ? How are they different from cloning vectors ? Give one example each for a viral and a bacterial cloning vector.

SECTION – C

(Case Based)

13. To save the crop plant from the attack of various insect pests the biotechnologists have developed many pest resistant plants. One such example is Bt corn plant. In this plant 'cry' genes were introduced which produces cry-proteins in the plant that has toxic effect on the pest (corn borer). Thus saves the corn plant from the attack of the corn borer. An experimental field study was conducted by the scientists to see the efficacy of the Bt corn plant against the attack of corn borers. Three different species of corn borers namely 'A', 'B', 'C' were collected and were independently fed on non Bt corn plants and Bt corn plants separately for the same period. The extent of the damage caused to the leaf area of the plant was observed and noted down. With the help of the observations and data collected the following bar graph was plotted. Study the graph and answer the questions that follow.



(क) उस मक्का छेदक की पहचान कीजिए जिसका Bt-मक्का पादप द्वारा सर्वाधिक सफल नियंत्रण किया गया । अपने निष्कर्ष की पुष्टि हेतु समुचित कारण भी दीजिए ।

(ख) उस मक्का छेदक की स्पीशीज़ की पहचान कीजिए जिस पर Bt जीनों द्वारा उत्पन्न आविष का न्यूनतम प्रभाव पड़ा ।

(ग) एक वैज्ञानिक के रूप में आप कार्न बोरर (मक्का छेदक) की 'B–स्पीशीज' से आक्रांत क्षेत्र में Bt–मक्का किस्म को उगाने के लिए क्या सलाह देंगे ?

(घ) एक Bt-जीन का नाम लिखिए जो मक्क छेदकों के नियंत्रण हेतु प्रोटीन का कूटलेखन करता है । 5

अथवा

एक अनुसंधानकर्ता ने प्रयोगशाला में काम करते हुए एक कवक की पहचान (खोज) की जिसे कृषि के क्षेत्र में अत्यंत महत्त्वपूर्ण माना जाता था । एक जैव प्रौद्योगिकी के विद्यार्थी के रूप में आप निम्न के लिए किन चरणों को अपनाने की सलाह देंगे ?

(क) कवक से इस वांछित जीन को पृथक करना ।

(ख) आगामी प्रयोगों तथा शोध कार्य हेतु इस जीन का प्रवर्धन करना ।

(i) Identify the species of the corn borer that was most successfully controlled by Bt corn plant. Give appropriate reason for your inference.

(ii) Identify the species of the corn borers which shows least impact of toxin produced by Bt genes.

(iii) What would be your advise as a Scientist, to the farmers for growing this particular Bt corn variety in the area which is infested by species–'B' of corn borers ?

(iv) Name one Bt gene that encodes protein in corn plants to control corn borers. **5**

OR

A gene was identified in a fungus by a research worker in a lab which was considered to be of a great importance in the field of agriculture. As a student of biotechnology, write the steps you would suggest to (i) Isolate this gene of interest from the fungus and (ii) amplify this gene for further experimentation and research.

*

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Senior Secondary School Term II Examination, 2022

Marking Scheme – BIOLOGY (SUBJECT CODE — 044)

(PAPER CODE — 57/1/1)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.

2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**

3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**

4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.

5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X' be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**

6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.

7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.

9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

10. A full scale of marks 0-35 has to be used. Please do not hesitate to award full marks if the answer deserves it.

11. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past: -
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

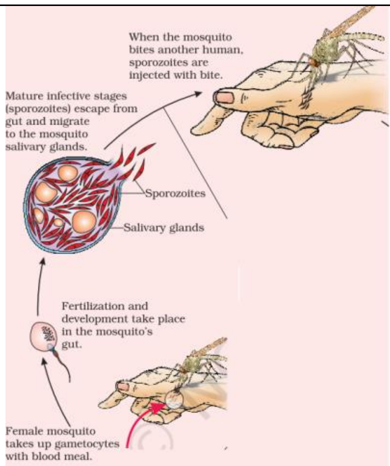
MARKING SCHEME

Senior Secondary School Examination TERM–II, 2022

BIOLOGY (Subject Code — 044)

[Paper Code — 57/1/1]

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION – 'A'	
1.	• Common cold–nose / respiratory passage - Pneumonia–(alveoli of) lungs / (air sacs of) lungs • causative agents–*Streptococcus pneumoniae* / *Haemophilus influenzae* (pneumonia) - Rhino virus (common cold)	½ ½ ½ ½
		2
2.	Allows vigorous growth of microbes, formation of flocs to form mesh like structures, microbes consume major part of organic waste in the sewage, reduces BOD of the affluent / reduces polluting potential **OR** *(a)* • Biogas / Gobar gas • Methane, CO_2 / H_2 / H_2S **Note: any one component along with methane to be awarded one mark**. *(b)* Anaerobic digestion of cellulose	½×4 ½ ½+½ ½
		2
3.	*(a)* Baculoviruses / *Nucleopolyhedrovirus* *(b)* Species specific, narrow spectrum insecticidal application, no negative impact on plants / mammals / birds / fish / non-target insects, desirable for integrated pest management (any two)	1 ½+½
		2
4.	Female *Anopheles* mosquito takes up gametocytes with blood meal, Fertilization and development take place in the mosquito's gut, Mature infective stage (sporozites) escape from the gut and migrate to mosquito salivary gland, Female *Anopheles* bites the humans transmitting the plasmodium to its second host to complete its life cycle. // Completes sexual stages of life cycle in female *Anopheles* mosquito / female *Anopheles* mosquito acts as primary host, acts as vector to transfer parasites from infected person to healthy person to complete its life cycle. //	½×4 1+1

		½ x 4
		2
5.	*(a)* Carrying capacity is the maximum possible number of organisms (beyond which no further growth is possible) in a habitat. *(b)* Limited resources lead to competition, fittest survives and reproduces	1 ½+½
		2
6.	(a) Shark harvest increases over the years from 1992 to 2003. (b) Biodiversity decreases due to over exploitation/ excessive harvesting **OR** Tilman conducted experiments in out door plots, plots with more species shows less year to year variation in biomass (more stability).	1+1 1+1
		2
	SECTION – 'B'	
7.	*(i)* Panama—Tropic Canada—Temperate Denmark—Polar *(ii)* Latitudinal gradient, species diversity decreases as we move away from equator toward poles / species diversity vary due to different climatic conditions present at different places of world.	½×3 ½+1
		3
8.	(a) • Five extinctions have already occurred • sixth is in progress (b) • Sixth extinction is much faster / sixth extinction is 100 to 1000 times faster • Human activities like industrialisation, loss of habitat, over exploitation,land reforms. (Any two)	½+½ 1 ½+½
		3

9.	• *Agrobacterium tumefaciens*—(plants pathogen), The disarmed Ti Plasmid is used as a vector to introduce the gene of interest in the variety of plants. • Retrovirus—(animals), Disarmed Retroviruses are used to transfer genes of interest in to mammalian host cells.	½+1 ½+1
		3
10.	Bacteria—*Rhizobium / Azospirillum / Azotobacter* Fungi—*Mycorrhiza / Glomus* Cyanobacteria—*Anabaena / Nostoc / Oscillatoria*	½+½ ½+½ ½+½
		3
11.	Do not eradicate pests but keep them at manageable level by various checks and balances, pests may be food for otherwise beneficiary predators and parasites who would suffer and not survive, more varieties in a landscape more sustainable it is (or any other correct reason)	1×3
		3
12.	(i) Helps in identifying non-transformants from transformants / Recombinants from non Recombinants	1
	(ii) Genes encoding resistance to antibiotics such as ampicillin / tetracycline/ kanamycin / chloramphenicol / amp^R / tet^R	1
	(iii) (The normal E. coli cells do not carry resistance against any of these antibiotics.) It helps to identify and select transformants / identification of recombinants.	1
	OR	
	• Plasmids are extra chromosomal self-replicating (double stranded) circular DNA molecules (generally found in bacterial cell)	1
	• Plasmid is circular extra chromosomal DNA of bacterial cells whereas cloning vector is a vehicle that carries foreign DNA into another cell.	1
	• Bacteriophage, pBR322	½+½
		3
	SECTION – 'C'	
13.	*(i)* • Species A • The leaf area damaged by species - A in Bt-corn is the least	1+1
	(ii) Species-B	1
	(iii) Not to grow Bt variety as seeds are expensive and of not much benefit (productivity wise) / advise to grow Bt corn with its proper justification	1
	(iv) Cry IAb. (No marks if only cry gene is written)	1
	OR	

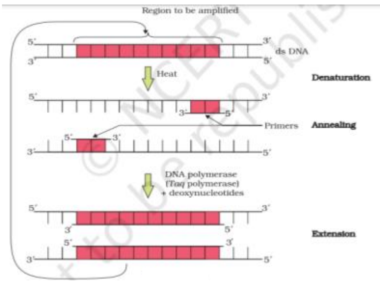
(i)

- (Isolation of genetic material) Fungal cell treated with chitinase, RNA to be removed by treating with RNAase, protein removed by treating with protease, and then addition of chilled ethanol. ½ × 4
- Cutting of DNA at specific location by restriction enzymes. ½
- Fragments are separated by gel electrophoresis ½

(ii) Multiple copies of separated genes of interest is synthesized by following steps of the method given below: PCR (polymerase chain reaction) - Denaturation, Annealing, Extension (followed by amplification) ½ x 4

//

(ii)Polymerase chain reaction/PCR ½



½

½

½

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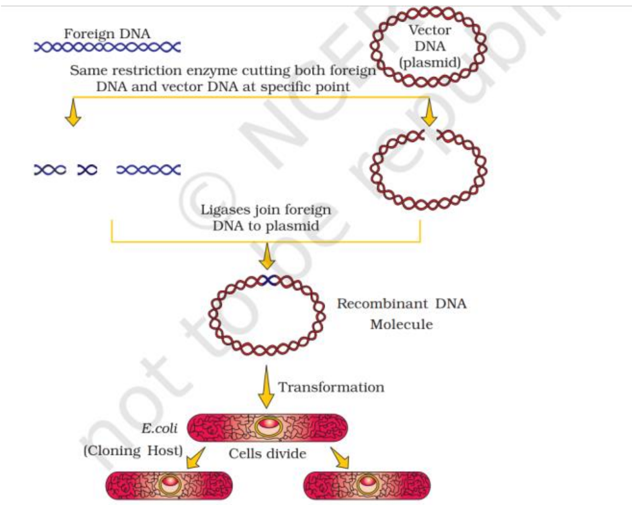
(ii) Multiple copies of separated genes of interest are synthesized by following the given below method: rDNA technology, same restriction enzyme cutting both foreign DNA and vector DNA at specific point, ligases join foreign DNA to Plasmid, transformation (cell divides and helps in multiplication of genes) ½ x 4

//

(ii) rDNA technology ½



½

½

½

5

* * *