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Question Paper

December 2025

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Application No	
Candidate Name	
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Test Date	18/12/2025
Test Time	9:00 AM - 12:00 PM
Subject	Life Sciences

Section : **PART-A**

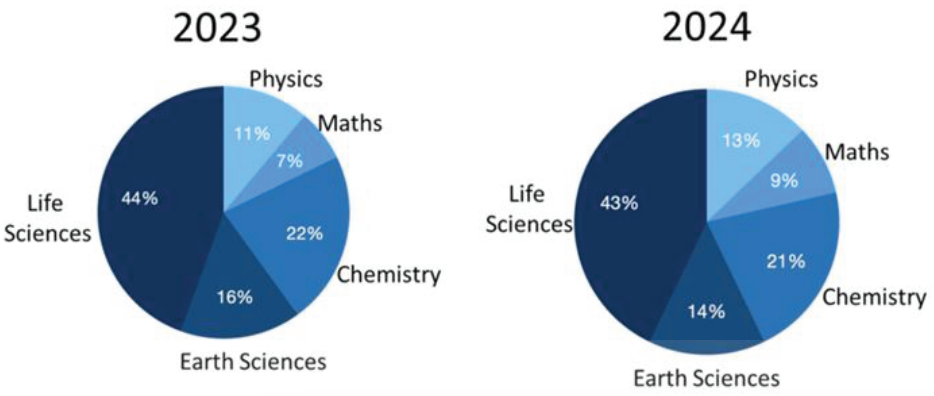
Q.1 A boatman on a bank of a river has to carry a dog, a cat and a container full of milk to the other bank in a boat, one at a time. The cat cannot be left alone with the milk or with the dog on either bank. What is the minimum number of times the boatman has to cross the river to carry all to the other bank?

1. 3
2. 5
3. 7
4. 8

Question Type : **MCQ**
Question ID : **209355277**
Option 1 ID : **2093551105**
Option 2 ID : **2093551106**
Option 3 ID : **2093551107**
Option 4 ID : **2093551108**

Q.2

The pie charts show placement percentages of graduates of five different subjects out of the total campus placements for two consecutive years.



In the year 2024, the number of Maths students who got placed was the double that of the previous year. Which of the following is the closest to the percentage change in the number of Life Sciences students placed in the year 2024?

1. decreased by 1%
2. increased by 50%
3. decreased by 50%
4. increased by 20%

Question Type : **MCQ**
Question ID : **209355275**
Option 1 ID : **2093551097**
Option 2 ID : **2093551098**
Option 3 ID : **2093551099**
Option 4 ID : **2093551100**

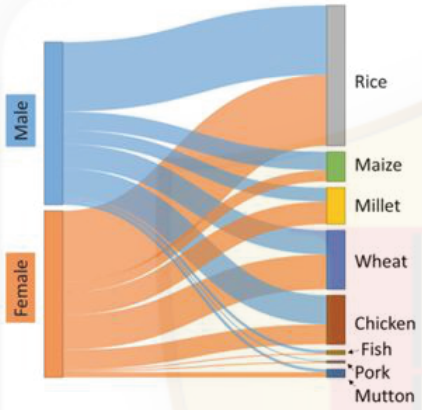
Q.3 Suppose a tap mixes hot water and cold water in a ratio that depends linearly on the proportion of opening. Water out of the tap has temperature 40°C when the tap is half-open, and 30°C when it is three-fourths open. To get water at 50°C, the tap should be_____.

1. one-eighth open
2. one-fourth open
3. three-eighths open
4. five-eighths open

4. 4

Question Type : **MCQ**
Question ID : **209355285**
Option 1 ID : **2093551137**
Option 2 ID : **2093551138**
Option 3 ID : **2093551139**
Option 4 ID : **2093551140**

Q.4 The Sankey diagram shows food preferences of males and females. The widths of the bands are proportional to numbers of persons opting for a given food item.

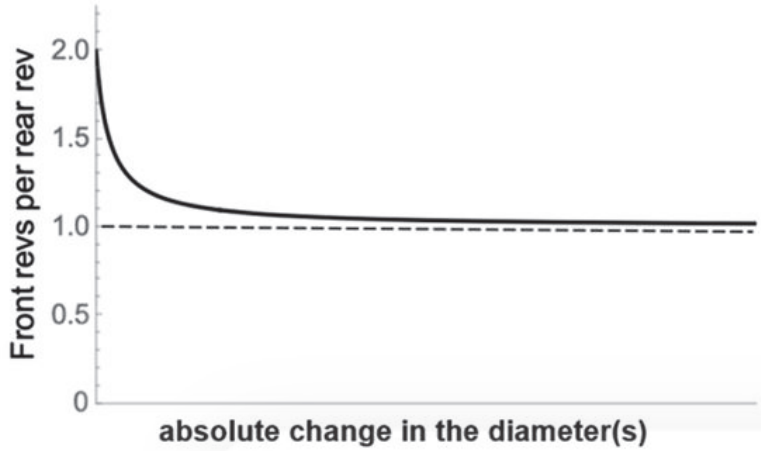


Which one of the following is an INCORRECT statement about the food preferences?

1. Chicken is the second most preferred food in males.
2. As compared to males, more females prefer wheat.
3. As compared to males, more females prefer mutton and millet.
4. Fewer females prefer rice than the total number of males preferring maize and millet.

Question Type : **MCQ**
Question ID : **209355266**
Option 1 ID : **2093551061**
Option 2 ID : **2093551062**
Option 3 ID : **2093551063**
Option 4 ID : **2093551064**

Q.5 With a certain set of diameters, a tractor's front wheels make 2 revolutions (revs) for every 1 revolution of the rear wheels. The effect of changing wheel diameter(s) is shown in the following plot.



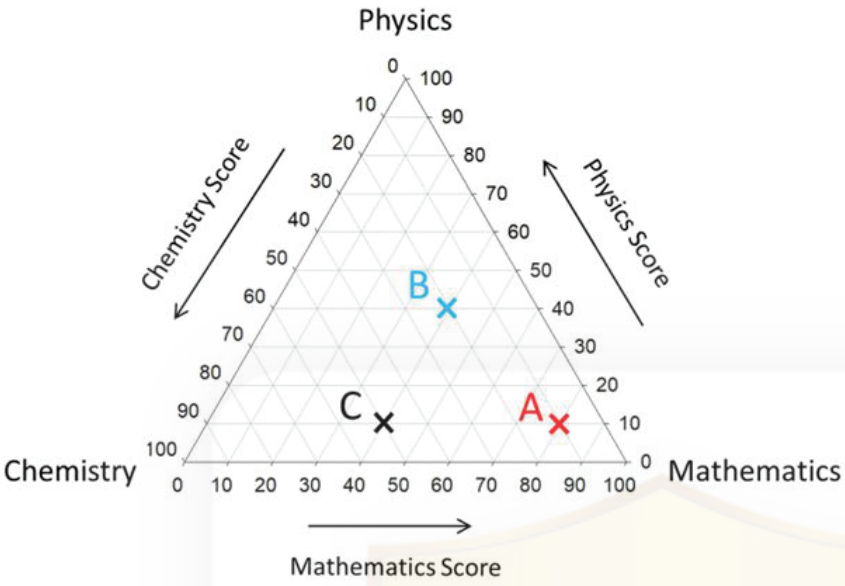
In this context, which of the following statements is CORRECT?

1. Only the rear wheel diameter is decreased
2. Both the rear and front wheel diameters are decreased equally
3. Both the rear and front wheel diameters are increased equally
4. The rear wheel diameter decreased, and the front wheel diameter increased equally

Question Type : **MCQ**
Question ID : **209355278**
Option 1 ID : **2093551109**
Option 2 ID : **2093551110**
Option 3 ID : **2093551111**
Option 4 ID : **2093551112**

Q.6

The following ternary figure shows the marks obtained by students A, B and C in an exam of 100 marks. Here, C received 10 marks in Physics, 50 marks in Chemistry and 40 marks in Mathematics.



Which one of the following is CORRECT?

1. A's marks in Chemistry are more than C's marks in Physics
2. B has scored equal in Mathematics and Physics
3. A has scored 20 in Chemistry
4. A has scored 80 in Chemistry

Question Type : **MCQ**
Question ID : **209355272**
Option 1 ID : **2093551085**
Option 2 ID : **2093551086**
Option 3 ID : **2093551087**
Option 4 ID : **2093551088**

Q.7 A person borrowed Rs. 2500/- for 2 years, and Rs. 2000/- for 3 years, with the same simple interest rate. If he paid a total of Rs. 550/- as interest, then the annual rate of interest was

1. 10%
2. 2%
3. 5%
4. 8%

Question Type : **MCQ**
Question ID : **209355269**
Option 1 ID : **2093551073**
Option 2 ID : **2093551074**
Option 3 ID : **2093551075**
Option 4 ID : **2093551076**

Q.8 An auditorium has 8 seats in the first row, with every row to follow having 4 more seats than its preceding row. The total capacity is 416. What is the minimum number of rows needed to seat 150 people?

1. 8
2. 5
3. 3
4. 2

Question Type : **MCQ**
Question ID : **209355280**
Option 1 ID : **2093551117**
Option 2 ID : **2093551118**
Option 3 ID : **2093551119**
Option 4 ID : **2093551120**

Q.9 The following bus schedule is seen at a bus stop located somewhere in between town A and town B.

Town A- 00:10, then every 20 mins

Town B- 00:15, then every 20 mins

If a person arrives at this bus stop at some random time, the probability that the next bus is for town B is

1. 1/2
2. 1/4
3. 1/3
4. 3/4

Question Type : **MCQ**
Question ID : **209355279**
Option 1 ID : **2093551113**
Option 2 ID : **2093551114**
Option 3 ID : **2093551115**
Option 4 ID : **2093551116**

Q.10 Suppose the words GATE, FAST, SAND and READ can be written in numbers as 2938, 6921, 0798 and 5917, but not necessarily in that order. The positions of the letters in a word and the corresponding digits in the respective number are the same. Then the word NEGATE will be written as

1. 716921
2. 380798
3. 375917
4. 891217

Question Type : **MCQ**
Question ID : **209355268**
Option 1 ID : **2093551069**
Option 2 ID : **2093551070**
Option 3 ID : **2093551071**
Option 4 ID : **2093551072**

Q.11 There is an increase of 30% in the number of people coming to a theatre after reducing the entry fee by 25% per person. How much change is expected in the total earnings?

1. 2.5% increase
2. 2.5% decrease
3. Nil
4. 7.5% increase

Question Type : **MCQ**
Question ID : **209355267**
Option 1 ID : **2093551065**
Option 2 ID : **2093551066**
Option 3 ID : **2093551067**
Option 4 ID : **2093551068**

Q.12 With only one match, between teams B and C, remaining in a tournament where each win fetches two points and a loss none, team A observes that they will become champions with more points than any other team if B wins, but not necessarily if B loses. Then

1. A is leading B by one point
2. B is leading C by one point
3. B is leading C by at least two points
4. A is leading C by at most two points

Question Type : **MCQ**
Question ID : **209355281**
Option 1 ID : **2093551121**
Option 2 ID : **2093551122**
Option 3 ID : **2093551123**
Option 4 ID : **2093551124**

Q.13 The unit's place digit is half the ten's place digit in a two-digit number N. If we swap the digits, the number gets reduced by 18. The number N is _____.

1. 24
2. 42
3. 48
4. 84

Question Type : **MCQ**

Question ID : **209355276**
Option 1 ID : **2093551101**
Option 2 ID : **2093551102**
Option 3 ID : **2093551103**
Option 4 ID : **2093551104**

Q.14 Numbers of seats for Mathematics, Physics and Biology in a college are in the ratio 2:3:4. What will be the respective ratio if the seats for each subject are increased by 50%?

1. 1:1:1
2. 2:3:4
3. 4:3:2
4. 3:2:4

Question Type : **MCQ**
Question ID : **209355271**
Option 1 ID : **2093551081**
Option 2 ID : **2093551082**
Option 3 ID : **2093551083**
Option 4 ID : **2093551084**

Q.15 A father said to his son, "I was as old as you are when I became your father." If the current age of father is 52 years, the age of son after 10 years will be _____.

1. 26 years
2. 36 years
3. 20 years
4. 40 years

Question Type : **MCQ**
Question ID : **209355270**
Option 1 ID : **2093551077**
Option 2 ID : **2093551078**
Option 3 ID : **2093551079**
Option 4 ID : **2093551080**

Q.16 A cellphone tower with signals reaching up to 500 m is set up on a conical hill of height 1.5 km and base radius 2 km. Assuming the tower's height to be negligible compared to the hill, the area served by the tower in km^2 is (the area of the curved surface of a right circular cone is π × base radius × slant height)

1. 0.2π
2. 0.25π
3. 4π
4. 5π

Question Type : **MCQ**
Question ID : **209355284**
Option 1 ID : **2093551133**
Option 2 ID : **2093551134**
Option 3 ID : **2093551135**
Option 4 ID : **2093551136**

Q.17 A box contains 20 black, 22 white, and 24 red socks. If a person draws socks at random one by one without looking, what is the minimum number of socks she must pick to be certain of having at least one pair of black socks?

1. 3
2. 4
3. 44
4. 48

Question Type : **MCQ**
Question ID : **209355283**
Option 1 ID : **2093551129**
Option 2 ID : **2093551130**
Option 3 ID : **2093551131**
Option 4 ID : **2093551132**

Q.18 Restaurants A, B, C, and D give the following offers:

A: one mocktail free for every two purchased
B: one mocktail free for every three purchased
C: two mocktails free for every six purchased
D: 30% discount on each mocktail

If all of the restaurants have the same marked price for each mocktail, in which restaurant would you pay the least if you drank eight mocktails?

1. A
2. B
3. C
4. D

Question Type : **MCQ**
Question ID : **209355273**
Option 1 ID : **2093551089**
Option 2 ID : **2093551090**
Option 3 ID : **2093551091**
Option 4 ID : **2093551092**

Q.19 Sachin sees one-fourth of his body (height) when he stands in front of a vertical mirror at a distance of 20 cm from it. How much of his body will he see if he steps back and stands 40 cm from the mirror?

1. half
2. one-fourth
3. one-eighth
4. full

Question Type : **MCQ**
Question ID : **209355274**
Option 1 ID : **2093551093**
Option 2 ID : **2093551094**
Option 3 ID : **2093551095**
Option 4 ID : **2093551096**

Q.20 Consider the following information regarding a 3-digit PIN.

6	8	9	→ One number is correct and correctly placed
7	3	8	→ Nothing is correct
9	0	6	→ Two numbers correct but wrongly placed
6	1	5	→ One number is correct but wrongly placed
7	8	0	→ One number is correct but wrongly placed

The correct PIN is

1. 059
2. 601
3. 590
4. 859

Question Type : **MCQ**
Question ID : **209355282**
Option 1 ID : **2093551125**
Option 2 ID : **2093551126**
Option 3 ID : **2093551127**
Option 4 ID : **2093551128**

Section : **PART-B**

Q.21 निम्न जंतुओं में से कौन सामान्यतः प्रतिवर्त अंडोत्सर्ग प्रदर्शित करता है?

1. चूहे
2. बंदर
3. बिल्लियाँ
4. मानव

Question Type : **MCQ**
Question ID : **209355313**
Option 1 ID : **2093551249**
Option 2 ID : **2093551250**
Option 3 ID : **2093551251**
Option 4 ID : **2093551252**

Q.22 निम्न कथनों में से कौन जातिवृत्तीय जाति अवधारणा के बारे में **गलत** है?

1. यह लिंगी और अलिंगी प्राणियों दोनों के लिए लागू हो सकती है और जननात्मक पृथक्करण पर निर्भर नहीं होती है।
2. यह उद्देश्य और सांख्यिकीय रूप से आनुवंशिक आकड़ों पर आधारित परीक्षण योग्य अवधारणाओं पर निर्भर करती है।
3. यह विभिन्न आकड़े स्रोतों के लिए सुदृढ़ है और निरंतर जातिवृत्तियां उत्पन्न करता है।
4. यह वर्गिकीय स्फीति से ग्रसित हो सकती है।

Question Type : **MCQ**
Question ID : **209355319**
Option 1 ID : **2093551273**
Option 2 ID : **2093551274**
Option 3 ID : **2093551275**
Option 4 ID : **2093551276**

Q.23 Which one of the following is NOT involved in the secretion of K^+ from blood into the tubular fluid by the principal cells of distal tubules?

1. Big K^+ channels (BK)
2. Renal outer medullary K^+ channels (ROMC)
3. $1Na^+$-$1K^+$-$2Cl^-$ symporter (NKCC2)
4. K^+/Cl^- cotransporter (KCC1)

Question Type : **MCQ**
Question ID : **209355311**
Option 1 ID : **2093551241**
Option 2 ID : **2093551242**
Option 3 ID : **2093551243**
Option 4 ID : **2093551244**

Q.24 Which one of the following pairs is analogous and NOT homologous?

1. Potato tuber and sweet potato tuber
2. Human arm and whale flipper
3. The thorn of citrus plant and the tendril of a cucurbit plant
4. Flippers of dolphin and fins of fish

Question Type : **MCQ**
Question ID : **209355320**
Option 1 ID : **2093551277**
Option 2 ID : **2093551278**
Option 3 ID : **2093551279**
Option 4 ID : **2093551280**

Q.25 Which one of the following options is a correct match of plant selection marker genes used for genetic transformation and their properties?

1.	*nptII*	-	Streptomycin resistance
2.	Mutant *ALS*	-	Imidazolinone resistance
3.	*aadA*	-	Rifampicin resistance
4.	*pat*	-	Penicillin resistance

Question Type : **MCQ**
Question ID : **209355330**
Option 1 ID : **2093551317**
Option 2 ID : **2093551318**
Option 3 ID : **2093551319**
Option 4 ID : **2093551320**

Q.26 निम्न कथनों में से कौन सा एक सुकेन्द्रकी DNA प्रतिकृतियन में प्रचुरोद्भवी कोशिका केन्द्रकी प्रतिजन (PCNA) की सही व्याख्या करता है?

1. यह RNA प्रारंभक संश्लेषण को उत्प्रेरित करता है।
2. यह सरकने वाले क्लैम्प कि तरह काम करता है जो DNA पॉलीमरेज की प्रक्रियात्मकता को बढ़ाता है।
3. यह RNA प्रारंभकों को ओकाजाकी खंडों से अलग करता है।
4. यह पैत्रक DNA को खोलता है।

Question Type : **MCQ**
Question ID : **209355295**
Option 1 ID : **2093551177**
Option 2 ID : **2093551178**
Option 3 ID : **2093551179**
Option 4 ID : **2093551180**

Q.27 निम्न विकल्पों में से कौन एक वन्यजीव (संरक्षण) संशोधन अधिनियम, 2022 में शामिल **नहीं** है?

1. कुछ प्रजातियों को 'पीड़क जन्तु' पदनाम देने के लिए एक नई अनुसूची का समावेश
2. अनुसूचियों का वैज्ञानिक पुनर्गठन
3. आक्रामक विदेशी प्रजातियों का नियमन
4. CITES के प्रावधानों के कार्यान्वयन के लिए संस्तुति

Question Type : **MCQ**
Question ID : **209355322**
Option 1 ID : **2093551285**
Option 2 ID : **2093551286**
Option 3 ID : **2093551287**
Option 4 ID : **2093551288**

Chosen Option : --

Q.28 In developing mouse brain, when gene *yfg* is deleted from hippocampal cell-type 'A', the number of neighbouring cell-type 'B' increases by five-fold. From this information, which one of the following statements accurately describes *yfg* functioning in wildtype 'A' cells?

1. It promotes 'B' proliferation.
2. It has no role in 'B' proliferation.
3. It inhibits 'B' proliferation.
4. It induces *yfg* expression in 'B' cells.

Question Type : **MCQ**
Question ID : **209355303**
Option 1 ID : **2093551209**
Option 2 ID : **2093551210**
Option 3 ID : **2093551211**
Option 4 ID : **2093551212**

Q.29 An antibiotic, that mimics aminoacyl-tRNAs, gets incorporated into the polypeptide chain and prematurely terminates elongation.

The following statements are made based on this observation:

A. It enters the ribosome through the A-site.
B. It enters the ribosome through the P-site.
C. A part of its structure resembles the carboxy terminus of amino acids and is available for making a peptide bond.
D. A part of its structure resembles the amino terminus of amino acids and is available for making a peptide bond.

Which one of the following options represents all correct statements?

1. A and B
2. A and D
3. B and D
4. A and C

Question Type : **MCQ**
Question ID : **209355296**
Option 1 ID : **2093551181**

Option 2 ID : **2093551182**
Option 3 ID : **2093551183**
Option 4 ID : **2093551184**

Q.30 निम्न में से कौन सा रोग विषाणु द्वारा **नहीं** होता है?

1. चेचक
2. टिटेनस
3. रूबेला
4. खसरा

Question Type : **MCQ**
Question ID : **209355290**
Option 1 ID : **2093551157**
Option 2 ID : **2093551158**
Option 3 ID : **2093551159**
Option 4 ID : **2093551160**

Q.31 The circadian rhythm of higher vertebrates is regulated by the

1. suprachiasmatic nucleus.
2. cerebral cortex.
3. pituitary gland.
4. thymus.

Question Type : **MCQ**
Question ID : **209355328**
Option 1 ID : **2093551309**
Option 2 ID : **2093551310**
Option 3 ID : **2093551311**

Option 4 ID : **2093551312**

Q.32 Which one of the following options is the correct sequence of gene expression for successful axis specification in Drosophila?

1. *Fushi tarazu; giant; hairy; gooseberry*
2. *Hedgehog; hunchback; runt; paired*
3. *Odd-skipped; knirps; hairy; armadillo*
4. *Krüppel; hairy; fushi tarazu; wingless*

Question Type : **MCQ**
Question ID : **209355302**
Option 1 ID : **2093551205**
Option 2 ID : **2093551206**
Option 3 ID : **2093551207**
Option 4 ID : **2093551208**

Q.33 Which key feature best differentiates somatic embryogenesis from organogenesis in plant tissue culture?

1. Somatic embryogenesis originates from zygotic embryos, while organogenesis originates from vegetative explants.
2. Somatic embryos develop bipolar structures (with both shoot and root poles), whereas organogenesis typically produces unipolar structures that require further differentiation.
3. Somatic embryogenesis does not require growth regulators, while organogenesis strictly requires an auxin–cytokinin balance.
4. In somatic embryogenesis, vascular connections are continuous with the parent tissue, whereas in organogenesis vascular strands remain independent.

Question Type : **MCQ**
Question ID : **209355333**
Option 1 ID : **2093551329**
Option 2 ID : **2093551330**
Option 3 ID : **2093551331**
Option 4 ID : **2093551332**

Q.34 निम्न कथनों में से कौन एक संरक्षण जीवविज्ञान का एक महत्वपूर्ण सिद्धांत **नहीं** माना जाता है?

1. केवल एकल प्रजाति की संरक्षण की कोशिशों के विपरीत पूरे पारिस्थितिक तंत्र को बनाए रखने पर ध्यान देना चाहिए।
2. एक प्रजाति/पोषी अन्योन्यक्रिया का विघटन पूरे पारिस्थितिक तंत्र में शुरू से अंत तक एक सोपानी प्रभाव उत्पन्न कर सकता है।
3. अशांति और उत्तराधिकार जैसी प्रक्रियाओं को रोकने के लिए पारिस्थितिक तंत्र उनकी चरम अवस्था में बनाए रखने चाहिए।
4. एक पारिस्थितिक तंत्र का प्रबंधन लंबे समय के लिए होना चाहिए और इसमें अनेक पारिस्थितिक प्रक्रियाएं और मानव गतिविधियों का प्रभाव शामिल होना चाहिए।

Question Type : **MCQ**
Question ID : **209355325**
Option 1 ID : **2093551297**
Option 2 ID : **2093551298**
Option 3 ID : **2093551299**
Option 4 ID : **2093551300**

Q.35 Which one of the following enzymes catalyzes the biochemical reaction given below?

1. Phosphoenolpyruvate mutase
2. Phosphoglycerate kinase
3. Pyruvate dehydrogenase phosphatase
4. Bis-phosphoglycerate mutase

Question Type : **MCQ**
Question ID : **209355287**
Option 1 ID : **2093551145**
Option 2 ID : **2093551146**
Option 3 ID : **2093551147**
Option 4 ID : **2093551148**

Q.36 Which one of the following options represents the correct order of events during newt limb regeneration following amputation?

1. Wound epidermis formation, remodelling of extracellular matrix, blastema formation, and differentiation
2. Blastema formation, remodelling of extracellular matrix, differentiation and wound epidermis formation
3. Blastema formation, wound epidermis formation, extracellular matrix remodelling and differentiation
4. Extracellular matrix remodelling, wound epidermis formation, blastema formation and differentiation

Question Type : **MCQ**
Question ID : **209355304**
Option 1 ID : **2093551213**
Option 2 ID : **2093551214**
Option 3 ID : **2093551215**
Option 4 ID : **2093551216**

Q.37 Which one of the following histone marks is NOT an indicator of heterochromatin?

1. H3K9 trimethylation
2. MacroH2A
3. H2AX
4. H4K20 trimethylation

Question Type : **MCQ**
Question ID : **209355291**

Option 1 ID : **2093551161**
Option 2 ID : **2093551162**
Option 3 ID : **2093551163**
Option 4 ID : **2093551164**

Q.38 Which one of the following components of the immune system is NOT effective for the clearance of large parasites like worms?

1. Basophils
2. Eosinophils
3. NK cells
4. Mast cells

Question Type : **MCQ**
Question ID : **209355299**
Option 1 ID : **2093551193**
Option 2 ID : **2093551194**
Option 3 ID : **2093551195**
Option 4 ID : **2093551196**

Q.39 Which one of the following corresponds to the angle of rotation per residue in a 3_{10} helix and 3.6_{13} helix, respectively?

1. 100° and 120°
2. 30° and 60°
3. 60° and 30°
4. 120° and 100°

Question Type : **MCQ**
Question ID : **209355288**
Option 1 ID : **2093551149**
Option 2 ID : **2093551150**
Option 3 ID : **2093551151**
Option 4 ID : **2093551152**

Q.40 Which one of the enzymatic activities is NOT present in bacterial RecA?

1. ATP hydrolysis activity
2. Strand-exchange activity
3. Nucleolytic activity
4. Proteolytic activity

Question Type : **MCQ**
Question ID : **209355294**
Option 1 ID : **2093551173**
Option 2 ID : **2093551174**
Option 3 ID : **2093551175**
Option 4 ID : **2093551176**

Q.41 Which one of the following is NOT caused by atriopeptins, a family of peptides produced in cardiac atrial tissues?

1. Natriuresis
2. Vasoconstriction
3. Diuresis
4. Inhibition of aldosterone secretion

Question Type : **MCQ**
Question ID : **209355312**
Option 1 ID : **2093551245**
Option 2 ID : **2093551246**
Option 3 ID : **2093551247**
Option 4 ID : **2093551248**

Q.42

Choose the INCORRECT statement regarding the synthesis of reactive oxygen species (ROS) upon pathogen infection in plants.

1. Plasma membrane-spanning NADPH oxidase is involved in the synthesis of ROS.
2. NADPH oxidases are encoded by respiratory burst oxidase homolog genes in *Arabidopsis* (*Atrboh*).
3. Activation of NADPH oxidase does not require the action of calcium-dependent protein kinases (CDPKs).
4. Apoplastic peroxidase enzymes (PRX) are involved in ROS production.

Question Type : **MCQ**
Question ID : **209355301**
Option 1 ID : **2093551201**
Option 2 ID : **2093551202**
Option 3 ID : **2093551203**
Option 4 ID : **2093551204**

Q.43 The cytosolic proteins, Ras and Rab, are anchored to the cytosolic face of the plasma membrane by prenylation. Prenylation typically occurs at which amino acid of the protein?

1. Cysteine residue at or near the C-terminus
2. Cysteine residue at or near the N-terminus
3. Glycine residue at or near the C-terminus
4. Glycine residue at or near the N-terminus

Question Type : **MCQ**
Question ID : **209355293**
Option 1 ID : **2093551169**
Option 2 ID : **2093551170**
Option 3 ID : **2093551171**
Option 4 ID : **2093551172**

Q.44

Which one of the following options represents a set of bird species, all of which are found ONLY in India?

1. Bluethroat, Amur Falcon, Bar-headed Goose
2. Yellow-throated Bulbul, Forest Owlet, Rufous Babbler
3. Pied Cuckoo, Green Imperial Pigeon, Black Drongo
4. Blue-tailed Bee-eater, Sarus Crane, Red-vented Bulbul

Question Type : **MCQ**
Question ID : **209355321**
Option 1 ID : **2093551281**
Option 2 ID : **2093551282**
Option 3 ID : **2093551283**
Option 4 ID : **2093551284**

Q.45 Which one of the following statements is FALSE regarding how retroviruses and DNA viruses can lead to cancer in host cells?

1. Rous sarcoma virus contains an oncogene derived from a host proto-oncogene, which allows it to rapidly induce tumours.
2. Slow-acting retroviruses cause cancer by integrating near host proto-oncogenes, activating their expression and leading to cell proliferation.
3. DNA viruses can cause cancer if their DNA becomes integrated into the host genome and expresses viral oncogenes, which stimulate cell growth and proliferation.
4. Retroviruses cause cancer only by directly mutating host DNA, without the need for integration or activation of proto-oncogenes.

Question Type : **MCQ**
Question ID : **209355298**
Option 1 ID : **2093551189**
Option 2 ID : **2093551190**
Option 3 ID : **2093551191**
Option 4 ID : **2093551192**

Q.46

In the complete blood profile analysis using an automated haematology analyser, the haemoglobin concentration is measured using

1. sedimentation analysis.
2. spectrophotometric methods.
3. mass spectrometry.
4. NMR spectroscopy.

Question Type : **MCQ**
Question ID : **209355331**
Option 1 ID : **2093551321**
Option 2 ID : **2093551322**
Option 3 ID : **2093551323**
Option 4 ID : **2093551324**

Q.47 The genome editing tool, CRISPR-Cas9, was developed based on which one of the following natural phenomena?

1. An immune response of lower eukaryotes
2. A bacterial defence mechanism
3. A specialised homologous recombination machinery in eukaryotes
4. Transposon insertion machinery in prokaryotes

Question Type : **MCQ**
Question ID : **209355332**
Option 1 ID : **2093551325**
Option 2 ID : **2093551326**
Option 3 ID : **2093551327**
Option 4 ID : **2093551328**

Q.48

निम्न से कौन सा युग्म, नाइट्रोजन का स्थिरिकरण कर सकने वाले युग्म प्राक्केंद्रक: आवृतबीजी सहजीवी का **नहीं** है?

1. नोस्टोक और गननेरा
2. फ्रेन्किया और कैसुरीना
3. ब्रैडीराइज़ोबियम और पैरास्पोनिया
4. ऐज़ोला और धान

Question Type : **MCQ**
Question ID : **209355307**
Option 1 ID : **2093551225**
Option 2 ID : **2093551226**
Option 3 ID : **2093551227**
Option 4 ID : **2093551228**

Q.49 Given below is one of the strands of a double-stranded DNA sequence:

5′ – ATGCGATGACGATGACGATGACGATGACGAACGATGAGATGG – 3′

In the absence of any other confounding factors (viz., length, T_m, etc.), which one of the following options represents the primer combination that would amplify the above double-stranded template in a PCR?

1. 5′– TACGCTACT – 3′ and 5′ – ATGAGATGG – 3′
2. 5′ – ATGCGATGA – 3′ and 5′ – GGTAGAGTA – 3′
3. 5′ – TCATCGCAT – 3′ and 5′ – CCATCTCAT – 3′
4. 5′ – ATGCGATGA – 3′ and 5′ – CCATCTCAT – 3′

Question Type : **MCQ**
Question ID : **209355334**
Option 1 ID : **2093551333**
Option 2 ID : **2093551334**
Option 3 ID : **2093551335**
Option 4 ID : **2093551336**

Q.50

Sulfur taken by plant roots from the soil undergoes major changes in the oxidation state as it converts from inorganic to biochemically available form. Which one of the following options represents the correct order of the conversion states of sulfur?

1. $SO_4^{2-} \longrightarrow SO_3^{2-} \longrightarrow S^{2-} \longrightarrow$ Cys
2. $S^{2-} \longrightarrow SO_3^{2-} \longrightarrow SO_4^{2-} \longrightarrow$ Cys
3. $SO_4^{2-} \longrightarrow SO_3^{2-} \longrightarrow S^{2-} \longrightarrow$ Gln
4. $S^{2-} \longrightarrow SO_3^{2-} \longrightarrow SO_4^{2-} \longrightarrow$ Gln

Question Type : **MCQ**
Question ID : **209355308**
Option 1 ID : **2093551229**
Option 2 ID : **2093551230**
Option 3 ID : **2093551231**
Option 4 ID : **2093551232**

Q.51 A cross is made between two strains of *E. coli*, Hfr *leu*$^+$ *arg*$^+$ *met*$^+$ × F$^-$ *leu*$^-$ *arg*$^-$ *met*$^-$ Str^R and the mixture is plated on minimal synthetic medium supplemented with streptomycin, arginine and methionine. If the linear organization of the genes are *leu-arg-met*, which one of the following genotypes is expected to occur with lowest frequency?

1. *leu*$^+$ *arg*$^+$ *met*$^+$
2. *leu*$^+$ *arg*$^+$ *met*$^-$
3. *leu*$^+$ *arg*$^-$ *met*$^-$
4. *leu*$^+$ *arg*$^-$ *met*$^+$

Question Type : **MCQ**
Question ID : **209355316**
Option 1 ID : **2093551261**
Option 2 ID : **2093551262**
Option 3 ID : **2093551263**
Option 4 ID : **2093551264**

Q.52 Which one of the following is NOT an evolutionary model for mate choice in animals?

1. Direct benefit model
2. Good gene model
3. Chase away model
4. Green beard effect

Question Type : **MCQ**
Question ID : **209355329**
Option 1 ID : **2093551313**
Option 2 ID : **2093551314**
Option 3 ID : **2093551315**
Option 4 ID : **2093551316**

Q.53 Which one of the following events are likely to result in delayed or defective cytokinesis?

1. Stabilization of mitotic cyclins
2. Activation of formin and myosin II
3. Stimulation of RhoA by centralspindlin
4. Activation of RhoA by Rho-GEF

Question Type : **MCQ**
Question ID : **209355292**
Option 1 ID : **2093551165**
Option 2 ID : **2093551166**
Option 3 ID : **2093551167**
Option 4 ID : **2093551168**

Q.54

Gradualism and punctuated equilibrium represent contrasting models of evolutionary change. Which one of the following options best describes these two models?

1. Gradualism emphasizes that evolution occurs through long periods of stasis interrupted by sudden, large-scale mutations, while punctuated equilibrium proposes continuous, slow change within species.
2. Gradualism and punctuated equilibrium both deny the role of natural selection in shaping evolutionary change.
3. Gradualism proposes that evolution proceeds through the steady accumulation of small changes, whereas punctuated equilibrium suggests long periods of evolutionary stability marked by relatively rapid bursts of speciation.
4. Both models reject the importance of the fossil record in understanding macroevolutionary patterns.

Question Type : **MCQ**
Question ID : **209355327**
Option 1 ID : **2093551305**
Option 2 ID : **2093551306**
Option 3 ID : **2093551307**
Option 4 ID : **2093551308**

Q.55 New protein-coding genes sometimes originate when exons from different ancestral genes are combined through recombination events, producing a novel domain architecture within a single polypeptide. This mechanism of generating new genes is called:

1. Exon shuffling, in which recombination or transposon-mediated rearrangements join coding regions from separate genes.
2. Alternative splicing, in which a single pre-mRNA is processed in multiple ways to yield different transcripts.
3. Retroposition, in which an mRNA is reverse-transcribed and inserted elsewhere in the genome.
4. Transposon insertion, in which mobile elements insert into genes, occasionally disrupting or modulating their expression.

Question Type : **MCQ**
Question ID : **209355326**
Option 1 ID : **2093551301**
Option 2 ID : **2093551302**
Option 3 ID : **2093551303**

Option 4 ID : **2093551304**

Q.56 Assimilation Efficiency is calculated as the percentage of the ingested energy that is assimilated by an organism. Which one of the following gut architectures has the lowest assimilation efficiency?

1. A monogastric gut with acid enzymes to break down food
2. A ruminant gut that facilitates regurgitation and chewing of cud
3. An avian gut with mechanical grinding in the gizzard
4. Cecal/Hindgut fermentation with enlarged cecum or large intestine

Question Type : **MCQ**
Question ID : **209355323**
Option 1 ID : **2093551289**
Option 2 ID : **2093551290**
Option 3 ID : **2093551291**
Option 4 ID : **2093551292**

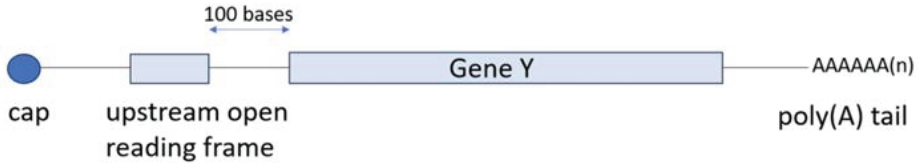
Q.57 Which one of the following molecules does NOT directly transduce signals to neighbouring cells?

1. Beta catenin
2. Connexin
3. BMP7
4. Dopamine

Question Type : **MCQ**
Question ID : **209355300**
Option 1 ID : **2093551197**
Option 2 ID : **2093551198**
Option 3 ID : **2093551199**
Option 4 ID : **2093551200**

Q.58

Yeast gene Y has an mRNA with the structure shown below. Both the upstream open reading frame (uORF) and the coding region of gene Y have start and stop codons.



Which one of the following will you remove to maximize translation of gene Y?

1. Cap
2. Start codon of the uORF
3. Stop codon of the uORF
4. Poly(A) tail

Question Type : **MCQ**
Question ID : **209355297**
Option 1 ID : **2093551185**
Option 2 ID : **2093551186**
Option 3 ID : **2093551187**
Option 4 ID : **2093551188**

Q.59 The resource-ratio hypothesis (R*) of competitive coexistence of species proposed by David Tilman postulates that

1. coexisting species are limited by different resources in the shared resource set.
2. shared resources are equally limiting for each competing species.
3. species abundances are determined by the ratios of limiting resources for each species.
4. the ratio between the resource availability and resource use is constant between competing species.

Question Type : **MCQ**
Question ID : **209355324**
Option 1 ID : **2093551293**
Option 2 ID : **2093551294**
Option 3 ID : **2093551295**
Option 4 ID : **2093551296**

Q.60 Which one of the following vitamins contains a transition metal ion as a part of its structure?

1. Vitamin C
2. Vitamin D_3
3. Vitamin B_{12}
4. Vitamin E

Question Type : **MCQ**
Question ID : **209355289**
Option 1 ID : **2093551153**
Option 2 ID : **2093551154**
Option 3 ID : **2093551155**
Option 4 ID : **2093551156**

Q.61 Which one of the following light treatments (L, light; D, dark) promotes flowering in short-day plants?

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **209355305**
Option 1 ID : **2093551217**
Option 2 ID : **2093551218**
Option 3 ID : **2093551219**
Option 4 ID : **2093551220**

Q.62 Two different antibodies against the same protein were generated. They were named, AB1 and AB2. While AB1 was able to detect the target protein in a western blot, it was unable to detect the protein in ELISA. The opposite was true for AB2. Which one of the following is the most likely reason?

1. AB1 detects SDS-bound protein, whereas AB2 detects protein that is not bound to SDS.
2. AB1 is unable to cross the cell membrane, whereas AB2 is membrane permeable.
3. AB1 detects epitopes on the folded protein, whereas AB2 detects the unfolded epitopes.
4. AB1 detects linear epitopes on unfolded protein, but AB2 detects discontinuous epitopes present on the folded protein.

Question Type : **MCQ**
Question ID : **209355335**
Option 1 ID : **2093551337**
Option 2 ID : **2093551338**
Option 3 ID : **2093551339**
Option 4 ID : **2093551340**

Q.63 Which one of the following metabotropic receptors increases intracellular cAMP level after stimulation by its specific neurotransmitter?

1. $mGluR_5$
2. $5HT_{2A}$
3. $5HT_4$
4. M_5

Question Type : **MCQ**
Question ID : **209355310**
Option 1 ID : **2093551237**
Option 2 ID : **2093551238**
Option 3 ID : **2093551239**
Option 4 ID : **2093551240**

Q.64

Given below are pairs of sugars.

A. D-glucose and D-fructose
B. D-galactose and D-glucose
C. α-D-glucose and β-D-glucose
D. D-ribose and D-ribulose

Which one of the following options represents the correct combination of anomer and epimer pairs, respectively?

1. A and C
2. B and D
3. C and B
4. A and D

Question Type : **MCQ**
Question ID : **209355286**
Option 1 ID : **2093551141**
Option 2 ID : **2093551142**
Option 3 ID : **2093551143**
Option 4 ID : **2093551144**

Q.65 A polydactyly allele shows 60% penetrance and variable expressivity. What would you expect to observe in a family carrying this allele?

1. 60% of carriers show the trait, and among those who show it, severity varies.
2. 100% of carriers show the trait but with 60% maximum severity.
3. 40% of carriers express the trait to the same degree in an identical manner.
4. 100% of carriers show the trait but the severity varies only in 40% of carriers.

Question Type : **MCQ**
Question ID : **209355317**
Option 1 ID : **2093551265**
Option 2 ID : **2093551266**
Option 3 ID : **2093551267**
Option 4 ID : **2093551268**

Q.66

Most transposable elements contain flanking terminal inverted repeats. Which one of following options is INCORRECT pertaining to these repeats?

1. They are not a part of the transposable element, but are generated during the insertion of the transposable element in the genome.
2. They are part of the transposable elements in the genome.
3. They move along with the transposable elements in the genome.
4. The repeats along with a functional transposase are sufficient for the process of transposition.

Question Type : **MCQ**
Question ID : **209355314**
Option 1 ID : **2093551253**
Option 2 ID : **2093551254**
Option 3 ID : **2093551255**
Option 4 ID : **2093551256**

Q.67 A C_3 plant is shifted from 25 °C to 40 °C under full sunlight. Which one of the following is most likely to happen?

1. Photorespiration rate decreases, leading to higher productivity.
2. Rubisco's oxygenase activity increases, reducing net CO_2 fixation.
3. Stomata remain fully open, increasing CO_2 uptake.
4. PEP carboxylase activity increases to compensate for CO_2 loss.

Question Type : **MCQ**
Question ID : **209355306**
Option 1 ID : **2093551221**
Option 2 ID : **2093551222**
Option 3 ID : **2093551223**
Option 4 ID : **2093551224**

Q.68

Which one of the following is the most appropriate effects of hypoxic pretreatment and acclimation on survival of plants under anoxia?

1. Prevention of ethanol fermentation
2. Increase in capacity of roots for lactate efflux
3. Prevention of glucose to lactate conversion
4. Prevention of ethanol diffusion

Question Type : **MCQ**
Question ID : **209355309**
Option 1 ID : **2093551233**
Option 2 ID : **2093551234**
Option 3 ID : **2093551235**
Option 4 ID : **2093551236**

Q.69 Lac repressor binding occurs at the level of

1. mRNA, on the sequence corresponding to the operator region.
2. DNA, in the *lac* operon in the operator region.
3. both DNA and RNA, in the sequences corresponding to the operator region.
4. ribosomes, during mRNA translation.

Question Type : **MCQ**
Question ID : **209355315**
Option 1 ID : **2093551257**
Option 2 ID : **2093551258**
Option 3 ID : **2093551259**
Option 4 ID : **2093551260**

Q.70

During long-term growth in static liquid culture, *Pseudomonas fluorescens* diversifies into distinct colony types with the following characteristics: wrinkly spreaders that form biofilms at the oxygen-rich surface, smooth morphs that grow freely in the oxygen-poor bottom layer, and fuzzy types that colonises the intermediate zone.

Which one of the following evolutionary processes best explains this ecological diversification?

1. Genetic drift resulting in differential microhabitat use
2. Adaptive radiation into different microhabitats
3. Coevolution between the distinct *P. fluorescens* strains in microhabitats
4. Convergent evolution among unrelated bacterial species

Question Type : **MCQ**
Question ID : **209355318**
Option 1 ID : **2093551269**
Option 2 ID : **2093551270**
Option 3 ID : **2093551271**
Option 4 ID : **2093551272**

Section : **PART-C**

Q.71 A B6 mouse (H-2b haplotype) was crossed with a CBA mouse (H-2k haplotype) to generate F1 progeny. The following skin transplant experiments were then performed:

A. Graft from B6 mouse to CBA mouse
B. Graft from F1 mouse to B6 parent
C. Graft from F1 mouse to CBA parent
D. Graft from F1 mouse to F1 mouse
E. Graft from B6 mouse to F1 mouse

Which one of the following options represents all recipients in which the graft is tolerated?

1. A
2. B and C
3. D
4. E

Question Type : **MCQ**
Question ID : **209355405**
Option 1 ID : **2093551617**
Option 2 ID : **2093551618**

Option 3 ID : **2093551619**

Option 4 ID : **2093551620**

Q.72 In a monogamous haplodiploid social insect colony, sterile workers assist the queen in producing additional sisters instead of reproducing themselves. According to Hamilton's rule, altruistic behaviour is favoured when the genetic benefit to relatives (weighted by coefficient of relatedness, r) exceeds the cost, 'c' to the actor. If a worker helps the queen raise three daughters instead of producing two of her own, then based on Hamilton's rule, will helping behaviour evolve?

[assume, genetic unit, which is the number of offsprings weighted by r as a measure of inclusive fitness]

1. Yes, because rb = 2.25 genetic units and c = 1 genetic unit
2. No, because rb = 0.375 genetic units and c = 1 genetic unit
3. Yes, but only if r < 0.1, indicating weaker kin selection.
4. No, because kin selection cannot operate in haplodiploid species.

Question Type : **MCQ**

Question ID : **209355398**

Option 1 ID : **2093551589**

Option 2 ID : **2093551590**

Option 3 ID : **2093551591**

Option 4 ID : **2093551592**

Q.73 The following statements describe some of the features of Quartz Crystal Microbalance (QCM) biosensors:

A. A QCM biosensor is built with thin disc-shaped piezoelectric material which is connected to metal electrodes on the opposite faces.
B. If an AC voltage is applied on the quartz crystal, it produces an oscillation at a stable resonant frequency which is not determined by the applied AC voltage.
C. The surface of the quartz crystal is functionalized with a specific receptor that can bind to the target analyte.
D. As the mass on the surface of the crystal is increased, the resonant frequency of crystal increases in a predictable, quantitative way following Sauerbrey equation.

Which one of the following options represents a combination of all correct statements?

1. A, B and C
2. B, C and D
3. B and D only
4. A and C only

Question Type : **MCQ**
Question ID : **209355406**
Option 1 ID : **2093551621**
Option 2 ID : **2093551622**
Option 3 ID : **2093551623**
Option 4 ID : **2093551624**

Q.74 In a polluted aquatic environment, bacteria are chronically exposed to low concentrations of multiple antibiotics released from pharmaceutical effluents. Over time, resistant colonies appear even when the antibiotic concentration remains constant. To determine whether resistance arises through induced mutation (a physiological response to antibiotics) or random mutation followed by selection, an ecologist performs a fluctuation test similar to that of Luria and Delbrück (1943) using replicate bacterial cultures.

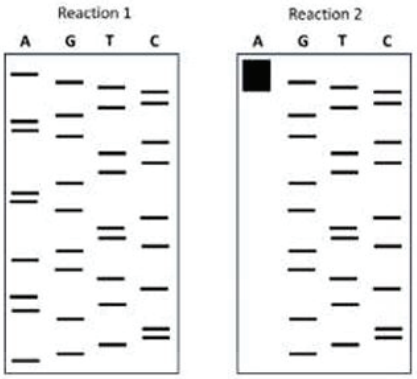
Which one of the following outcomes would best support the conclusion that antibiotic resistance arises by random mutation followed by selection, rather than by induction?

1. Each replicate culture yields nearly the same number of resistant colonies after exposure to the antibiotic.
2. Different replicate cultures show large fluctuations in the number of resistant colonies, even though each was treated identically.
3. Resistant colonies appear only after antibiotic addition.
4. The number of resistant colonies increases predictably and proportionally with exposure time in every replicate culture.

Question Type : **MCQ**
Question ID : **209355397**
Option 1 ID : **2093551585**
Option 2 ID : **2093551586**
Option 3 ID : **2093551587**
Option 4 ID : **2093551588**

Q.75

Two Sanger sequencing reactions were carried out using the same DNA template and primer. The sequencing gels are shown below:



Lane A of the reaction 2 gel shows the absence of lower bands and accumulation of higher bands (represented by a black thick band). The following reasons are predicted:

A. The template DNA does not contain the base A near its 5′-region.
B. The processivity of the Sequenase enzyme is very high.
C. In the second reaction, the concentration of ddATP is very low.
D. In the second reaction, the concentration of ddTTP is very high.

Which one of the following options represents the correct reason(s)?

1. A, B, and D
2. B and C
3. D only
4. C only

Question Type : **MCQ**
Question ID : **209355409**
Option 1 ID : **2093551633**
Option 2 ID : **2093551634**
Option 3 ID : **2093551635**
Option 4 ID : **2093551636**

Q.76 A protein with a binding pocket containing amino acid residues, Asp (pKa = 4.0), and His (pKa = 6.5) interacts with a ligand at pH 7.0 at 25 °C. The binding affinity of the ligand increases 10-fold upon 'His' protonation. Assuming 'His' protonation is the sole contributor to the enhanced binding, calculate the fraction of 'His' residue protonation and the change in the binding free energy corresponding to the enhanced affinity (R = 1.987 cal/mol/K).

1. 0.48 and -3.61 kcal/mol
2. 0.76 and -2.46 kcal/mol
3. 0.96 and -1.63 kcal/mol
4. 0.24 and -1.36 kcal/mol

Question Type : **MCQ**
Question ID : **209355339**
Option 1 ID : **2093551353**
Option 2 ID : **2093551354**
Option 3 ID : **2093551355**
Option 4 ID : **2093551356**

Q.77 Signalling pathways that are important for tumorigenesis and cancer include those involved in cell proliferation and cell growth. The following statements were made regarding pathways and molecules involved in cancer:

A. Abnormal activation of the PI3-kinase/Akt pathway is involved in dysregulated growth.
B. Bcl2 overexpression and enhanced apoptosis lead to efficient clearance of damaged cancer cells.
C. Loss of p53 can allow cells with damaged DNA to escape apoptosis and continue to proliferate.
D. Inhibition of the Rho family GTPase *RhoC* leads to enhanced actin-based cell motility and facilitates metastasis.

Which one of the following options represents the combination of all correct statements?

1. A and B
2. A and C
3. B and C
4. C and D

Question Type : **MCQ**
Question ID : **209355355**
Option 1 ID : **2093551417**
Option 2 ID : **2093551418**
Option 3 ID : **2093551419**
Option 4 ID : **2093551420**

Q.78

Given below are few hormones (Column X) and their specific inhibitors (Column Y).

Column X		Column Y	
A.	Growth hormone	i.	Mifepristone
B.	Progestogens	ii.	Inhibin B
C.	Parathormone	iii.	Somatostatin
D.	Follicle-stimulating hormone	iv.	High calcium levels

Which one of the following combinations correctly matches the hormones with their inhibitors?

1. A – i; B – ii; C – iv; D - iii
2. A – iii; B – i; C – iv; D – ii
3. A – iv; B – ii; C – iii; D - i
4. A – iii; B – iv; C – i; D - ii

Question Type : **MCQ**
Question ID : **209355376**
Option 1 ID : **2093551501**
Option 2 ID : **2093551502**
Option 3 ID : **2093551503**
Option 4 ID : **2093551504**

Q.79 The following statements are made with respect to signal transduction events in phytohormone signalling in plants:

A. Autophosphorylation of a histidine residue in the receiver domain of the response regulator is important for signal transduction through the two-component system.
B. Phosphorylation of a conserved aspartate residue in the transmitter domain of the histidine kinase is important for the two-component system.
C. CYTOKININ RESPONSE 1 (CRE1), a cytokinin receptor, functions as an Arabidopsis histidine-containing phosphotransfer (AHP) factor.
D. In Arabidopsis, pseudo-AHP, called AHP6, acts as an inhibitor of cytokinin signalling.
E. ETR1, an ethylene receptor in Arabidopsis, has histidine kinase activity and a receiver domain.

Which one of the following options is a combination of all correct statements?

1. A and C
2. B and D
3. C and E
4. D and E

Question Type : **MCQ**
Question ID : **209355358**
Option 1 ID : **2093551429**
Option 2 ID : **2093551430**
Option 3 ID : **2093551431**
Option 4 ID : **2093551432**

Q.80 Which one of the following statements about evolution of the vertebrate brain is most accurate?

1. The relative size of the neocortex in primates is primarily determined by the absolute size of the brain and not by social or ecological pressures.
2. Increased brain size in birds and mammals is always accompanied by longer lifespans and slower reproductive rates, without exceptions.
3. Brain regions can evolve independently in response to specific ecological or behavioural demands, rather than all regions scaling uniformly with overall brain size.
4. The cerebellum, involved in motor coordination, has remained largely unchanged throughout vertebrate evolution because motor function is highly conserved.

Question Type : **MCQ**
Question ID : **209355401**
Option 1 ID : **2093551601**
Option 2 ID : **2093551602**
Option 3 ID : **2093551603**
Option 4 ID : **2093551604**

Q.81

Given below are a few statements about meiosis in animal cells.

A. Failure of the chiasma formation leads to non-disjunction in meiosis I.
B. Meiotic cohesin Rec8 ensures mono-orientation of sister chromatids in meiosis II.
C. Crossover interference reduces clustering of recombination sites.
D. Residual double-strand breaks arrest meiosis at metaphase.

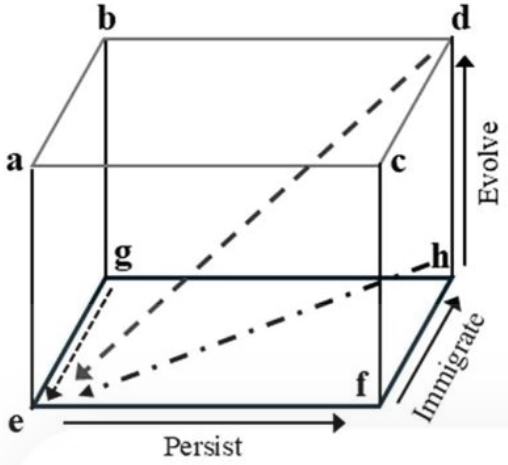
Which one of the following options has all the correct statements?

1. A and B only
2. A, C and D
3. A, B and C
4. B and C only

Question Type : **MCQ**
Question ID : **209355344**
Option 1 ID : **2093551373**
Option 2 ID : **2093551374**
Option 3 ID : **2093551375**
Option 4 ID : **2093551376**

Q.82

The taxon cycle is the predicted, progressive ecological and evolutionary changes in the descendants of founding populations. Taking the case of insular biotas, the figure below can be used to conceptualize and predict species types (a, b, c, d, e, f, g, h) in insular biotas based on fundamental capacities to evolve, immigrate and persist.



The table below has species types (Column X) and the possible traits (Column Y) associated with each type.

Column X		Column Y	
P.	c	i.	Ecologically naïve species, and endemics near the end of the taxon cycle (e.g., dwarfed elephants)
Q.	d	ii.	An unlikely type, because the ability to evolve on isolated islands requires relatively long persistence
R.	e	iii.	Limited dispersal abilities; unlikely to inhabit isolated oceanic islands
S.	b	iv.	Supertramps, powerful dispersers such as microsnails, ferns, and rafting rodents

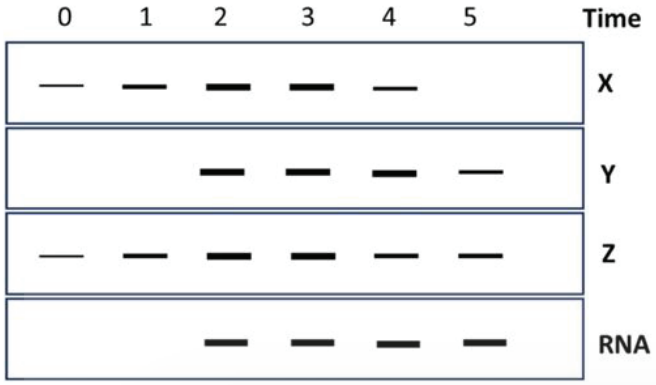
Which one of the following options represents all correct matches between Column X and Column Y?

1. P (i) Q (ii) R (iii) S (iv)
2. P (iv) Q (i) R (ii) S (iii)
3. P (ii) Q (iii) R (iv) S (i)
4. P (iii) Q (iv) R (i) S (ii)

Question Type : **MCQ**
Question ID : **209355390**
Option 1 ID : **2093551557**
Option 2 ID : **2093551558**
Option 3 ID : **2093551559**
Option 4 ID : **2093551560**

Q.83

Chromatin immunoprecipitation (ChIP) and RT-PCR were performed to investigate the activation of expression of a particular gene, results of which are shown below. X, Y and Z indicate ChIP with antibodies for specific proteins, and 'RNA' shows gene expression at the indicated time points.



Based on the results, choose the option that correctly identifies the X, Y and Z proteins.

1. X: H4K8Ac Y: TBP Z: H3K9Ac
2. X: TBP Y: H4K8Ac Z: H3K9Ac
3. X: H4K8Ac Y: H3K9Ac Z: TBP
4. X: H3K9Ac Y: TBP Z: H4K8Ac

Question Type : **MCQ**
Question ID : **209355347**
Option 1 ID : **2093551385**
Option 2 ID : **2093551386**
Option 3 ID : **2093551387**
Option 4 ID : **2093551388**

Q.84

The physiological regulation of plasma osmolality by osmotically active neurons (osmoreceptors) in the organum vasculosum of lamina terminalis (OVLT) of hypothalamus is described in the following statements:

A. In hyperosmolal state, the non-selective cationic channels in the osmoreceptor membrane becomes active causing hyperpolarization of receptor cells.
B. In hyperosmolal state, shrinkage of osmoreceptor cells occurs.
C. Activated osmoreceptors send action potentials to the supraoptic nucleus (SON) and paraventricular nucleus (PVN) to release arginine vasopressin (AVP).
D. In hypoosmolal state, the stretching of osmoreceptor membrane causes inactivation of transient receptor vanilloid protein 4 (TRVP4) resulting in the activation of osmoreceptors.

Which one of the following options represents a combination of all correct statements?

1. A and B
2. B and C
3. C and D
4. A and D

Question Type : **MCQ**
Question ID : **209355373**
Option 1 ID : **2093551489**
Option 2 ID : **2093551490**
Option 3 ID : **2093551491**
Option 4 ID : **2093551492**

Q.85 The following statements are made about body temperature regulation in humans:

A. Lactic acid and potassium ions are less concentrated in sweat while sweating little than while sweating a lot.
B. When the temperature of the surroundings becomes greater than that of the skin, body loses heat by conduction.
C. When heat is applied directly to the pre-optic area of hypothalamus by inserting a thermode in the brain, the animal begins to sweat profusely.
D. Chemical thermogenesis through thyroid gland stimulation requires weeks of exposure to cold temperature.

Which one of the following options represents the combination of all correct statements?

1. C and D
2. B and C
3. A and B
4. A and D

ns

2. 2

3. 3

4. 4

Question Type : **MCQ**
Question ID : **209355377**
Option 1 ID : **2093551505**
Option 2 ID : **2093551506**
Option 3 ID : **2093551507**
Option 4 ID : **2093551508**

Q.86 Given below are statements on the citric acid cycle and urea cycle, which have shared metabolic intermediates.

A. Oxaloacetate is converted to aspartate.
B. Fumarate is a citric acid cycle intermediate.
C. Arginosuccinate is cleaved to fumarate and arginine.
D. Aspartate combines with citrulline to produce argininosuccinate in the mitochondrial matrix.

Which one of the following options represents the combination of all correct statements?

1. A and D only
2. B and C only
3. A, C and D
4. A, B and C

Question Type : **MCQ**
Question ID : **209355336**
Option 1 ID : **2093551341**
Option 2 ID : **2093551342**
Option 3 ID : **2093551343**
Option 4 ID : **2093551344**

Q.87

The table below gives life history characteristics of an endangered grassland bird in two geographically distinct populations. Assume that the species follows a logistic growth model, calculate the population growth rate (dN/dt) for both populations.

Population	No. of individuals (N)	births/year (B)	deaths/year (D)	Carrying capacity (K)
Rajasthan (R)	120	42	6	240
Maharashtra (M)	300	96	6	375

Based on this data, which one of the following options gives the combination of correct inferences that can be drawn about the growth rate in both populations?

1. Both populations are growing AND $(dN/dt)_M > (dN/dt)_R$
2. Both populations are declining AND $(dN/dt)_M < (dN/dt)_R$
3. Both populations are growing AND $(dN/dt)_R = (dN/dt)_M$
4. Both populations are declining AND $(dN/dt)_M > (dN/dt)_R$

Question Type : **MCQ**
Question ID : **209355393**
Option 1 ID : **2093551569**
Option 2 ID : **2093551570**
Option 3 ID : **2093551571**
Option 4 ID : **2093551572**

Q.88 The table below lists conditions (Column X) and their evolutionary/behavioural outcome (Column Y).

Column X		Column Y	
A	Cooperative breeding mediated by kin selection without physiological suppression of reproduction	i	Eusocial species such as naked mole rats
B	Hormonal reproductive suppression in nonbreeding females mediated by aggression	ii	High paternity certainty, low risk of cuckoldry
C	Biparental care	iii	Delayed dispersal and breeding of offspring such as in social birds

Which one of the options below is a correct match between all terms of Column X and Column Y?

1. A-ii B-i C-iii
2. A-i B-ii C-iii
3. A-ii B-iii C-i
4. A-iii B-i C-ii

4. 4

Question Type : **MCQ**
Question ID : **209355400**
Option 1 ID : **2093551597**
Option 2 ID : **2093551598**
Option 3 ID : **2093551599**
Option 4 ID : **2093551600**

Q.89 Dynamic Light Scattering measurements of a protein encapsulated inside AOT/isooctane reverse micelles suspended in n-heptane at 10 °C and 1 atm show an average hydrodynamic diameter of 17 nm, while the empty micelles have an average diameter of 11 nm. Calculate the approximate hydrodynamic radius of the encapsulated protein, assuming spherical geometry of the protein and the reverse micelle and that the protein only occupies the aqueous core of the micelle.

1. 8.60 nm
2. 7.60 nm
3. 3.00 nm
4. 6.60 nm

Question Type : **MCQ**
Question ID : **209355410**
Option 1 ID : **2093551637**
Option 2 ID : **2093551638**
Option 3 ID : **2093551639**
Option 4 ID : **2093551640**

Q.90

A lambda bacteriophage integrated into the genome of *E. coli* and became lysogenic. Upon UV irradiation, it is expected that the lytic cycle will be induced. Due to mutations that have occurred as a result of UV irradiation, you find that the lambda bacteriophage remains in the lysogenic state and lysis is impaired.

Mutations in the following genes have been proposed to explain this observation.

A. *cI* gene, protease cleavage site
B. *cII* gene, DNA binding site
C. *RecA* gene of *E. coli*
D. *RuvA* gene of *E. coli*

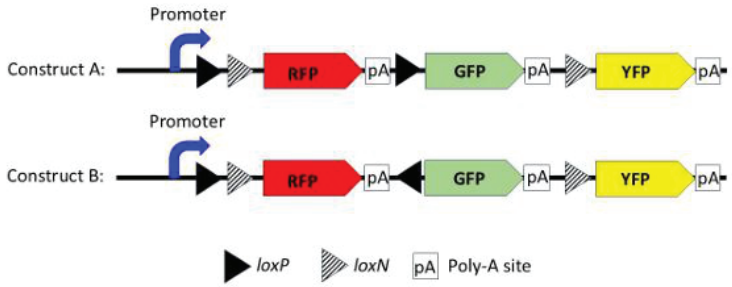
Which one of the following options represents all correct statements?

1. A and B
2. B and D
3. A and C
4. C and D

Question Type : **MCQ**
Question ID : **209355351**
Option 1 ID : **2093551401**
Option 2 ID : **2093551402**
Option 3 ID : **2093551403**
Option 4 ID : **2093551404**

Q.91

The following constructs, A or B, have been introduced into two different cultures of eukaryotic cells.



Cre recombinase can act upon *loxP-loxP* and *loxN-loxN* sites. The following outcomes have been predicted on the types of fluorescence emitted by the cells upon induction of Cre-recombinase:

A. The cells transfected with construct A will yield three types of cells: each type expressing either red or green or yellow fluorescence.
B. The cells transfected with construct B will yield three types of cells: each type expressing either red or green or yellow fluorescence.
C. The cells transfected with construct A will yield two types of cells: each type expressing either red or green fluorescence.
D. The cells transfected with construct B will yield two types of fluorescent cells: each type expressing either red or yellow fluorescence.

Which one of the following options represents the combination of all correct statements?

1. A and D
2. A and B
3. B and C
4. C and D

Question Type : **MCQ**
Question ID : **209355349**
Option 1 ID : **2093551393**
Option 2 ID : **2093551394**
Option 3 ID : **2093551395**
Option 4 ID : **2093551396**

Q.92

Some features of Transcranial Direct Current Stimulation (tDCS) are stated below:

A. The membrane potential of neurons is modulated by applying a weak electrical current between two electrodes placed on the scalp.
B. Neurons under the anode become depolarized, and neurons under the cathode become hyperpolarized during tDCS.
C. tDCS can disrupt neuronal activity and create a "virtual lesion" via anodal stimulation.
D. Neuronal activity is decreased in regions below the anode and increased in regions below the cathode.

Which one of the following options represents the combination of all correct statements?

1. A, B and C
2. B, C and D
3. C and D only
4. A and B only

Question Type : **MCQ**
Question ID : **209355408**
Option 1 ID : **2093551629**
Option 2 ID : **2093551630**
Option 3 ID : **2093551631**
Option 4 ID : **2093551632**

Q.93

In an *in vitro* translation reaction, the 43S pre-initiation complex (PIC) was incubated with the *in vitro* transcribed and capped mRNA for Gene X, followed by addition of the 60S subunit. As a control, mRNA for Gene Y isolated from cells was incubated in the same reaction. The mRNA for Gene Y was bound to the 80S ribosomes and polyribosomes, while mRNA of Gene X remained unbound. In a parallel experiment, mRNAs for both Gene X and Gene Y were found to be associated *in vivo* with 80S and polyribosomes.

The following statements were made to explain the above observation.

A. The *in vitro* system was globally defective for 80S assembly.
B. Gene X mRNA has a sequence or structural feature that specifically prevents 80S assembly *in vitro*.
C. Gene X mRNA lacks a start codon.
D. Gene X mRNA requires other cellular factors which are absent in the *in vitro* mix to permit initiation.
E. The *in vitro* assay preferentially degrades Gene X mRNA.

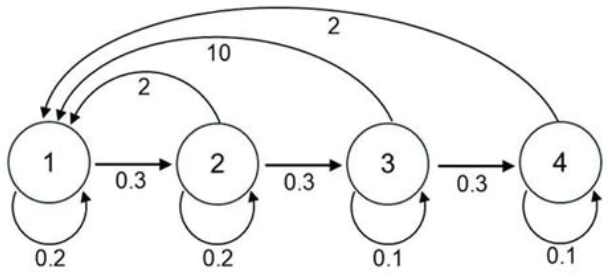
Which one of the following options represents all correct statements?

1. A and B
2. B and C
3. B and D
4. D and E

Question Type : **MCQ**
Question ID : **209355353**
Option 1 ID : **2093551409**
Option 2 ID : **2093551410**
Option 3 ID : **2093551411**
Option 4 ID : **2093551412**

Q.94

The figure below shows a life cycle graph and the corresponding population projection matrix that is invariant over time for a population with four successive classes (1-4). All contributions to class 1 from other classes is via fecundity.



$$\begin{bmatrix} 0.2 & 2 & 10 & 2 \\ 0.3 & 0.2 & 0 & 0 \\ 0 & 0.3 & 0.1 & 0 \\ 0 & 0 & 0.3 & 0.1 \end{bmatrix}$$

Given this life cycle, no resource limitation, and initial numbers of individuals n_1 = 95, n_2 = 5, n_3 = 15, and n_4 = 4 in the four classes, consider the following statements regarding the future population states in a long-term simulation of population growth:

A. The population will grow and attain a stable class distribution.
B. The population will grow but the number of individuals in each class will be proportional to the initial numbers.
C. The population will grow but numbers of individuals in the classes will fluctuate disproportionately over time.
D. The population will grow at a fixed growth rate and all classes will grow at the same rates.

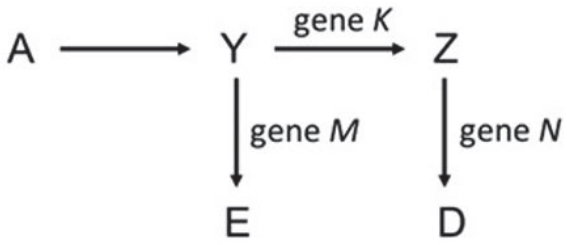
Which one of the following options represents a combination of all correct outcomes?

1. A and D
2. A and C
3. B and D
4. B and C

Question Type : **MCQ**
Question ID : **209355391**
Option 1 ID : **2093551561**
Option 2 ID : **2093551562**
Option 3 ID : **2093551563**
Option 4 ID : **2093551564**

Q.95

Researchers attempted genetic manipulation of the metabolic pathway shown below for enhanced production of "D". However, increased expression of gene "*N*" did not result in increased production of "D" in any transgenic line. Levels of "E" were similar in transgenic as well as untransformed plants.



The following hypotheses were proposed for explaining the observed results.

A. Feedback inhibition of "N" by "D"
B. Epistasis of gene *N* over gene *M*
C. Substrate limitation for "N"
D. Feedback inhibition of "M" by "E"

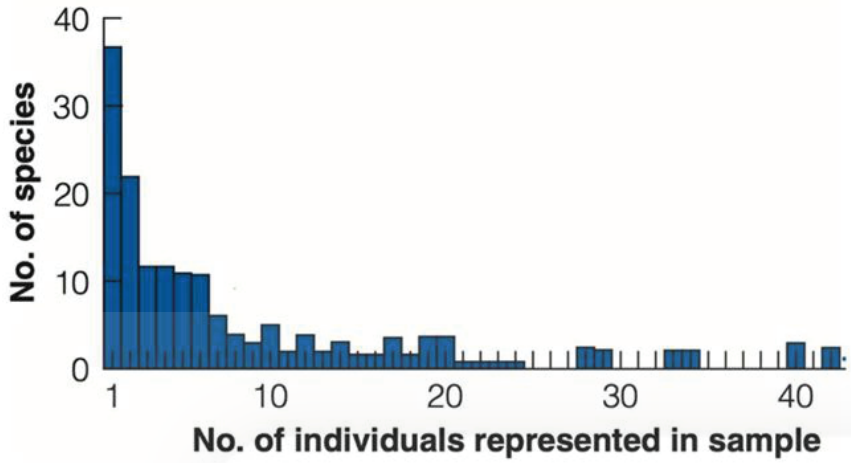
Which one of the following options lists all factors that, either independently or in combination, could explain the above results?

1. A and B
2. A and C
3. C and D
4. B and D

Question Type : **MCQ**
Question ID : **209355404**
Option 1 ID : **2093551613**
Option 2 ID : **2093551614**
Option 3 ID : **2093551615**
Option 4 ID : **2093551616**

Q.96

In a systematic ecological survey of lepidopterans in a moist deciduous forest, a total of 197 species were recorded with 6814 individuals. The relative abundance data are presented below.



Keeping the above pattern in mind, which one of the statements below is correct?

1. Most species are common and are represented by a large number of individuals.
2. Most species are rare and few species are common, represented by a large number of individuals.
3. Most species are common and few species are rare, represented by few individuals.
4. Common and rare species are evenly present, with an equal representation of individuals.

Question Type : **MCQ**
Question ID : **209355394**
Option 1 ID : **2093551573**
Option 2 ID : **2093551574**
Option 3 ID : **2093551575**
Option 4 ID : **2093551576**

Q.97 Recombination between two genes in *Neurospora crassa* yielded equal numbers of parental ditype (PD) and tetratype (TT), and 12 times as many TT as non-parental ditype (NPD).

What is the distance between the genes in map units (mu)?

1. 6 mu
2. 7 mu
3. 14 mu
4. 28 mu

Question Type : **MCQ**
Question ID : **209355378**
Option 1 ID : **2093551509**
Option 2 ID : **2093551510**
Option 3 ID : **2093551511**
Option 4 ID : **2093551512**

Q.98 Following statements were made regarding the theory of symbiogenesis in the origin of eukaryotic cells.

A. Mitochondria and chloroplasts have typically their own circular DNA, similar to bacterial DNA.
B. Mitochondria and chloroplasts are surrounded by a single membrane like other organelles.
C. Division of mitochondria and chloroplasts occurs synchronously with the division of nuclear genome.
D. Ribosomes in mitochondria and chloroplasts are similar to those found in prokaryotes.
E. Genetic analysis shows that mitochondrial DNA is closely related to certain proteobacteria.

Which one of the following options has all the correct statements?

1. A, B, C, D and E
2. A, C and E only
3. A, D and E only
4. A, C, D and E only

Question Type : **MCQ**
Question ID : **209355342**
Option 1 ID : **2093551365**
Option 2 ID : **2093551366**
Option 3 ID : **2093551367**
Option 4 ID : **2093551368**

Q.99

Rhododendron arboreum of the family Ericaceae represents one of the ancient tree species of the genus showing extreme disjunction in the Indian subcontinent. It is represented by two sub-species *viz.*, ssp. *arboreum* Smith in the forests of north-eastern India (temperate) and spp. *nilagiricum* distributed in the southern Western Ghats (tropical) of India with no distribution in the intervening plains.

The following are some of the biogeographical theories that explain distribution of flora and fauna in the Indian subcontinent

A. Island biogeography theory - The mountains function as isolated islands, promoting speciation.
B. Satpura Hypothesis - Species migrated between the Himalayas and the Western Ghats along a cooler, wetter corridor formed by the Satpura mountain range during periods of glacial expansion
C. The Noah's Ark hypothesis/ 'Out of India' hypothesis – the Indian subcontinent is a remnant of the ancient supercontinent Gondwana, that acted as an isolated "ark" for millions of years, giving rise to some modern plant and mammalian groups

Which one of the combinations of biogeographical models explain the distribution of *R. arboreum*?

1. A and C only
2. A, B and C
3. A and B only
4. B and C only

Question Type : **MCQ**
Question ID : **209355389**
Option 1 ID : **2093551553**
Option 2 ID : **2093551554**
Option 3 ID : **2093551555**
Option 4 ID : **2093551556**

Q.100

The following statements are made regarding colchicine treatment in plants for inducing polyploidy.

A. In colchicine-treated cells, sister chromatids cannot separate during anaphase, leading to chromosome doubling when the nucleus reforms.
B. Colchicine stimulates endoreduplication in the treated cells, bypassing cytokinesis to yield polyploid cells in a process called "C-mitosis".
C. In sterile interspecific hybrids, colchicine treatment may restore fertility by converting them into amphipolyploids.
D. Colchicine treatment during meiosis has no effect, as it only acts on mitotic cells.
E. Colchicine binds to tubulin and prevents spindle fibre formation during mitosis.

Which one of the following options represents a combination of all correct statements?

1. A, C and E only
2. B and C only
3. A, B, C and E
4. A, B, D and E

Question Type : **MCQ**
Question ID : **209355402**
Option 1 ID : **2093551605**
Option 2 ID : **2093551606**
Option 3 ID : **2093551607**
Option 4 ID : **2093551608**

Q.101 Nitrogen cycling is a critical ecosystem process. The table below lists the names of the processes (Column X) and nature of the reactions (Column Y) in the nitrogen cycle.

Column X		Column Y	
A.	Ammonification	i.	Conversion of N_2 to NH_3
B.	Nitrogen fixation	ii.	Hydrolysis of protein and oxidation of amino acids
C.	Nitrification	iii.	Reduction of NO_3^- to N_2O and N_2
D.	Denitrification	iv.	Oxidation of NH_3 to NO_2^- and from NO_2^- to NO_3^-

Which one of the following options represents all correct matches between Column X and Column Y?

1. A (i) B (ii) C (iv) D (iii)
2. A (ii) B (i) C (iv) D (iii)
3. A (iv) B (i) C (iii) D (ii)
4. A (ii) B (iv) C (iii) D (i)

Question Type : **MCQ**
Question ID : **209355392**
Option 1 ID : **2093551565**
Option 2 ID : **2093551566**
Option 3 ID : **2093551567**
Option 4 ID : **2093551568**

Q.102 In eukaryotes, many cells can assemble a spindle in the absence of centrosomes as in the case of plant cells during mitosis, and animal cells during meiosis in females. In this context, centrosome-free mitotic extracts from frog oocytes, when supplied with beads covered with DNA, are sufficient to assemble the mitotic spindle. Listed below are a few proteins that could be involved in spindle assembly in such a setting:

A. Ran GTPase
B. Ran-GEF
C. TPX2
D. Myosin V

Which one of the following options has all proteins that are directly involved in controlling spindle assembly without centrosomes?

1. A only
2. A and B only
3. A, B, and C only
4. A, B, C, and D

Question Type : **MCQ**
Question ID : **209355343**
Option 1 ID : **2093551369**
Option 2 ID : **2093551370**
Option 3 ID : **2093551371**
Option 4 ID : **2093551372**

Q.103

Most vascular plants face two broad challenges that affect their growth, reproduction and evolutionary success. One major challenge (Stress) includes shortages of resources such as light, water, nutrients or other physicochemical limitations. A second major challenge (Disturbance) includes factors such as grazing, diseases, storms, frost, erosion, and fire. When cross tabulated, we get the following table:

Intensity of Disturbance	Intensity of Stress	
	Low	High
Low	I	III
High	II	IV

The outcomes of this cross tabulation can be seen as fundamental life history strategies. Based on the above information, which one of the following statements is correct?

1. Conditions of low stress and low disturbance, result in a strategy that aims to maximize competitiveness and results in plants with small biomass, rapid reproduction and are short-lived.
2. Conditions of high stress and low disturbance result in plants that are slow growing, attaining low- to medium-biomass, with low reproductive output and are long-lived.
3. Conditions of low stress and high disturbance results in plants that are robust in terms of biomass, with low growth rates and slow reproduction.
4. Conditions of high stress and high disturbance results in small plants that can rapidly grow, have high reproductive output and are long-lived.

Question Type : **MCQ**
Question ID : **209355395**
Option 1 ID : **2093551577**
Option 2 ID : **2093551578**
Option 3 ID : **2093551579**
Option 4 ID : **2093551580**

Q.104

The following statements are made regarding bioremediation and phytoremediation.

A. Phytovolatilization can reduce soil contamination but may create secondary pollution in the atmosphere.
B. In rhizofiltration, plants are effective only if their roots are exposed to contaminated soil.
C. Phytostabilization reduces contaminant mobility, but the total pollutant load in the soil remains unchanged.
D. Bioventing involves the injection of air or oxygen into soil to stimulate aerobic microbial degradation.
E. During *in situ* bioaugmentation, the remediation is achieved by physically removing contaminated soil for off-site treatment and replacing it with decontaminated soil.

Which one of the following options represents a combination of all INCORRECT statements?

1. B and E only
2. B, C and E
3. A, C and D
4. A and D only

Question Type : **MCQ**
Question ID : **209355403**
Option 1 ID : **2093551609**
Option 2 ID : **2093551610**
Option 3 ID : **2093551611**
Option 4 ID : **2093551612**

Q.105 The following statements are made regarding phenolic biosynthesis in plants.

A. The lignans and flavonoids have abundant methylated carboxyl groups, compared to methylated hydroxyl groups.
B. Cells producing lignans and flavonoids have a very high demand for S-adenosylmethionine.
C. The majority of methylation reactions involved in the formation of phenolics are catalyzed by *O*-methyltransferases.
D. The catechol-*O*-methyltransferase (COMT) has strict substrate specificity.

Which one of the following options represents the combination of all correct statements?

1. A and B
2. B and C
3. C and D
4. A and D

Question Type : **MCQ**
Question ID : **209355370**
Option 1 ID : **2093551477**
Option 2 ID : **2093551478**
Option 3 ID : **2093551479**
Option 4 ID : **2093551480**

Q.106 Experiments addressing axes patterning in amphibian embryos are listed in column X and the observations are listed in column Y.

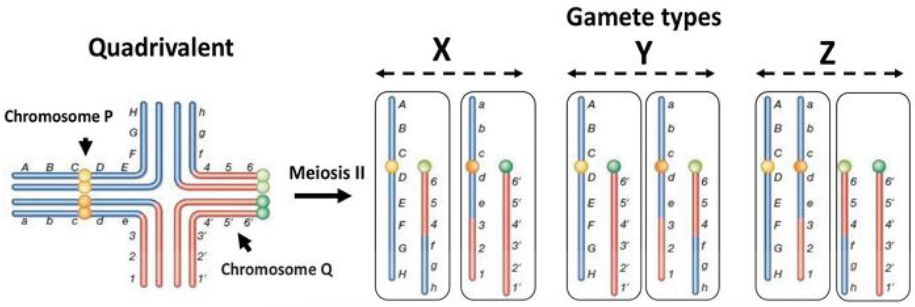
Column X		Column Y	
A.	Grafting of dorsal blastopore lip from donor early gastrula into presumptive ventral epidermis of host early gastrula	i.	Rescue of dorsal development
B.	Injection of noggin mRNA into UV-treated Xenopus embryos	ii.	Induction of secondary head structures
C.	Injection of morpholinos to inhibit BMPs 2, 4, and 7	iii.	Formation of a secondary embryo
D.	Grafting of anterior archenteron roof from late gastrula into the blastocoel of early gastrula	iv.	Enlarged neural tube

Which one of the following options represents all correct matches between column X and column Y?

1. A - iii, B - i, C - iv, D - ii
2. A - ii, B - iii, C - iv, D - i
3. A - iv, B - i, C - ii, D - iii
4. A - iii, B - ii, C - iv, D - i

Question Type : **MCQ**
Question ID : **209355363**
Option 1 ID : **2093551449**
Option 2 ID : **2093551450**
Option 3 ID : **2093551451**
Option 4 ID : **2093551452**

Q.107 In a plant heterozygous for a reciprocal translocation involving chromosome P (ABCDEFGH) and chromosome Q (123456), meiosis I produces a quadrivalent as shown in the figure, which after meiosis II results in gametes of types labelled X, Y and Z.



Which one of the following combinations correctly represents the segregation pattern of gametes that arise from the quadrivalent configuration as shown in the diagram?

1. X = Alternate Y = Adjacent II Z = Adjacent I
2. X = Adjacent II Y = Alternate Z = Adjacent I
3. X = Adjacent I Y = Adjacent II Z = Alternate
4. X = Adjacent I Y = Alternate Z = Adjacent II

Question Type : **MCQ**
Question ID : **209355379**
Option 1 ID : **2093551513**
Option 2 ID : **2093551514**
Option 3 ID : **2093551515**
Option 4 ID : **2093551516**

Q.108 The following statements are put forth about hormonal changes during normal pregnancy in humans.

A. Pituitary secretion of FSH and LH increases.
B. Aldosterone secretion increases.
C. Glucocorticoid secretion decreases.
D. Thyroxine secretion increases.

Which one of the following options has a combination of all correct statements?

1. A and B
2. C and D
3. A and C
4. B and D

Question Type : **MCQ**
Question ID : **209355374**
Option 1 ID : **2093551493**
Option 2 ID : **2093551494**
Option 3 ID : **2093551495**
Option 4 ID : **2093551496**

Q.109 Following statements are made regarding abscisic acid (ABA) signalling during water stress in plants.

A. ABA causes membrane depolarization by decreasing cytosolic calcium levels.
B. ABA causes alkalinisation of the cytosol which stimulates opening of K^+ efflux channels.
C. ABA inhibits the activity of the plasma membrane H^+-ATPase which results in membrane depolarization.
D. During stomatal closure, ABA induces reorganization of tubulin cytoskeleton mediated by Rho GTPases.
E. ABA induced membrane depolarization occur by release of calcium from endoplasmic reticulum and vacuoles.

Which one of the following options is a combination of all correct statements?

1. A, B, D and E
2. B, C and E
3. A, B, C and D
4. C, D and E

Question Type : **MCQ**
Question ID : **209355368**
Option 1 ID : **2093551469**
Option 2 ID : **2093551470**
Option 3 ID : **2093551471**
Option 4 ID : **2093551472**

Q.110

Column X lists different types of ion channels and column Y defines the nature/ property of these channels.

	Column X		Column Y
A	Channelrhodopsin	i	Voltage-gated
B	Shaker-related potassium channels	ii	Mechano-sensitive
C	Piezo ion channel	iii	Ligand-gated
D	Acetylcholine receptor	iv	Light driven

Which one of the following options represents all correct matches between Column X and Column Y?

1. A (iii) B (i) C (iv) D (ii)
2. A (i) B (ii) C (iv) D (iii)
3. A (iv) B (iii) C (ii) D (i)
4. A (iv) B (i) C (ii) D (iii)

Question Type : **MCQ**
Question ID : **209355345**
Option 1 ID : **2093551377**
Option 2 ID : **2093551378**
Option 3 ID : **2093551379**
Option 4 ID : **2093551380**

Q.111 The table below gives different eras (Column X) and periods of the geological time scale (Column Y).

Column X		Column Y	
A.	Ordovician	i.	Mesozoic
B.	Permian	ii.	Cenozoic
C.	Paleogene	iii.	Paleozoic
D.	Cretaceous		

Which one of the following options represents all correct matches of Column X and Column Y?

1. A – i; B – ii; C – iii; D – ii
2. A – iii; B – iii; C – ii; D – i
3. A – ii; B – i; C – iii; D – iii
4. A – ii; B – iii; C – i; D – i

Question Type : **MCQ**
Question ID : **209355396**
Option 1 ID : **2093551581**
Option 2 ID : **2093551582**
Option 3 ID : **2093551583**
Option 4 ID : **2093551584**

Q.112 The following statements were made about major histocompatibility complex (MHC) molecules:

A. Multiple MHC-I molecules can be expressed on a single cell.
B. MHC-I molecules exhibit greater diversity than antibodies.
C. MHC-I haplotypes inherited from the mother and father and expressed on a given cell are codominant.
D. All MHC-I molecules on a given cell express the same endogenous peptide.
E. MHC-I molecules are present on platelets.

Which one of the following options represents the combination of all correct statements?

1. A, B and C
2. A, C and E
3. B and D
4. C, D and E

Question Type : **MCQ**
Question ID : **209355356**
Option 1 ID : **2093551421**
Option 2 ID : **2093551422**
Option 3 ID : **2093551423**
Option 4 ID : **2093551424**

Q.113

The following statements are made with respect to the major classes of heat shock proteins (HSP) in plants.

A. Cytosolic HSP100 is essential while the chloroplast HSP100 / Clpβ family protein is not essential for heat stress response.
B. Proteins of HSP90 family are exclusively localized in the nucleus.
C. Members of HSP60 protein family, chaperonins, are abundant even at normal temperatures.
D. The C-terminal domain of small HSPs is homologous to α-crystallins, proteins found in vertebrate eye lens.

Which one of the following options is a combination of all correct statements?

1. A and C
2. B and D
3. A and B
4. C and D

Question Type : **MCQ**
Question ID : **209355371**
Option 1 ID : **2093551481**
Option 2 ID : **2093551482**
Option 3 ID : **2093551483**
Option 4 ID : **2093551484**

Q.114 The following statements are made regarding photosynthesis in a mutant maize (C_4 plant) that lacks functional bundle sheath chloroplasts:

A. Photorespiration would remain low due to PEP carboxylase activity.
B. Calvin cycle would be severely compromised, reducing sugar production.
C. Carbon fixation would shift entirely to mesophyll cells without yield penalty.
D. CO_2 concentration around Rubisco would increase dramatically.

Which one of the following options is a combination of all INCORRECT statements?

1. A and B only
2. A, B and C
3. C and D only
4. A, C and D

Question Type : **MCQ**

Question ID : **209355366**
Option 1 ID : **2093551461**
Option 2 ID : **2093551462**
Option 3 ID : **2093551463**
Option 4 ID : **2093551464**

Q.115 Given below are different types of mapping populations in plants (Column X) and their characteristic features (Column Y).

Column X		Column Y	
A.	F_2 mapping population	i.	1:0 segregation ratio of dominant markers
B	Backcross population	ii.	1:1 segregation ratio for both dominant and co-dominant markers
C.	RILs	iii.	Recombination is represented only from the male source
D.	F_1DH	iv.	3:1 phenotypic segregation ratio of dominant markers

Which one of the following options is the correct match between all terms of Column X and Column Y?

1. A-iv B-i C-ii D-iii
2. A-ii B-iii C-i D-iv
3. A-i B-ii C-iv D-iii
4. A-iii B-iv C-ii D-i

Question Type : **MCQ**
Question ID : **209355382**
Option 1 ID : **2093551525**
Option 2 ID : **2093551526**
Option 3 ID : **2093551527**
Option 4 ID : **2093551528**

Q.116

A eukaryotic protein, 'X' activates a target gene by increasing its transcription when an inducer is added. The results of the experiments are shown in the table below.

Experiment	Results without inducer	Results with inducer
Immunofluorescence of protein 'X'	No colocalization with DAPI	Colocalization with DAPI
Electrophoretic Mobility Shift Assay (EMSA)	No binding to probe derived from the promoter of the target gene	No binding to probe derived from the promoter of the target gene
Chromatin immunoprecipitation of the promoter of the target gene	Low acetylation	High acetylation

Which one of the following options is the correct mechanism of protein X-mediated transcriptional activation of the target gene upon addition of the inducer?

1. It acts in the cytoplasm as part of a signal transduction cascade.
2. It moves to the nucleus and acts as a coactivator.
3. It remains in the nucleus and acts as a chromatin modifier.
4. It moves to the cytoplasm and acts as a repressor.

Question Type : **MCQ**
Question ID : **209355352**
Option 1 ID : **2093551405**
Option 2 ID : **2093551406**
Option 3 ID : **2093551407**
Option 4 ID : **2093551408**

Q.117

The following statements were made about host-pathogen interactions during influenza virus infection:

A. Entry of the virus is mediated by the interaction of the HA-protein of the virus with sialic acid receptors on the airway epithelium.
B. CTLs are primed in the thymus to kill respiratory epithelial cells that present viral antigens on MHC-I molecules.
C. CTLs are primed in the thymus to kill respiratory epithelial cells that present viral antigens on MHC-II molecules.
D. Viral neuraminidase is required for the release of mature viruses from infected cells.

Which one of the following options represents the combination of all correct statements?

1. A and C
2. A, B and D
3. B and D only
4. A and D only

Question Type : **MCQ**
Question ID : **209355354**
Option 1 ID : **2093551413**
Option 2 ID : **2093551414**
Option 3 ID : **2093551415**
Option 4 ID : **2093551416**

Q.118 To test if viral proteins are transported between Golgi stacks in vesicles or are released into the cytosol by one Golgi stack and taken up by another, viral protein transport was examined between Golgi stacks of infected and uninfected cells.

Which one of the following experimental designs would best distinguish these two hypotheses?

1. Test whether viral protein transport happens in the presence of antibodies depleting clathrin in acceptor Golgi stacks
2. Test whether viral protein transport happens in the presence of antibodies depleting COPII in acceptor Golgi stacks
3. Test whether viral protein transport happens in the presence of protease in the assay mix.
4. Test whether viral protein transport happens when either donor or acceptor Golgi stacks are treated with detergents sequentially

4. 4

Question Type : **MCQ**
Question ID : **209355346**
Option 1 ID : **2093551381**
Option 2 ID : **2093551382**
Option 3 ID : **2093551383**
Option 4 ID : **2093551384**

Q.119 Immunoprecipitation (IP) of protein X from cell lysate using anti-X antibody, followed by RT-PCR for mRNA-Y, indicates the presence of protein X-mRNA-Y complex *in vivo*. To confirm this interaction, recombinant protein X and *in vitro* transcribed mRNA-Y are incubated, followed by affinity purification of protein X. However, mRNA-Y was not present in the eluates containing X but rather in the unbound fraction.

Given below are a few statements to explain the observations.

A. Protein X and mRNA-Y are expressed at the same level in the cell, so the interaction is robust.
B. Protein X and mRNA-Y physically interact via a bridge protein/co-factor absent in the purified protein X.
C. mRNA-Y binds to the antibody used in the immunoprecipitation.
D. The mRNA binding domain of the recombinant protein X may have an altered conformation.

Which one of the following is a combination of all correct statements?

1. A and B
2. B and D
3. C only
4. C and D

Question Type : **MCQ**
Question ID : **209355362**
Option 1 ID : **2093551445**
Option 2 ID : **2093551446**
Option 3 ID : **2093551447**
Option 4 ID : **2093551448**

Q.120

Given below are mechanisms that can facilitate major evolutionary transitions, such as the transition from genes to genomes, from unicellular to multicellular organisms, or from individuals to colonies.

A. Conflict mediation mechanisms maintain cooperation within emergent units.
B. Reduced genetic relatedness among cooperating units accelerates these transitions.
C. Division of labour evolves when specialisation increases group-level fitness more than individual fitness losses.
D. Transitions are irreversible once higher-level individuality is achieved.

Which one of the following options is a combination of all correct statements?

1. B and C
2. A, C, and D
3. A and C only
4. C and D only

Question Type : **MCQ**
Question ID : **209355388**
Option 1 ID : **2093551549**
Option 2 ID : **2093551550**
Option 3 ID : **2093551551**
Option 4 ID : **2093551552**

Q.121 The table below lists taxonomic groups (Column X) and their morphological features (Column Y).

Column X	Column Y
A. Crustacea	i. Two pairs of antennae
B. Chelicerata	ii. Antennae absent
C. Phoronida	iii. Presence of lophophore

Which one of the following options represents all correct matches between Column X and Column Y?

1. A – ii B – iii C – i
2. A – iii B – i C – ii
3. A – i B – iii C – ii
4. A – i B – ii C – iii

Question Type : **MCQ**

Question ID : **209355386**
Option 1 ID : **2093551541**
Option 2 ID : **2093551542**
Option 3 ID : **2093551543**
Option 4 ID : **2093551544**

Q.122 In amphibians and fish, the cells of the organizer ultimately contribute to – (i) pharyngeal endoderm, (ii) head mesoderm, (iii) dorsal mesoderm, and (iv) dorsal blastopore lip. The following statements are made about the function of the organizer and its derivatives:

A. The pharyngeal endoderm and pre-chordal plate prevent formation of forebrain and midbrain.
B. The organizer has the ability to dorsalize the ectoderm and induce formation of the neural tube.
C. The dorsal mesoderm inhibits induction of the hindbrain and trunk.
D. The organizer tissue possesses the ability to dorsalize the surrounding mesoderm into somite-forming mesoderm.

Which one of the following options is a combination of all correct statements?

1. A and C
2. B and D only
3. A, B and D
4. B, C and D

Question Type : **MCQ**
Question ID : **209355361**
Option 1 ID : **2093551441**
Option 2 ID : **2093551442**
Option 3 ID : **2093551443**
Option 4 ID : **2093551444**

Q.123

Given below are a few statements related to inheritance biology:

A. A crossover is the breakage of two DNA molecules at the same position and their rejoining in two reciprocal recombinant combinations.
B. Crossing over takes place at the four-chromatid stage.
C. As the distance between two genes increases, the recombination frequencies move closer to 50%.
D. Percentage of recombinants between two genes can be used as a quantitative index of the accurate physical distance between them.

Which one of the following options is a combination of all correct statements?

1. A and C only
2. B and D only
3. A, B and C
4. B, C and D

Question Type : **MCQ**
Question ID : **209355380**
Option 1 ID : **2093551517**
Option 2 ID : **2093551518**
Option 3 ID : **2093551519**
Option 4 ID : **2093551520**

Q.124 The following statements were made regarding cell fate specification of trophoblast and inner cell mass (ICM) during mammalian embryogenesis:

A. Oct4 represses Cdx2 expression, enabling some cells to become ICM.
B. Cdx2 synthesized by the trophoblast cells activate Oct4 and Nanog.
C. Expression of Nanog allows cells of the ICM to retain their pluripotency.
D. YAP binds to TEAD4 and represses Cdx2 in the trophoblast cells.

Which one of the following options correctly represent events that determine the fate of trophoblasts and ICM?

1. A and B
2. B and C
3. C and D
4. A and C

Question Type : **MCQ**
Question ID : **209355360**
Option 1 ID : **2093551437**

Option 2 ID : **2093551438**
Option 3 ID : **2093551439**
Option 4 ID : **2093551440**

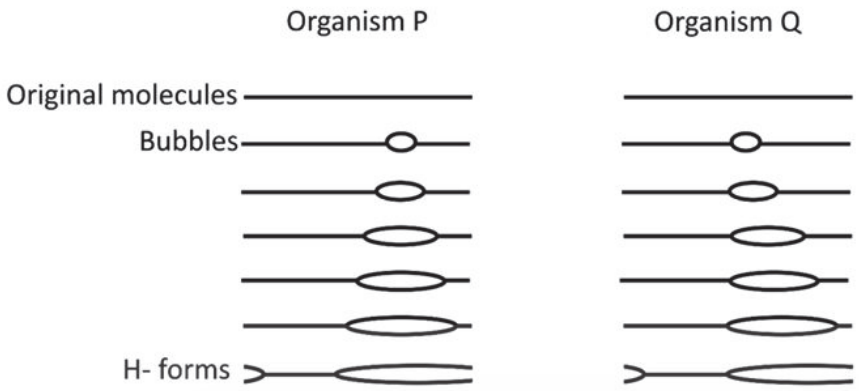
Q.125 A newly discovered small mammal from Madagascar lays eggs, has a cloaca, and shows electroreception through its snout. Molecular phylogenetics places it basal to all other living mammals. Based on these characters, which one of the following groups can it be assigned to?

1. Eutheria (placental mammals)
2. Metatheria (marsupials)
3. Prototheria (monotremes)
4. Theria (marsupials + placentals)

Question Type : **MCQ**
Question ID : **209355387**
Option 1 ID : **2093551545**
Option 2 ID : **2093551546**
Option 3 ID : **2093551547**
Option 4 ID : **2093551548**

Q.126

Circular genomic DNA isolated from actively replicating stages of organisms, P and Q were digested with a restriction enzyme that cuts both genomes only once. The electron-micrographs of the digested DNAs are shown below:



The following comments are made on the number of replication origins and directionality of the replication fork(s):

A. In organism P there are two replication origins, and replication is bidirectional.
B. In organism P there is one replication origin, and replication is bidirectional.
C. In organism Q there is one replication origin, and replication is bidirectional.
D. In organism Q there is one replication origin, and replication is unidirectional.

Which one of the following options represents the combination of all correct statements?

1. A and C
2. A and D
3. B and C
4. B and D

Question Type : **MCQ**
Question ID : **209355348**
Option 1 ID : **2093551389**
Option 2 ID : **2093551390**
Option 3 ID : **2093551391**
Option 4 ID : **2093551392**

Q.127

Conjugation experiments were performed by mixing four different auxotrophic strains (P, Q, R and S) of *E. coli* in different combinations. The generation of prototrophs in each of these combinations on appropriate minimal selection media is given below:

Combination of strains	No. of prototrophs obtained
P and Q	20
S and R	1000
P and R	0
P and S	1000

Based on the above data, the following statements were made:

A. Strains P and R are F^- strains.
B. Strain Q is a F^+ strain.
C. Strain S is a Hfr strain.
D. Strains P and R are F^+ and F^- strains, respectively.
E. Strains P and R are both Hfr strains.

Which one of the following options represents a combination of all correct statements?

1. A, C and D
2. A, B and D
3. B, C and E
4. A, B and C

Question Type : **MCQ**
Question ID : **209355383**
Option 1 ID : **2093551529**
Option 2 ID : **2093551530**
Option 3 ID : **2093551531**
Option 4 ID : **2093551532**

Q.128

Following statements are made regarding sex determination in plants.

A. In *Silene latifolia*, females are homogametic (XX) and males are heterogametic (XY).
B. Papaya (*Carica papaya*) shows trioecy, but its sex determination is not associated with sex chromosomes.
C. All dioecious plants with separate sexes possess heteromorphic sex chromosomes.
D. Plant sex chromosomes are ancient, and their Y chromosomes are highly degenerated, much like those in mammals.
E. Unlike animals, dosage compensation is generally weak or absent in plant sex chromosome systems.

Which one of the following combinations contains all INCORRECT statements?

1. A, C and E
2. B, C and D
3. A and D
4. B and E

Question Type : **MCQ**
Question ID : **209355365**
Option 1 ID : **2093551457**
Option 2 ID : **2093551458**
Option 3 ID : **2093551459**
Option 4 ID : **2093551460**

Q.129 The following experimental observations are made when a small ligand binds with nanomolar affinity in a deep hydrophobic pocket of the partner protein.

A. The ligand forms a hydrogen bond with a backbone carbonyl oxygen upon binding.
B. Several nonpolar groups in proteins form a hydrophobic network due to the conformational change, leading to the displacement of buried water molecules to the surface.
C. A negatively charged side chain of an amino acid located near the binding site is desolvated.
D. The desolvated sidechain of an amino acid located near the binding site does not form a salt bridge with the ligand.

Which one of the following options represents the combination of all correct statement(s) that explain(s) net stabilisation of the ligand:protein complex?

1. A and B
2. B and D
3. C and D
4. A only

Question Type : **MCQ**
Question ID : **209355337**
Option 1 ID : **2093551345**
Option 2 ID : **2093551346**
Option 3 ID : **2093551347**
Option 4 ID : **2093551348**

Q.130 In T4 phage, a mutation in the rII locus gives rise to large and round plaques. The wild type plaques are small and ragged. Ten independent mutants (M1 to M10) in the rII locus were isolated. In order to test whether the mutations affected the same protein coding regions, *E. coli* cells were infected with two mutant phages at a time. The plaques obtained from such infection were either small and ragged (+) or large and round (-). The results obtained from all combinations of infection involving the ten mutants is summarized below:

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
M1	-	+	-	-	+	+	+	+	+	-
M2		-	+	+	-	-	-	-	-	+
M3			-	-	+	+	+	+	+	-
M4				-	+	+	+	+	+	-
M5					-	-	-	-	-	+
M6						-	-	-	-	+
M7							-	-	-	+
M8								-	-	+
M9									-	+
M10										-

The following conclusions were drawn from the above observations:

A. The mutants map to two complementation groups.
B. M1 and M10 are mutations in two different genes.
C. Each complementation group is represented by 5 mutants.

Which one of the following options represents a combination of correct statement(s)?
1. A only
2. B only
3. A and B
4. B and C

Question Type : **MCQ**
Question ID : **209355381**
Option 1 ID : **2093551521**
Option 2 ID : **2093551522**
Option 3 ID : **2093551523**
Option 4 ID : **2093551524**

Q.131 The following are four biological processes that occur inside a living cell.

A. Spontaneous *cis-trans* isomerization of proline in proteins
B. Co-translational protein folding
C. α-helix formation
D. Hydrogen bond formation in free water

Which one of the following options represents the slowest to fastest order of the timescale for these processes?

1. D > C > B > A
2. A > B > C > D
3. D > C > A > B
4. C > B > D > A

Question Type : **MCQ**
Question ID : **209355338**
Option 1 ID : **2093551349**
Option 2 ID : **2093551350**
Option 3 ID : **2093551351**
Option 4 ID : **2093551352**

Q.132

Given below are the different stages of Arabidopsis embryogenesis (Column X) and their characteristic patterns of cell division (Column Y).

Column X		Column Y	
A.	Zygotic	(i)	Formation of an 8-cell embryo, exhibiting radial symmetry and undergoing additional cell division to create the protoderm
B.	Globular	(ii)	Polarized growth of cells followed by a symmetric transverse division giving rise to a small apical cell and an elongated basal cell
C.	Heart	(iii)	Cell elongation and cellular differentiation processes throughout the embryonic axis with visible distinction between the adaxial and abaxial tissue of the cotyledons
D.	Torpedo	(iv)	Focused cell division forming two cotyledons, giving bilateral symmetry to the embryo

Which one of the following options represents the correct match between Column X and Column Y?

1. A (i) B (ii) C (iii) D (iv)
2. A (ii) B (i) C (iv) D (iii)
3. A (ii) B (i) C (iii) D (iv)
4. A (i) B (iv) C (ii) D (iii)

Question Type : **MCQ**
Question ID : **209355364**
Option 1 ID : **2093551453**
Option 2 ID : **2093551454**
Option 3 ID : **2093551455**
Option 4 ID : **2093551456**

Q.133 A 20-bp GC-rich promoter undergoes a conformational transition between the B-form to Z-form of DNA, involving bases 6 to 13. The rest of the bases always remain in the B-form. The B- to Z-DNA transition occurs with a half-life of 2 s, and Z- to B-DNA transition has a half-life of 6 s.

If the cognate transcription factor requires 10 continuous B-DNA base pairs for binding, for how many seconds in a 20 s window can the transcription factor remain bound to the promoter, assuming steady-state conditions?

1. 4 s
2. 5 s
3. 10 s
4. 15 s

Question Type : **MCQ**
Question ID : **209355340**
Option 1 ID : **2093551357**
Option 2 ID : **2093551358**
Option 3 ID : **2093551359**
Option 4 ID : **2093551360**

Q.134 Antibiotic resistant strains of various pathogenic bacteria are a serious concern for human health. The following table has the names of important bacteria (Column X), specific strains of which can cause serious illnesses (Column Y).

Column X		Column Y	
A.	Specific strains of *Enterobacteriaceae*	i.	Re-emerged as a significant community- and hospital-acquired infection due to Methicillin resistance
B	Specific strains of *Rickettsia*	ii.	Multi-drug resistant (MDR) strains found in humans and food, suggesting a potential for broader spread
C.	*Salmonella* and *Klebsiella pneumoniae*	iii.	A type of bacteria that is difficult to treat due to resistance to multiple antibiotics, mainly Carbapenem
D.	*Staphylococcus aureus*	iv.	The causative agent of murine typhus, which has shown transmission via organ transplants.

Which one of the options below is the correct match between all terms of Column X and Column Y?

1. A (iv) B (ii) C (iii) D (i)
2. A (ii) B (i) C (iv) D (iii)
3. A (iii) B (iv) C (ii) D (i)
4. A (i) B (iii) C (i) D (ii)

Question Type : **MCQ**
Question ID : **209355384**
Option 1 ID : **2093551533**
Option 2 ID : **2093551534**
Option 3 ID : **2093551535**
Option 4 ID : **2093551536**

Q.135

ENZ function prevents premature differentiation of mouse neural stem cells. Kinase inhibitor treatment differentiates these cells prematurely. This is prevented if a specific serine-to-aspartate (S to D) mutation is introduced in ENZ.

Based on this information, which one of the following statements is INCORRECT?

1. The specific serine to aspartate substitution has the same effect as phosphorylation of ENZ on neural stem cell differentiation.
2. The specific serine may be the site of ENZ phosphorylation.
3. The serine-to-aspartate mutation is expected to yield the same results as an asparagine substitution.
4. The serine-to-aspartate mutation is expected to yield the same results as a glutamic acid substitution.

Question Type : **MCQ**
Question ID : **209355350**
Option 1 ID : **2093551397**
Option 2 ID : **2093551398**
Option 3 ID : **2093551399**
Option 4 ID : **2093551400**

Q.136 A certain trait in a species is governed by variation at the AB locus that has two alleles (A, B) that give rise to three genotypes, AA, AB and BB. A sample of 1000 individuals of the species were genotyped and the data is given in the table below:

Genotype	Number of individuals
AA	400
AB	400
BB	200

Assume that each genotype is represented equally in males and females and mating is random. If the parents were randomly drawn from the sample of 1000 individuals given above, which one of the following options gives all correct values of the offspring genotype frequencies?

1. AA: 0.4; AB: 0.4; BB: 0.2
2. AA: 0.6; AB: 0.2; BB: 0.2
3. AA: 0.16; AB: 0.16; BB: 0.04
4. AA: 0.36; AB: 0.48; BB: 0.16

Question Type : **MCQ**
Question ID : **209355399**

Option 1 ID : **2093551593**
Option 2 ID : **2093551594**
Option 3 ID : **2093551595**
Option 4 ID : **2093551596**

Q.137 Given below are a few statements regarding Aquaporin-mediated water transport in plants.

A. The activity of aquaporins is regulated by altered pH and Ca^{2+} concentration as well as phosphorylation.
B. Aquaporin activity is also regulated by reactive oxygen species.
C. Aquaporins are restricted only to epidermis and endodermal cells and not present in xylem parenchyma.
D. Aquaporins do not mediate influx of boric acid and salicylic acid into cytosol.

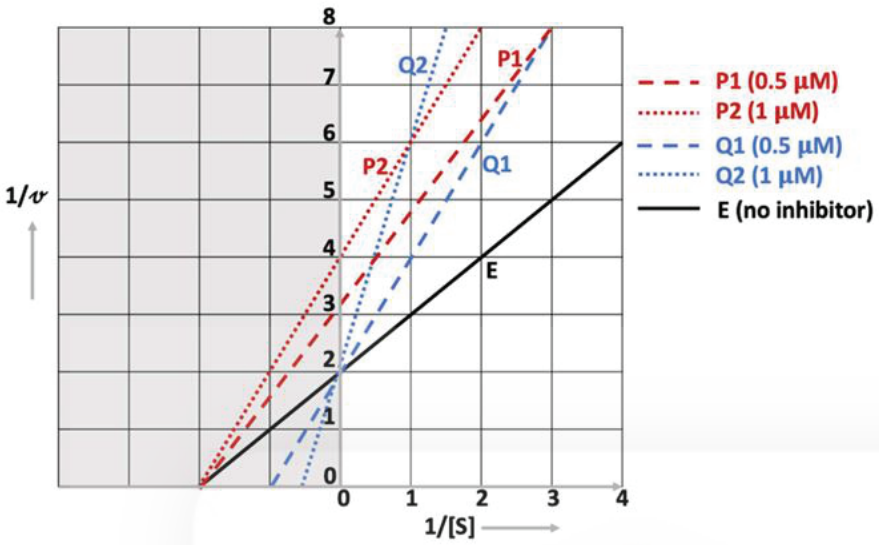
Which one of the following options represents the combination of all correct statements?

1. A and B
2. B and C
3. C and D
4. A and D

Question Type : **MCQ**
Question ID : **209355369**
Option 1 ID : **2093551473**
Option 2 ID : **2093551474**
Option 3 ID : **2093551475**
Option 4 ID : **2093551476**

Q.138

The following graph represents the enzyme kinetics observed for an enzyme (E) in the presence of 2 different inhibitors, P and Q, each at two different concentrations (x-axis – 1/v; 1/(moles/min); y-axis – 1/[S]; 1/μM).



Based on the graph, what is the substrate concentration (in μM) at which both inhibitors achieve 50% inhibition?

1. 0.333
2. 0.5
3. 1.0
4. 2.0

Question Type : **MCQ**
Question ID : **209355341**
Option 1 ID : **2093551361**
Option 2 ID : **2093551362**
Option 3 ID : **2093551363**
Option 4 ID : **2093551364**

Q.139

The following statements are made regarding the functioning of phytochromes A and B during light signaling in plants.

A. Phytochrome B (PhyB) lacks nuclear localization signal (NLS) and after perceiving light, it takes hours for nuclear import.
B. Phytochrome A (PhyA) contains NLS and its nuclear import occurs rapidly.
C. P_{FR} form of PhyA depends on FAR-RED ELONGATED HYPOCOTYL 1 (FHY1) and its homolog FHL for nuclear import.
D. P_{FR} form of PhyB depends on FHY1 and its homolog FHL for nuclear import.

Which one of the following options represents all correct statement(s)?

1. A and B
2. C only
3. A and C
4. D only

Question Type : **MCQ**
Question ID : **209355359**
Option 1 ID : **2093551433**
Option 2 ID : **2093551434**
Option 3 ID : **2093551435**
Option 4 ID : **2093551436**

Q.140 The following statements propose some of the similarities and differences between classic non-peptide neurotransmitters (CNN) and peptide neurotransmitters (PN):

A. CNN are synthesized at the presynaptic terminal while PN are synthesized in the cell body.
B. PN receptors are confined to the specific synapse at which PN is released like that of CNN.
C. When one neuron (containing both CNN and PN) is stimulated at low frequency, both PN and CNN are released from the presynaptic terminal, but at higher frequencies, only CNN is released.
D. The typical action of CNN has short latency and short duration (milliseconds) while PN action may have long latency and may persist for long duration (seconds).

Which one of the following options represents a combination of all correct statements?

1. A and B
2. B and C
3. C and D
4. A and D

Question Type : **MCQ**
Question ID : **209355372**
Option 1 ID : **2093551485**
Option 2 ID : **2093551486**
Option 3 ID : **2093551487**
Option 4 ID : **2093551488**

Q.141 During development, *yfg* expression is regulated by proteins E, F and G, which are abundant and have long half-lives. After a "specific stage of development", the protein E is activated by a single short wave of phosphorylation. This leads to the following events:

- Phosphorylated E activates F.
- Active F activates G.
- Active G promotes *yfg* expression.
- Active F completely inhibits E, and active G completely inhibits F function.

Which one of the following describes the expression of *yfg* soon after the "specific stage of development" is reached?

1. Continuously transcribing
2. One pulse of transcription
3. Transcription not initiated
4. Multiple pulses of transcription

Question Type : **MCQ**
Question ID : **209355357**
Option 1 ID : **2093551425**
Option 2 ID : **2093551426**
Option 3 ID : **2093551427**
Option 4 ID : **2093551428**

Q.142

Given below are statements about ion transport proteins in pancreatic duct cells which influence the composition of pancreatic juice.

A. Primary Cl^-/HCO_3^- exchanger is located on the luminal side.
B. CFTR is located primarily on the basolateral side.
C. Na^+- bicarbonate cotransporter is located on the basolateral side.
D. Na^+/hydrogen exchanger-1 is located on the luminal side.

Which one of the following options has a combination of all correct statements?

1. A and B
2. C and D
3. A and C
4. B and D

Question Type : **MCQ**
Question ID : **209355375**
Option 1 ID : **2093551497**
Option 2 ID : **2093551498**
Option 3 ID : **2093551499**
Option 4 ID : **2093551500**

Q.143 Given below are names of plants (Column X) and the habitats (Column Y) in which they naturally occur.

Column X		Column Y	
A	*Myristica fatua*	i	Eastern Himalayas
B	*Strobilanthes kunthiana*	ii	Nilgiris
C	*Madhuca indica*	iii	Fresh water swamp forests
D	*Rhododendron pendulum*	iv	Central India

Which one of the following options is a correct match of all terms between Column X and Column Y?

1. A-ii B-i C-iii D-iv
2. A-iv B-iii C-ii D-i
3. A-iii B-ii C-iv D-i
4. A-iii B-iv C-i D-ii

Question Type : **MCQ**
Question ID : **209355385**

Option 1 ID : **2093551537**
Option 2 ID : **2093551538**
Option 3 ID : **2093551539**
Option 4 ID : **2093551540**

Q.144 Beyond its primary role in reducing atmospheric nitrogen to ammonia during symbiotic nitrogen fixation, the nitrogenase enzyme complex is also capable of catalyzing other reactions. Listed below are some reactions.

A. Acetylene reduction ($C_2H_2 \rightarrow C_2H_4$)
B. H_2 production ($2H^+ \rightarrow H_2$)
C. ATP hydrolysis ($ATP \rightarrow ADP + P_i$)
D. Oxidized ferredoxin to Reduced Ferredoxin
E. NAD reduction ($NAD^+ + H^+ \rightarrow NADH$)

Which one of the following options represents the combination of reactions that are NOT catalysed by the nitrogenase enzyme complex?

1. B and C
2. D and E
3. A and C
4. B and D

Question Type : **MCQ**
Question ID : **209355367**
Option 1 ID : **2093551465**
Option 2 ID : **2093551466**
Option 3 ID : **2093551467**
Option 4 ID : **2093551468**

Q.145 In standard or batch cultures, cells are grown in a fixed volume of medium. As they grow, nutrients are consumed and metabolites accumulate. Eventually, cultures may stop growing because of nutrient depletion and accumulation of toxic products. The following procedures may prolong the life of batch cultures:

A. Gradual addition of fresh medium and increasing volume of the culture
B. Replacing a constant fraction with an equal volume of fresh medium
C. Occasional removal of used medium and reducing growth factors in the medium
D. Intermittently adding serum and growth factors to the medium

Which one of the following combinations will ensure healthy growth of cells in culture?

1. A and B
2. B and C
3. C and D
4. A and D

Question Type : **MCQ**
Question ID : **209355407**
Option 1 ID : **2093551625**
Option 2 ID : **2093551626**
Option 3 ID : **2093551627**
Option 4 ID : **2093551628**

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Answer Key List			
Sno	**Subject**	**QuestionID**	**Correct Option(s)**
1	LIFE SCIENCES	209355266	2093551064
2	LIFE SCIENCES	209355267	2093551066
3	LIFE SCIENCES	209355268	2093551071
4	LIFE SCIENCES	209355269	2093551075
5	LIFE SCIENCES	209355270	2093551078
6	LIFE SCIENCES	209355271	2093551082
7	LIFE SCIENCES	209355272	2093551086
8	LIFE SCIENCES	209355273	2093551092
9	LIFE SCIENCES	209355274	2093551094
10	LIFE SCIENCES	209355275	2093551098
11	LIFE SCIENCES	209355276	2093551102
12	LIFE SCIENCES	209355277	2093551107
13	LIFE SCIENCES	209355278	2093551111
14	LIFE SCIENCES	209355279	2093551114
15	LIFE SCIENCES	209355280	2093551119
16	LIFE SCIENCES	209355281	2093551124
17	LIFE SCIENCES	209355282	2093551125
18	LIFE SCIENCES	209355283	2093551132
19	LIFE SCIENCES	209355284	2093551133
20	LIFE SCIENCES	209355285	2093551138
21	LIFE SCIENCES	209355286	2093551143
22	LIFE SCIENCES	209355287	2093551148
23	LIFE SCIENCES	209355288	2093551152
24	LIFE SCIENCES	209355289	2093551155
25	LIFE SCIENCES	209355290	2093551158
26	LIFE SCIENCES	209355291	2093551163
27	LIFE SCIENCES	209355292	2093551165

28	LIFE SCIENCES	209355293	2093551169
29	LIFE SCIENCES	209355294	2093551175
30	LIFE SCIENCES	209355295	2093551178
31	LIFE SCIENCES	209355296	2093551182
32	LIFE SCIENCES	209355297	2093551186
33	LIFE SCIENCES	209355298	2093551192
34	LIFE SCIENCES	209355299	2093551195
35	LIFE SCIENCES	209355300	2093551197
36	LIFE SCIENCES	209355301	2093551203
37	LIFE SCIENCES	209355302	2093551208
38	LIFE SCIENCES	209355303	2093551211
39	LIFE SCIENCES	209355304	2093551213
40	LIFE SCIENCES	209355305	2093551217
41	LIFE SCIENCES	209355306	2093551222
42	LIFE SCIENCES	209355307	2093551228
43	LIFE SCIENCES	209355308	2093551229
44	LIFE SCIENCES	209355309	2093551234
45	LIFE SCIENCES	209355310	2093551239
46	LIFE SCIENCES	209355311	2093551243
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48	LIFE SCIENCES	209355313	2093551251
49	LIFE SCIENCES	209355314	2093551253
50	LIFE SCIENCES	209355315	2093551258
51	LIFE SCIENCES	209355316	2093551264
52	LIFE SCIENCES	209355317	2093551265
53	LIFE SCIENCES	209355318	2093551270
54	LIFE SCIENCES	209355319	2093551275
55	LIFE SCIENCES	209355320	2093551280
56	LIFE SCIENCES	209355321	2093551282

57	LIFE SCIENCES	209355322	2093551285
58	LIFE SCIENCES	209355323	2093551292
59	LIFE SCIENCES	209355324	2093551293
60	LIFE SCIENCES	209355325	2093551299
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63	LIFE SCIENCES	209355328	2093551309
64	LIFE SCIENCES	209355329	2093551316
65	LIFE SCIENCES	209355330	2093551318
66	LIFE SCIENCES	209355331	2093551322
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75	LIFE SCIENCES	209355340	2093551358
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81	LIFE SCIENCES	209355346	2093551383
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83	LIFE SCIENCES	209355348	2093551392
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86	LIFE SCIENCES	209355351	2093551403
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88	LIFE SCIENCES	209355353	2093551411
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90	LIFE SCIENCES	209355355	2093551418
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92	LIFE SCIENCES	209355357	2093551425
93	LIFE SCIENCES	209355358	2093551432
94	LIFE SCIENCES	209355359	2093551434
95	LIFE SCIENCES	209355360	2093551440
96	LIFE SCIENCES	209355361	2093551442
97	LIFE SCIENCES	209355362	2093551446
98	LIFE SCIENCES	209355363	2093551449
99	LIFE SCIENCES	209355364	2093551454
100	LIFE SCIENCES	209355365	2093551458
101	LIFE SCIENCES	209355366	2093551464
102	LIFE SCIENCES	209355367	2093551466
103	LIFE SCIENCES	209355368	2093551470
104	LIFE SCIENCES	209355369	2093551473
105	LIFE SCIENCES	209355370	2093551478
106	LIFE SCIENCES	209355371	2093551484
107	LIFE SCIENCES	209355372	2093551488
108	LIFE SCIENCES	209355373	2093551490
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111	LIFE SCIENCES	209355376	2093551502
112	LIFE SCIENCES	209355377	2093551505
113	LIFE SCIENCES	209355378	2093551512
114	LIFE SCIENCES	209355379	2093551516

115	LIFE SCIENCES	209355380	2093551519
116	LIFE SCIENCES	209355381	2093551521
117	LIFE SCIENCES	209355382	2093551525
118	LIFE SCIENCES	209355383	2093551532
119	LIFE SCIENCES	209355384	2093551535
120	LIFE SCIENCES	209355385	2093551539
121	LIFE SCIENCES	209355386	2093551544
122	LIFE SCIENCES	209355387	2093551547
123	LIFE SCIENCES	209355388	2093551551
124	LIFE SCIENCES	209355389	2093551555
125	LIFE SCIENCES	209355390	2093551560
126	LIFE SCIENCES	209355391	2093551561
127	LIFE SCIENCES	209355392	2093551566
128	LIFE SCIENCES	209355393	2093551571
129	LIFE SCIENCES	209355394	2093551574
130	LIFE SCIENCES	209355395	2093551578
131	LIFE SCIENCES	209355396	2093551582
132	LIFE SCIENCES	209355397	2093551586
133	LIFE SCIENCES	209355398	2093551589
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135	LIFE SCIENCES	209355400	2093551600
136	LIFE SCIENCES	209355401	2093551603
137	LIFE SCIENCES	209355402	2093551605
138	LIFE SCIENCES	209355403	2093551609
139	LIFE SCIENCES	209355404	2093551614
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141	LIFE SCIENCES	209355406	2093551624
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143	LIFE SCIENCES	209355408	2093551632

144	LIFE SCIENCES	209355409	2093551636
145	LIFE SCIENCES	209355410	2093551638