

Life Science Paper II

Time Allowed : 75 Minutes]

[Maximum Marks : 100

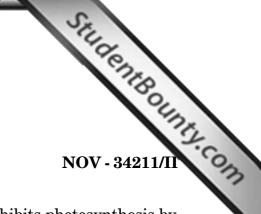
Note : This Paper contains Fifty (50) multiple choice questions, each question carrying Two (2) marks. Attempt *All* questions.

- 1. Sex determination in mammals is governed by TDy. The most probable candidate gene for TDy is :
 - (A) Zfy
 - (B) Bkm
 - (C) Sry
 - (D) Sox 9
- 2. How does homologous recombination play a role in replicative transposition ?
 - (A) Replicative transposition can only occur between homologous sequences
 - (B) Proteins involved in homologous recombination are required to initiate replicative transposition
 - (C) After the transposon is replicated, free copy of sequence is integrated into genome at the new site via homologous recombination
 - (D) Replication of transposon sequence converts the hybrid DNA molecule into a cointegrate, which is uncoupled via homologous recombination

- 3. Which of the following types of genes are *not* found in mitochondrial genome ?
 - (A) tRNA genes
 - (B) respiratory chain genes
 - (C) rRNA genes
 - (D) glycolytic genes
- 4. Genes responsible for determining the identification of the segments in *Drosophila* are the :
 - (A) Gap genes
 - (B) Pair-rule genes
 - (C) Segment polarity genes
 - (D) Homeotic selector genes
- 5. In garden peas, yellow seed colour (Y) is dominant to green (y), round seed shape (R) is dominant to wrinkled (r) and tall (T) is dominant to dwarf (t). These traits segregate independently. What phenotypes are expected from the cross TyRRTt and YyRRTT ?
 - (A) Yellow-wrinkled-dwarf and green-round-tall
 - (B) Yellow-round-tall only
 - (C) Yellow-round-tall and greenround-tall
 - (D) Yellow-round-tall and greenwrinkled-dwarf

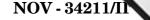
- 6. Damage encountered during replication is repaired by :
 - (A) Nucleotide excision repair system
 - (B) Base excision repair system
 - (C) Recombination repair system
 - (D) Mismatch repair system
- Transgenic plants expressing the 7. *CryA1* genes will show the following phenotype :
 - (A) Pathogen resistance
 - (B) Insect resistance
 - (C) Drought tolerance
 - (D) Oxidative stress tolerance
- 8. Why is actin used as a control for transcriptome studies in vertebrates ?
 - (A) It is used as a negative control as the gene is not expressed in vertebrates
 - (B) It is used as a negative control as its mRNA is degraded rapidly
 - (C) It is used as a positive control as its expression is fairly constant in different cell types
 - (D) It is used as a positive control as it is the most highly expressed gene in all cell types

- StudentBounty.com 9. Which of the following codons code for two amino acids based on its context ?
 - (A) AUG
 - (B) GUG
 - (C) UGA
 - (D) GUA
- 10. For efficient attachment of sister chromatids to the spindle, which one of the following processes is required :
 - (A) Inhibition of Cdk
 - (B) Aggregation of lamins in nuclear membrane
 - of (C) Breakdown nuclear membrane
 - (D) Rapid synthesis of cyclin B
- 11. Which of the following enzymes is not found in lysosome ?
 - (A) Collagenase
 - (B) Mannosidase
 - (C) Acetylcholine esterase
 - (D) Hyaluronidase
- 12. Which of the following is *not* a part of host defence mechanism :
 - (A) Lipopolysaccharide
 - (B) Macrophage
 - (C) Skin
 - (D) Interferon



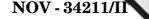
- 13. Which of the following components exhibits peptidyl transferase activity ?
 - (A) 16S *r*RNA
 - (B) 23S rRNA
 - (C) One of the 30S ribosomal protein
 - (D) One of the 50S ribosomal protein
- 14. Which one of the following is *not* a molecular motor ?
 - (A) Myosin
 - (B) Kinesin
 - (C) Dynein
 - (D) Dynamin
- 15. Which one of the following immune cells has both myeloid and lymphoid lineage ?
 - (A) Natural killer cell
 - (B) Dendritic cell
 - (C) Mast cell
 - (D) Monocyte
- 16. Which of the following can be used for distinguishing an activated T lymphocyte from a naive T cell ?
 - (A) Presence of T cell receptor
 - (B) Presence of co-receptor
 - (C) CD28
 - (D) IL-2 receptor

- 17. Paraquat inhibits photosynthesis by blocking :
 - (A) PS I
 - (B) PS II
 - (C) ATPase
 - (D) Cyt bf
- 18. Which of the following is the donor of new glucose molecules in glycogen synthesis ?
 - (A) UDP glucose 1 phosphate
 - (B) UDP glucose 6 phosphate
 - (C) Glucose 1 phosphate
 - (D) UDP glucose
- 19. Protein denaturation does *not* involve the breakage of :
 - (A) Hydrogen bonds
 - (B) Peptide bonds
 - (C) Ionic bonds
 - (D) Disulphide bonds
- 20. The connecting link between HMP shunt and lipid synthesis is ?
 - (A) Acetyl CoA
 - (B) NADPH
 - (C) Sedoheptulose 7-phosphate
 - (D) NADH



- 21. Cytochrome P_{450} is a member of which family of oxidoreductases ?
 - (A) Catalase
 - (B) Hydroperoxidase
 - (C) Oxidase
 - (D) Oxygenase
- 22. A sigmoidal plot of substrate concentration ([S]) versus reaction velocity (V) indicates which of the following ?
 - (A) Cooperative binding
 - (B) Competitive inhibition
 - (C) Michaelis-Menten kinetics
 - (D) Non-competitive inhibition
- 23. Which of the following proteins is not absolutely required for growth of Saccharomyces cerevisiae in a medium containing glucose as the sole source of carbon ?
 - (A) Phosphoglycerate kinase
 - (B) Cytochrome oxidase
 - (C) Hexokinase
 - (D) Glyceraldehyde 3 phosphate dehydrogenase

- StudentBounty.com 24. Purine synthesis differs from pyrimidine synthesis. Which of the following is *true* ?
 - (A) Purine ring is synthesized on pentose sugar
 - (B) Purine ring is synthesized and then coupled to pentose sugar
 - (C) Pyrimidine ring is synthesized on pentose
 - (D) Pyrimidine ring is derived from purine ring
- Which of the following statements 25.about species and speciation is true ?
 - (A) Hybrids are always selected against in nature
 - (B) Reproductive isolating mechanisms are usually selected against in nature
 - (C) A single species can evolve through undergoing adaptive radiation and produce a cluster of species
 - (D) Species usually have only one type of reproductive isolating mechanism



- 26. A classical example of microevolutionary process is :
 - (A) development of penicillin resistant bacteria
 - (B) recurrence of pest
 - (C) appearance of six fingers in both left and right hand and in some human newborns
 - (D) occurrence of non-disjunction in population of dividing cell
- 27. Which of the following statements is most likely to be *true* about two species ?
 - (A) They occupy different niches
 - (B) They can never hybridize naturally
 - (C) Their chromosome number will differ
 - (D) Their structural genes may show 25-50% sequence homology
- 28. A rare allele which is being selected against :
 - (A) is found predominantly in heterozygotes
 - (B) has selection co-efficient of 0.01
 - (C) can be said to be in linkage disequilibrium
 - (D) is found to be a result of bottleneck

- StudentBounty.com 29. A similar feature (at the molecular level) occurring in different species whose ancestral lineages differ from each other is called :
 - (A) parallelism
 - (B) convergent evolution
 - (C) divergent evolution
 - (D) homology
- 30. Which of the following processes is thought to underlie concerted evolution ?
 - (A) Gene conversion
 - (B) Lateral gene transfer
 - (C) Programmed mutation
 - (D) Transposition
- 31. According to Stebbins :
 - (A) Dicotyledons evolved before monocotyledons
 - (B) Dicotyledons evolved from monocotyledons
 - (C) Monocotyledons and dicotyledons evolved parallel
 - (D) Sporophyte evolution \mathbf{is} independent of gametophyte

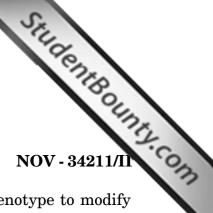
- 32. For each molecule of ATP \rightarrow ADP + Pi, the Na^+/K^+ ATPase moves across the plasma membrane.
 - (A) 2K⁺ and 2Na⁺ ions
 - (B) $2K^+$ and $3Na^+$ ions
 - (C) $3K^+$ and $2Na^+$ ions
 - (D) 3K⁺ and 3Na⁺ ions
- 33. Signal transduction does notinvolve :
 - (A) Interaction of a molecule with cell surface receptor
 - (B) Phosphorylation of membrane bound proteins
 - (C) Production of secondary messengers
 - (D) Activation of nuclear membrane proteins
- 34. Mutations that increase the yield of a microbial product are most likely to occur in :
 - (A) Biosynthetic genes
 - (B) Catabolic genes
 - (C) Plasmid-encoded genes
 - (D) Regulatory genes

- StudentBounty.com Antimalarial drug primaquine 35. causes side effects in some people leading to RBC lysis and jaundice. This is due to a deficiency in the enzyme :
 - (A) Glucose 6P dehydrogenase
 - (B) Fructose 6P dehydrogenase
 - (C) Aldolase
 - (D) Hexokinase
- 36. Intracellular concentration of the following ions in a plant cell are :
 - (A) $K^+ > Ca^{2+} > Na^+$
 - (B) $Ca^{2+} > K^+ > Na^+$
 - (C) $K^+ > Na^+ > Ca^{2+}$
 - (D) $Na^+ > K^+ > Ca^{2+}$
- Which of the following chloroplastic 37. proteins is rapidly turned over in the presence of light ?
 - (A) Light harvesting chlorophyll binding proteins
 - (B) Plastoquinone binding proteins
 - (C) Plastocyanin binding protein
 - (D) NADP reductase



- 38. Q_{10} is associated with one of the following specific processes :
 - (A) Growth rate
 - (B) Photosynthesis
 - (C) Oxygen affinity of haemoglobin
 - (D) Breathing rate
- 39. The aortic valve :
 - (A) Prevents mixing of auricular and ventricular blood
 - (B) Prevents back flow of blood from auricles to ventricles
 - (C) Prevents mixing of blood between right and left auricles
 - (D) Prevents back flow of blood from major arteries to ventricles
- 40. The centre of origin of maize is :
 - (A) Tropical America
 - (B) Brazil
 - (C) Peru
 - (D) Central Asia
- 41. Field gene banks are least useful for :
 - (A) Ornamental species
 - (B) Plantation crops
 - (C) Forest trees
 - (D) Wild relatives of crops

- 42. Remote sensing followed by broad scale sampling is used to assess :
 - (A) genetic diversity
 - (B) taxonomic diversity
 - (C) species diversity
 - (D) ecosystem diversity
- 43. DNA barcoding for species identification involves the use of :
 - (A) VNTRs
 - (B) Cytochrome oxidase gene
 - (C) tRNA gene family
 - (D) Actin and vimentin
- 44. Classification based on overall similarities and differences is :
 - (A) Phylogenetic classification
 - (B) Phenetic classification
 - (C) Natural classification
 - (D) Artificial classification



- 45. Susceptibility to extinction of Blue Whale has been attributed to :
 - (A) small population size
 - (B) low reproductive rate
 - (C) both (A) and (B)
 - (D) habitat loss
- 46. Conservation of cultivated plants has been mandated to the :
 - (A) National Bureau of Plant Genetic Resources
 - (B) World Conservation Union
 - (C) Ministry of Environment and Forests
 - (D) National facility for plant tissue culture Repository
- 47. Mint oil is obtained from :
 - (A) Mentha spicata
 - (B) Mentha piperata
 - (C) Peperomia pallida
 - (D) Piper nigrum

- 48. The ability of a genotype to modify its growth and development in response to changes in environment is known as :
 - (A) Allelopathy
 - (B) Phenotypic plasticity
 - (C) Adaptability
 - (D) Mutatability
- 49. In uncrowded, resource-rich environment, natural selection would favour organisms which are able to achieve rapid population growth. Such organisms are termed as :
 - (A) k-strategists
 - (B) γ-strategists
 - (C) α -strategists
 - (D) β -strategists
- 50. The relative efficiency of scavenging of nutrients by rainwater is called :
 - (A) Deposition velocity
 - (B) Carbonation
 - (C) Weathering
 - (D) Wash-out ratio



ROUGH WORK



ROUGH WORK

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	nature of Invigilators			
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	LIFE SCIENC	E	(In figures as in Admit Card)	
	Paper II		Seat No. (In words)	
N	OV - 34211			
		A	Answer Sheet No.	
Tin	ne Allowed : 75 Minutes]		[Maximum Marks : 100	
	Number of Pages i	in this	Booklet : 12	
	Instructions for the Candidates		परीक्षार्थींसाठी सूचना	
1.	Write your Seat Number in the space	1.	या पानावरील वरच्या कोपऱ्यात आपला आसन क्रमांक	
	provided on the top of this page. Write your Answer Sheet No. in the space		तसेच आपणास दिलेल्या उत्तरपत्रिकेचा क्रमांक	
	provided for Answer Sheet No. on the		त्याखाली लिहावा.	
2.	top of this page. Write and darken Test Booklet No. on	2.	प्रश्नपत्रिका क्रमांक OMR उत्तरपत्रिकेवर दिलेल्या	
	OMR Answer Sheet.		रकान्यात लिहून त्याप्रमाणे काळा करावा.	
3.	This paper consists of Fifty (50)	3.	या प्रश्नपत्रिकेत पन्नास बहुनिवड प्रश्न आहेत.	
4.	multiple choice type of questions. Each item has four alternative	4.	प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी	
	responses marked (A), (B), (C) and (D).		चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा	
	You have to darken the responses as indicated below on the correct		रफाना खाला दराविल्यांत्रमाण ठळकपण फाळा करावाः	
	response against each item.		$3c_1 A B = D$	
	Example: A B 🔵 D		जर (C) हे योग्य उत्तर असेल तर.	
5.	Where (C) is the correct response. Your responses to the items for this	5.	या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे उत्तरपत्रिकेमध्येच	
υ.	paper are to be indicated on the		द्यावीतः उत्तराच्या रकान्यामध्ये (×) (3) (/) व	
	Answer Sheet only. Responses like (×)		अस्पष्टपणे काळे केलेले उत्तर ग्राह्य धरले जाणार	
	(3)(/) and light shaded responses will not be considered/evaluated.		नाही.	
6.	Read instructions given inside	6.	आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.	
7	carefully.	7.	कच्च्या कामासाठी प्रश्नपत्रिकेच्या शेवटी कोरे पान	
7.	One Sheet is attached at the end of the booklet for rough work.			
8.	You should return the test booklet and	8.	या पेपरची परीक्षा संपल्यानंतर प्रश्नपत्रिका व	
	carry any paper with you outside the		-	
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	answer sheet both to the invigilator at the end of the paper and should not carry any paper with you outside the	9.	यो पंपरेषो परोक्षो संपल्पानेतर प्रश्नपत्रिको उत्तरपत्रिका दोन्ही पर्यवेक्षकांना परत करावी. यातीत कोणताही कागद तुमच्या बरोबर परीक्षा केंद्राबाहे नेण्यास सक्त मनाई आहे. प्रश्नपत्रिकेवर दर्शविलेली उत्तरे तपासली जाणा नाहीत.	