

SUBJECT CODE		SUBJECT		PAPER	
C-09-17		LIFE SCIENCES		III	
HALL TICKET NUMBER			QUESTION BOOKLET NUMBER		
			303336		
OMR SHEET NUMBER					
DURATION	MAXIMUM MARKS	NUMBER OF PAGES	NUMBER OF QUESTIONS		
2 Hour 30 Minutes	150	20	75		

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INSTRUCTIONS FOR THE CANDIDATES

- Write your Hall Ticket Number in the space provided on the top of this page.
- This paper consists of seventy five multiple-choice type of questions.
- At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to **open the booklet and compulsorily examine it as below** :
 - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
 - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
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- Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
Example : (A) (B) (C) (D)
 where (C) is the correct response.
- Your responses to the items are to be indicated in the OMR Answer Sheet given to you. If you mark at any place other than in the circle in the OMR Answer Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
- If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
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- Use only Blue/Black Ball point pen.
- Use of any calculator or log table etc., is prohibited.
- There is no negative marks for incorrect answers.

అభ్యర్థులకు సూచనలు

- ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
- ఈ ప్రశ్న పత్రము ద్వైబిధ బహుళైచ్ఛిక ప్రశ్నలను కలిగి ఉంది.
- పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములో ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా పరిచూసుకోండి.
 - ఈ ప్రశ్న పత్రమును చూడడానికి కవర్ పేజీ అంచన ఉన్న కాగితపు సీలును చించండి. స్టికర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నాపత్రమును మీరు అంగీకరించవద్దు.
 - కవరు పేజీ పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను పరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా ఏదైనా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏదైనా తేడాలుండుట వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగ్గా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.
 - పై విధంగా పరిచూసుకొన్న తర్వాత ప్రశ్నాపత్రం సంఖ్యను OMR పత్రము పై అభివిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నాపత్రము పై నిర్దిష్టస్థలంలో రాయవలెను.
- ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతి ప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్ తో కింద తెలిపిన విధంగా ఘరించాలి.
ఉదాహరణ : (A) (B) (C) (D)
 (C) సరైన ప్రతిస్పందన అయితే
- ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రముతో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే ఘరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై వేరొక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
- ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
- చితుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
- OMR పత్రము పై నిర్దిష్ట స్థలంలో సూచించవలసిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
- పరీక్ష పూర్తయిన తర్వాత మీ OMR పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి. వాటిని పరీక్ష గది బయటకు తీసుకువెళ్లకూడదు. పరీక్ష పూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని, OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్లవచ్చు.
- నీలి/నల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.
- లాగరిథమ్ టేబుల్స్, క్యాలిక్యులేటర్లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.
- తప్ప సమాధానాలకు మార్కులు తగ్గింపు లేదు.

SEAL



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LIFE SCIENCES

Paper - III

1. Rifampicin is a specific inhibitor of :
- (A) RNA polymerase III
 - (B) RNA polymerase II
 - (C) RNA polymerase I
 - (D) Bacterial RNA polymerase
2. Identify the following events in the correct order of their occurrence.
- (a) Formation of mRNA
 - (b) DNA segment opens (unzips)
 - (c) mRNA attaches to ribosomes
 - (d) Amino acids form peptide bonds
 - (e) tRNA carries amino acids to mRNA
- The correct order of events required for protein synthesis is :
- (A) (a) (b) (c) (d) (e)
 - (B) (b) (a) (c) (d) (e)
 - (C) (b) (a) (c) (e) (d)
 - (D) (b) (a) (d) (e) (c)
3. Consider the following statements associated with the germination of an angiospermous seed :
- (a) In germinating seeds, the lipids are converted into carbohydrates
 - (b) The increase in respiratory rate continues till senescence
 - (c) As the seed gets hydrated and germinates, enzymatic activity is increased
 - (d) The respiration rate of the germinating seed increases along with the increased enzymatic activity.
- Of these statements :
- (A) (a), (c) and (d) are correct
 - (B) (a), (b) and (c) are correct
 - (C) (b), (c) and (d) are correct
 - (D) (b) and (d) are correct
4. *Pseudomonas aeruginosa* uses quorum sensing to coordinate cell aggregation. They grow within a host without harming it until their population density reaches to a specific concentration. At this point, they use quorum sensing to aggressively reproduce in order to overtake the host's immune system. Which of the following is a true statement about this process ?
- (A) When specific population density is reached, a chemical signal is released to communicate with nearby bacteria
 - (B) This process is initiated when the bacteria are under attack by an antibiotic
 - (C) This process is used when cell junctions are not present for cellular communication
 - (D) Quorum sensing is used to break down the biofilms



5. If you had 30V, 10D and 5J regions able to code for a heavy chain of an antibody (Ab) and 30V and 5J region genes able to code for a light chain of the Ab, you could have a maximum Abs in an individual with repertoire of :

- (A) $45 \times 35 = 1575$ specificities
- (B) $(30 \times 5) \times (30 \times 10 \times 5) = 225,000$ specificities
- (C) $(30 \times 5) + (30 \times 10 \times 5) = 1650$ specificities
- (D) More than 225,000 specificities

6. Sertoli cells produce :

- (A) Testosterone
- (B) FSH
- (C) LH
- (D) Androgen-binding Protein

7. Examples to tetrapyrrolic structures are :

- (a) Pheophytin
- (b) Cryptochrome
- (c) Chromophore
- (d) Cytochrome

- (A) (a), (b)
- (B) (b), (d)
- (C) (a), (c), (d)
- (D) (b), (c), (d)

8. The events which take place on stromal side of thylakoid membrane of chloroplast during light reaction of photosynthesis :

- (a) NADP⁺ reduction
 - (b) ADP Phosphorylation
 - (c) Photolysis of water
 - (d) Electron transfer mediated by plastocyanin
- (A) (a), (b)
 - (B) (b), (c)
 - (C) (c), (d)
 - (D) (b), (d)

9. Match the following :

List - I (Blood vessel)	List - II (Structure)
(a) Venule	(i) Consists of only endothelium
(b) Vein	(ii) Consists of Tunica media and endothelium
(c) Arteriole	(iii) Consists of Tunica externa, Tunica media, Tunica intima and endothelium
(d) Capillary	(iv) Consists of Tunica externa and endothelium

Codes :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|-------|
| (A) | (iii) | (ii) | (i) | (iv) |
| (B) | (iv) | (ii) | (i) | (iii) |
| (C) | (iv) | (iii) | (ii) | (i) |
| (D) | (ii) | (iii) | (i) | (iv) |

10. Which parasitic infection will spread through auto-infection in man ?

- (A) Pin Worm
- (B) Filarial worm
- (C) Vesical blood fluke
- (D) Large intestine fluke

11. Match the following genera given in List - I to that of fruit type in List - II using codes :

List - I		List - II	
(a) <i>Abelmoschus</i>	(i)	Pyridium	
(b) <i>Aristolochia</i>	(ii)	Loculicidal capsule	
(c) <i>Datura</i>	(iii)	Porous capsule	
(d) <i>Papaver</i>	(iv)	Septicidal capsule	
	(v)	Septifragal capsule	

Codes :

	(a)	(b)	(c)	(d)
(A)	(ii)	(iv)	(v)	(iii)
(B)	(ii)	(v)	(iv)	(i)
(C)	(ii)	(iv)	(v)	(i)
(D)	(ii)	(iii)	(iv)	(v)

12. Arrange the various components of electromagnetic spectrum in an ascending order :

- (A) X - rays → Gamma rays → Visible Light → UV rays → Infrared rays → Radio waves → Micro waves
- (B) UV rays → X - rays → Gamma rays → Visible light → Micro waves → Radio waves → Infrared rays
- (C) Micro waves → Radio waves → Visible Light → Infrared rays → X - rays → UV rays → Gamma rays
- (D) Gamma rays → X - rays → UV rays → Visible light → Infrared rays → Micro waves → Radio waves

13. Assertion (A) :

The oxides of nitrogen directly threatening the quality of life by formation of 'Photochemical smog'. It is responsible for tearing eyes and lung damage.

Reason (R) :

In the presence of ultraviolet radiation in sunlight, NO_2 reacts with unburned hydrocarbons to Produce a Photochemical smog.

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

14. Match the following lists :

List - I		List - II	
(a) Petite mutants	(i)	Limnaea	
(b) Kappa particles	(ii)	Neurospora	
(c) Shell coiling	(iii)	yeast	
(d) Poky strains	(iv)	Paramecium	

The correct match is :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|-------|------|
| (A) | (ii) | (i) | (iii) | (iv) |
| (B) | (iii) | (iv) | (i) | (ii) |
| (C) | (i) | (iii) | (ii) | (iv) |
| (D) | (iv) | (ii) | (iii) | (i) |



15. Identify the sequence of events in Urine production :

- (a) Filtration
- (b) Secretion
- (c) Reabsorption
- (d) Water conservation
- (A) (b), (c), (a), (d)
- (B) (a), (b), (c), (d)
- (C) (a), (c), (b), (d)
- (D) (c), (b), (a), (d)

16. Nutritional status of diversified organisms :

List - I

List - II

- | | |
|---|-------------------------------|
| (a) Carbon source
CO ₂ and energy
source is light | (i) Chemoautotrophy |
| (b) Carbon
source CO ₂ and
energy source is
chemicals | (ii) Photoheterotrophy |
| (c) Carbon
source organics
and energy
source is light | (iii) Chemoheterotroph-
hy |
| (d) Carbon source
organics and
energy source
is chemicals | (iv) Photoautotrophy |

Codes :

- | | | | | |
|-----|-------|-------|------|-------|
| | (a) | (b) | (c) | (d) |
| (A) | (ii) | (iii) | (iv) | (i) |
| (B) | (iii) | (iv) | (ii) | (i) |
| (C) | (iv) | (iii) | (ii) | (i) |
| (D) | (iv) | (i) | (ii) | (iii) |

17. The conditions necessary for evolution of a Population by natural selection are :

- (a) Genetic variability
- (b) Meritable
- (c) Differential Reproduction
- (d) Gene Pool
- (A) (a), (b), (c)
- (B) (b), (c), (d)
- (C) (a), (c), (d)
- (D) (a), (b), (d)

18. Assertion (A) :

The uninucleate microspore undergoes equal division to form two daughter cells of equal size as in *Datura*.

Reason (R) :

Homozygous diploids breed true.

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

19. The key enzyme in regulation of cholesterol biosynthesis is :

- (A) HMG CoA reductase
- (B) Aceto Acetyl transferase
- (C) Squalene synthase
- (D) Dehydrogenase



20. In PURINE Biosynthesis, AMP is formed in which of the following sequence ?

- (A) Inosine Monophosphate → Adenylosuccinate → Adenylate
- (B) Inosine Monophosphate → Xanthylate → Adenylate
- (C) Inosine Monophosphate → Ribose 5-P → Adenylate
- (D) Inosine Monophosphate → Ribulose 5-P → Adenylate

21. Match Column - I with Column - II with respect to oxidative phosphorylation.

Column I	Column II
(a) Oxidative phosphorylation	(i) Blocked by rotenone
(b) NADH reductase	(ii) Blocked by Antimycina
(c) QH ₂ to cytochrome C ₁	(iii) Blocked by CN ⁻
(d) Cytochrome oxidase to oxygen	(iv) Yields ATP in mitochondria

Codes :

- | | | | | |
|-----|-------|------|-------|-------|
| (a) | (b) | (c) | (d) | |
| (A) | (iv) | (i) | (ii) | (iii) |
| (B) | (iii) | (ii) | (i) | (iv) |
| (C) | (ii) | (i) | (iii) | (iv) |
| (D) | (i) | (iv) | (iii) | (ii) |

22. Match the following from List - I with List - II :

List - I

List - II

- | | |
|------------------|----------------------------|
| (a) Autotrophy | (i) <i>Nitrosomonas</i> sp |
| (b) Lithotrophy | (ii) <i>E.Coli</i> |
| (c) Diazotrophy | (iii) Nitrogenase |
| (d) Heterotrophy | (iv) Rubisco |

Codes :

- | | | | | |
|-----|-------|------|-------|-------|
| (a) | (b) | (c) | (d) | |
| (A) | (ii) | (iv) | (i) | (iii) |
| (B) | (iii) | (ii) | (iv) | (i) |
| (C) | (iv) | (ii) | (iii) | (i) |
| (D) | (iv) | (i) | (iii) | (ii) |

23. Arrange the steps in glycolysis in correct order :

- (a) Fructose - 6 - phosphate
 - (b) Glyceraldehyde - 3 - phosphate
 - (c) Glucose - 6 - phosphate
 - (d) Phospoenol pyruvic acid
 - (e) Pyruvic acid
- | | |
|-----|-------------------------|
| (A) | (c), (a), (b), (d), (e) |
| (B) | (b), (a), (c), (e), (d) |
| (C) | (b), (a), (d), (e), (c) |
| (D) | (b), (d), (c), (a), (e) |



24. Which form of DNA helix is predominantly present in cells ?
- (A) A - form
 - (B) Z - form
 - (C) B - form
 - (D) T - form
25. Which one statement is true about the genetic code ?
- (A) The genetic code table lists tRNA sequences
 - (B) Every protein starts with a Pro amino acid
 - (C) Each amino acid is encoded by exactly one codon
 - (D) Only three codons have no matching anticodons
26. Which of the following three are signaling molecules ?
- (a) Testosterone
 - (b) Thyroxin
 - (c) Adenylate cyclase
 - (d) Insulin
- (A) (a), (b) and (c)
 - (B) (b), (c) and (d)
 - (C) (a), (b) and (d)
 - (D) (a), (c) and (d)
27. Identify the pro-apoptotic protein from the following :
- (a) Bax
 - (b) Bad
 - (c) Bcl - 2
 - (d) Bcl - xl
- (A) (a) and (b)
 - (B) (b) and (c)
 - (C) (c) and (d)
 - (D) (a) and (d)
28. Consider the following process :
- (a) Involution
 - (b) Epiboly
 - (c) Invagination
- Which of the above accomplish the gastrulation in frog ?
- (A) (a) and (b)
 - (B) (b) and (c)
 - (C) (a) and (c)
 - (D) (a), (b) and (c)
29. If a leaf cell of an angiosperm plant had 24 chromosomes, then its stigma cell, antipodal cell and endosperm nucleus would contain :
- (A) 12, 24 and 36 chromosomes respectively
 - (B) 24, 12 and 24 chromosomes respectively
 - (C) 12, 36 and 24 chromosomes respectively
 - (D) 24, 12 and 36 chromosomes respectively



30. Match the following :

List - I		List - II	
(a) Nectory guides	(i)	Pisatin	
(b) Phytoalexins	(ii)	Ferulic acid	
(c) Allelopathic substances	(iii)	Tannins	
(d) Feeding deterrents	(iv)	Flavonols	

Codes :

	(a)	(b)	(c)	(d)
(A)	(iii)	(i)	(iv)	(ii)
(B)	(ii)	(iv)	(i)	(iii)
(C)	(iv)	(i)	(ii)	(iii)
(D)	(iv)	(ii)	(iii)	(i)

31. In the caudal medulla of mammalian brain, respiratory rhythm generation is done by the following :

- (a) Pontine respiratory group (PRG)
 - (b) Parafacial respiratory group (Pre -I)
 - (c) Pre - Botzinger complex
 - (d) Rostral medulla
- (A) (a) and (b)
(B) (b) and (c)
(C) (c) and (d)
(D) (a) and (d)

32. Assertion (A) :

Acetyl choline decreases the mammalian heart beat

Reason (R) :

The decrease in heart beat is due to the binding of acetyl choline β_1 adrenergic receptors activating the adenylyl cyclase signal transduction pathway that opens Na^+ and Ca^{2+} channels

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

33. Polygenic Inheritance is very common in determining characteristics that are :

- (A) Qualitative in nature
(B) Quantitative in nature
(C) Primarily hidden
(D) Not keeping with Mendelian genetics



34. Which one of the following specifically describes the use of linkage analysis in the search for a disease specific gene in a family ?
- (A) The drawing of a pedigree and to find who is normal and who is affected.
 - (B) To access a large pedigree and be able to obtain DNA from most of the family members.
 - (C) The correlation of a DNA polymorphism with a family specific mutation.
 - (D) The finding of an association of a DNA polymorphism with the clinical phenotype.

35. Based on the rules of International Code of Botanical Nomenclature (ICBN) some of the names of families of Angiosperms were changed. Pick up the correct combinations indicating the old name and corrected (changed) name from the following list :
- (a) Cruciferae - Brassicaceae
 - (b) Umbelliferae - Umbellaceae
 - (c) Palmae - Arecaceae
 - (d) Guttiferae - Clusiaceae
- (A) (a), (b) and (d)
 - (B) (a), (b) and (c)
 - (C) (a) and (c)
 - (D) (a), (c) and (d)

36. Match the following :
- | List - I | | List - II | |
|------------------------|-------|----------------------------------|--|
| (a) Linnaeus | (i) | Five kingdom concept | |
| (b) Whittakar | (ii) | Classification of Bacteria | |
| (c) Bentham and Hooker | (iii) | Binomial nomenclature | |
| (d) Bergy's manual | (iv) | Natural system of classification | |

- Codes :
- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|------|
| (A) | (i) | (iii) | (ii) | (iv) |
| (B) | (iii) | (i) | (iv) | (ii) |
| (C) | (iv) | (iii) | (i) | (ii) |
| (D) | (iii) | (ii) | (i) | (iv) |

37. Match the following :
- | | | |
|--|-------|----------------|
| (a) Standing waters (lakes, ponds) | (i) | Photic zone |
| (b) Running water (streams, rivers) | (ii) | Lentic systems |
| (c) Water level fluctuates up and down (marshes, swamps) | (iii) | Lotic systems |
| (d) Lighted portion of a lake inhabited by phytoplankton | (iv) | Wet lands |

- Codes :
- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|------|
| (A) | (iii) | (iv) | (ii) | (i) |
| (B) | (ii) | (iii) | (iv) | (i) |
| (C) | (iii) | (ii) | (i) | (iv) |
| (D) | (iv) | (iii) | (ii) | (i) |



38. Assertion (A) :

During cambrian period (about 500 million years ago), there was an evolutionary explosion of new life, such as sponges, corals, worms, shellfish, sea weeds, and the ancestors of seed plants and vertebrates.

Reason (R) :

The tiny green plants of the sea were able to produce an excess of oxygen over the respiration ($P/R > 1$) needs of all organisms allowed the whole earth to be populated in short time.

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

39. Stanley Miller (1953) experimented to know about Primitive Earth billion years ago. He sent an electrical charge through a flask of a chemical solution and created organic compounds including amino acids.

That chemical solution is with :

- (a) Methane
 - (b) Ammonia
 - (c) Hydrogen
 - (d) Water
- (A) (a), (c), (d)
 - (B) (b), (c), (d)
 - (C) (a), (b), (c), (d)
 - (D) (a), (b), (c)

40. A graph of a cumulative frequency distribution is termed as :

- (A) Frequency polygon
- (B) Ogive
- (C) Bar graph
- (D) Pie-diagram

41. Ammonium acetate is used to augment precipitation of DNA with ethanol because :

- (A) It can be removed easily from DNA being insoluble in ethanol.
- (B) It can be removed easily from DNA being soluble in ethanol.
- (C) The method is efficient and cheaper.
- (D) The method is used since it eliminates RNA.

42. Dolly sheep was genetically similar to :

- (A) The mother from which nucleated fertilized egg was taken
- (B) The mother from which nuclear DNA of udder cell was taken
- (C) The surrogate mother
- (D) Father from which the sperm was taken

43. Assertion (A) :

RNAs can readily synthesize the antigenic proteins and offer immunity.

Reason (R) :

RNAs are less stable than DNAs. This poses a big problem for RNA vaccine manufacture and distribution.

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

44. Protein *domain* relates to :
- (A) Single secondary structural motif arrangement
 - (B) Compact 3-D structure formed by several secondary structural motifs
 - (C) β - bends
 - (D) Only helix-loops

45. Match the Column-I with Column-II in respect of lysosomal biogenesis.

Column-I	Column-II
(a) Lysosomal Enzymes	(i) Undergo Modification in Golgi Apparatus
(b) Highmannose Glycan structure	(ii) By vesicles
(c) Modified enzymes	(iii) Glycoproteins
(d) Transported to lysosomes	(iv) Recognized by specific receptors

Codes :

- | | | | | |
|-----|-------|-------|-------|-------|
| | (a) | (b) | (c) | (d) |
| (A) | (i) | (iv) | (iii) | (ii) |
| (B) | (ii) | (i) | (iv) | (iii) |
| (C) | (iii) | (i) | (iv) | (ii) |
| (D) | (iv) | (iii) | (i) | (ii) |

46. Purification of Proteins by affinity chromatography requires :

- (a) Matrix - ligand - protein that binds ligand
- (b) Specific eluting conditions
- (c) Only ligand is required
- (d) Biological specificity is not required

The **correct** combination is :

- (A) (a) and (c)
- (B) (a) and (b)
- (C) (b) and (c)
- (D) (c) and (d)

47. Assertion (A) :

A nucleus taken from a somatic cell and implanted into an e-nucleated egg cell of a frog, often gives rise into an adult individual

Reason (R) :

Differentiated donar nucleus could be totipotent

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

48. An operon is a coordinated unit of gene expression consisting of :

- (A) Regulator gene, operator site, structural genes
- (B) Operator site, structural genes
- (C) Structural genes
- (D) Regulator gene



49. Glycoproteins Acquire N-glycan structures :

- (a) A core oligosaccharide is first formed.
 - (b) Core oligosaccharide is covalently attached to nitrogen atom of asparagine.
 - (c) Core oligosaccharide is attached to serine residue in the protein.
 - (d) The reaction above doesnot require an enzyme.
- (A) (a) and (b) are correct
(B) (a) and (c) are correct
(C) (b) and (c) are correct
(D) (b) and (d) are correct

50. Kartagenre's syndrome is related to :

- (A) Cilia
- (B) Glyoxysomes
- (C) Chromosomes
- (D) Plastids

51. Which of the following cell types are formed from the hematopoietic stem cells in bone marrow ?

- (a) Red blood cells
 - (b) T cells
 - (c) B cells
 - (d) Monocytes
 - (e) Macrophages
- (A) (a), (b), (c), (d) and (e)
(B) (a), (b), (c) and (d)
(C) (b), (c), (d) and (e)
(D) (a), (c), (d) and (e)

52. Assertion (A) :

In many members of orchidaceae and Asclepiadaceae the microspores in a sporangium remain together to form the pollinium.

Reason (R) :

Usually the microspores separate from one another immediately after meiosis.

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

53. Which one of the DNA and RNA base has no 'oxygen' in the molecular structure ?

- (A) Uracil
- (B) Adenine
- (C) Guanine
- (D) Cytosine

54. Which of the following is not a structural motif in DNA binding proteins ?

- (A) bZIP
- (B) TFIID
- (C) Helix - turn - helix
- (D) Zinc finger



55. Match the following :

Human Population levels throughout history.

List-I		List-II	
(a) Old stone age	(i)	4000 B.C.	
(b) New stone age	(ii)	2000-3000 B.C.	
(c) Bronze age	(iii)	1000 B.C.	
(d) Iron age	(iv)	8000 B.C.	

Codes :

	(a)	(b)	(c)	(d)
(A)	(iii)	(iv)	(ii)	(i)
(B)	(iv)	(i)	(ii)	(iii)
(C)	(ii)	(iii)	(iv)	(i)
(D)	(ii)	(iv)	(i)	(iii)

56. Androgenic haploids are more useful due to their :

- (A) Potential foliage and attractive flowers
- (B) Excessive vigour
- (C) Homozygous genetic condition
- (D) High productivity

57. An actively growing bacterial culture having a population of 1×10^2 cells per ml is incubated for two hours at its optimum growth conditions resulted in its final population of 1×10^4 cells per ml. What is its generation time ?

- (A) 14 mts
- (B) 18 mts
- (C) 22 mts
- (D) 28 mts

58. Match the following lists :

List-I		List-II	
(a) β - lactamase	(i)	Folic acid	
(b) Streptomycin	(ii)	Acetic acid bacteria	
(c) Venegar	(iii)	Ampicillin	
(d) Growth factor	(iv)	Ribosome	

The correct match is :

	(a)	(b)	(c)	(d)
(A)	(i)	(iii)	(iv)	(ii)
(B)	(iii)	(iv)	(ii)	(i)
(C)	(iii)	(ii)	(iv)	(i)
(D)	(iv)	(iii)	(ii)	(i)

59. Assertion (A) :

Genetic variability is the root of any breeding programme.

Reason (R) :

Entire collection of plants and seeds having diverse alleles for all genes in a given crop is called germplasm collection.

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



60. Identify the correct statement :

- (a) The water use efficiency (WUE) of Pineapple is more than that of sugarcane
 - (b) CO₂ compensation point for sugarcane is less than that for sunflower
 - (c) The ATP requirement for the synthesis of one glucose molecule in sunflower is more than that in case of sorghum
- (A) Only (b) is correct
(B) Only (c) is correct
(C) (a) and (b) are correct
(D) (b) and (c) are correct

61. The three amino acids present in glutathione are :

- (A) Glutamic acid, cysteine, Glycine
- (B) Cysteine, alanine, proline
- (C) Alanine, Serine, Aspartic acid
- (D) Leucine, Glycine, Glutamic acid

62. Assertion (A) :

outcrossing is the best breeding method for cattle that are below average in milk production.

Reason (R) :

outcrossing involves mating of superior males of one breed with females of another breed.

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

63. Match the following :

List - I (Parts of brain)	List - II (Function)
(a) Amygdala	(i) Converts short-term memory to long-term memory
(b) Hippocampus	(ii) Integrates sensory information and acts as a relay station to the cortex
(c) Cerebellum	(iii) Involved in emotional responses particularly aggression and fear
(d) Thalamus	(iv) Maintains body posture and coordinates locomotion

Codes :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|-------|------|
| (A) | (iii) | (iv) | (ii) | (i) |
| (B) | (ii) | (iii) | (i) | (iv) |
| (C) | (iv) | (ii) | (iii) | (i) |
| (D) | (iii) | (i) | (iv) | (ii) |

64. Identify the macromolecules that disrupt ice crystal formation in Antarctic fish as an adaptation :

- (a) Glycoproteins
 - (b) Proteins
 - (c) Cholesterol
 - (d) Phospholipids
- (A) (a) and (b)
(B) (b) and (c)
(C) (c) and (d)
(D) (a) and (d)



65. Match the following :

List - I		List - II
(a) Different genetic make up of the individual organisms within a species (intra-specific variation)	(i)	Alpha diversity
(b) Species is the basic unit of classification. Variety of species used for describing the biodiversity wealth of an area	(ii)	Ecosystem diversity
(c) Living organisms are their interacting physical environment of a particular area	(iii)	Genetic diversity
(d) For within habitat or within community diversity	(iv)	Species diversity

Codes :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|-----|
| (A) | (iv) | (iii) | (ii) | (i) |
| (B) | (ii) | (iii) | (iv) | (i) |
| (C) | (iii) | (ii) | (iv) | (i) |
| (D) | (iii) | (iv) | (ii) | (i) |

66. Identify the correct statements :

- (a) The microscopic soil forms—phytoedaphon
 - (b) Plants with Perennating structures buried under the soil—Geophytes
 - (c) Plants that grow within the bodies of other plants—epiphytes
 - (d) Plants that grow in water—Hydrophytes
- (A) (a), (b), (c)
 (B) (b), (c), (d)
 (C) (a), (b), (d)
 (D) (a), (c), (d)

67. A normal curve is otherwise called as :

- (A) Leptokurtic
- (B) Platykurtic
- (C) Mesokurtic
- (D) Asymmetric

68. The principle of photoelectric effect is used in the construction of :

- (A) Colorimeter
- (B) pH meter
- (C) Calorimeter
- (D) Lyophilizer

69. Choose the correct sequence of evolutionary events in one form of allopatric speciation.

- (a) Geological Isolation
 - (b) Ecological Isolation
 - (c) Increased pre-mating reproductive isolation
 - (d) Increased genetic divergence
 - (e) Selection completed
- (A) (c), (d), (b), (e)
 (B) (a), (d), (c), (e)
 (C) (c), (b), (d), (e)
 (D) (a), (b), (c), (e)



70. Match the following lists :

- | List - I | List - II |
|--------------------------------|---|
| (a) Bubble column bioreactor | (i) It constitutes a tower bioreactor |
| (b) Airlift bioreactor | (ii) Air is added to the culture medium under pressure through sparger |
| (c) Stirred tank reactor | (iii) The medium of the vessel is divided into interconnected zones by means of a baffle or draft tube. In one of the two zones (riser), the air/ gas is pumped |
| (d) Pressure - cycle fermenter | (iv) In this reactor, air or gas is introduced at the base of the column through perforated pipes or plates or metal microporous spargers. |

The correct match is :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|-------|
| (A) | (iv) | (iii) | (ii) | (i) |
| (B) | (iii) | (ii) | (iv) | (i) |
| (C) | (i) | (iii) | (ii) | (iv) |
| (D) | (ii) | (iv) | (i) | (iii) |

Read the passage and answer the questions given below (71-75) :

Agricultural pests are organisms that cause damage or spread diseases or cause economic loss etc, generally feed on cultivated crops. The most noxious of these organisms are various insects, but certain fungi, bacteria, viruses, phytonematodes, snails, slugs, rats, mice, birds and mammals etc., also fit into this category. Weed is a plant considered as undesirable plant at a wrong time and wrong place. Generally in an agroecosystem, the weed compete with agricultural crops, forest plantation and forage grasses for light and nutrients. Some unwanted plants poison cattle or have serious effects; others simply detract from the appearance of lawns and gardens. Bringing these pests under control has three main purposes: to protect our food, to protect our health, and for convenience.

Part of the credit for modern human prosperity can be attributed to pest control. For example, pesticides are vital elements in the prevention of the diseases that kill and incapacitate humans. In addition to having an agricultural use, pesticides have become important public health tools used to combat diseases such as malaria and sleeping sickness. Insects, plant pathogens and weeds destroy the crops to the extent of 37% (before and after harvest) of potential agricultural production. Efforts to control these losses involved the use of pesticides (chemicals that kill animals and insects). Pesticide is a broad term and it includes, insecticides, nematicides, molluscides, fungicides, bactericides, antiviral compounds and herbicides (chemicals that kill plants) etc. In the Worldwide, 2.84 million tons of pesticides were used in 2009 that is costing 34 billion



American dollars. Many of these changes in agricultural technology, such as monoculture and the wide use of genetically identical crops boosted yields. These also brought on an increase in the proportion of crop lost to pests from 71% in the 1950s to 37% today. During the last half-century, the use of herbicides and pesticides multiplied manifold, leading ecological imbalance and effected the growth and development of many non-target organisms. Finally, it is disturbing the structure and function of various ecosystems including agroecosystem (artificial or man-made) and unsustainable dependency on them.

Medical practice employs two basic means of treating infectious diseases. One approach is to give the patient a massive dose of antibiotics, hoping to eliminate the pathogen causing the problem or to stop the pathogen before it can get established. The other approach is to stimulate the patient's immune system with a vaccine to produce long-lasting protection against any future invasion. In practice, both means are often used to keep a particular pathogen under control. The same basic philosophies govern the control of agricultural pests. The first is the chemical control of insect pests. Like the use of antibiotics, synthetic pesticides seeks a 'magic bullet' that will eradicate, kill or greatly lessen the numbers of the pest organisms. Although it has had much success, this approach gives only short term protection. Further more, the chemical often has side effects that are highly damaging to other organisms. The second philosophy is ecological control. Like stimulating the body's immune system, this approach seeks to give long-lasting protection by developing control agents on the basis of knowledge of the pest's life cycle and of their ecological relationships. Thus, the benefits of pest control can be obtained while maintaining the

integrity of the ecosystem. These two philosophies are combined in the approach called 'Integrated Pest Management (IPM)'. IPM is an approach to controlling pest population by using all suitable methods - optimum use of synthetic pesticides (chemical pesticides) use of biological agents and ecological balance and methods of pest control such as host plant resistance, cultural control, IPM - in a way that brings about long-term management of pest populations below the economic thresh-hold level and also has minimal environment impact. This approach is increasing in usage, especially where pesticides are seen as undesirable because of health risks and in developing countries, the cost of pesticides is often prohibitive.

71. Which of the following pest that affect the yield of crop is a prokaryote ?
- (A) Bacteria
 - (B) Fungi
 - (C) Phytonematode
 - (D) Insect
72. The approach to give long-lasting protection to crops by developing pest control agents on the basis of knowledge of the pests life cycle is :
- (A) Mechanical control
 - (B) Genetic control
 - (C) Biological control
 - (D) Chemical control



73. Following is concerned with "Magic Bullet".

- (A) Magic bullet is used to fertilizes the cropland
- (B) To kill the non-target organisms
- (C) Used to kill pests
- (D) Highly environment friendly material

74. Which is not the characteristic feature of a weed ?

- (A) A plant at a wrong time when main crop is cultivated
- (B) A plant that gives a good yield compared to the main field crop
- (C) A plant that is growing in a wrong place
- (D) A plant that is growing as a undesirable plant in a habitat

75. Which is not the aim of Integrated Pest Management ?

- (A) Environmental safety
- (B) Kill pests by using higher Quantities of synthetic pesticides
- (C) To maintain ecological balance
- (D) Encourage survival of bioagents

- o O o -



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