M.Sc. Molecular Human Genetics.

Set No. 1 **Question Booklet No.**

16P/288/5

(To be filled up by the candidate by blue/black ball-point pen)

Roll No. | | | | | | | | | | |

Code N. (490)

Serial No. of OMR Answer Sheet .....

Day and Date ..... (2016)

..... **(Signature of Invigilator)**

INSTRUCTIONS TO CANDIDATES

(Use only ***blue/black ball-point pen*** in the space above and on both sides of the Answer Sheet)

1. Within 30 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall ***except the Admit Card without its envelope.***
3. ***A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.***
4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.
5. ***On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.***
6. ***No overwriting is allowed in the entries of Roll No., Question Booklet no. and Set no. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.***
7. ***Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfairmeans.***
8. ***Each question in this Booklet is followed by four alternative answers. For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.***
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).*
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit only **OMR *Answer Sheet*** at the end of the Test.
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 40

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण पृष्ठ पर दिये गए हैं।]

ROUGH WORK

रफ़ कार्य

16P/288/5

No. of Questions : 150

Time : 2 Hours ***Full Marks : 450***

Note : (1) Attempt as many questions as you can. Each question carries **3 (Three)** marks. ***One mark will be deducted for each incorrect answer.*** **Zero** mark will be awarded for each unattempted question.

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

01. Heat is added to a substance, but its temperature does not increase. Which one of the following statements provides the best explanation for this observation ?

(1) The substance has unusual thermal properties.

(2) The substance must be cooler than its environment.

(3) The substance must be a gas.

(4) The substance undergoes a change of phase.

02. Consider the substances aluminium, copper, steel and wood all at room temperature . Which one would feel the coolest if held in your hand (which is at a temperature above room temperature) ?

(1) Aluminium

(2) Copper

(3) Steel

(4) Wood

03. The temperature of water at the surface of a deep lake is 2^0 C. The temperature expected at the bottom is :

(1) 0^0 C (2) 2^0 C (3) 4^0 C (4) 6^0 C

04. A metal sheet with a circular hole is heated, the hole :

(1) Gets larger (2) Gets smaller

(3) Remains of the same size (4) Gets deformed

05. Under which of the following circumstances does a real gas behave like an ideal gas ?

(1) The gas particles move very slowly

(2) The gas particles do not collide with each other very often

(3) The interaction between the gas particles is negligible

(4) The interaction between the gas particles and the walls of the container is negligible

06. Which of the following parameters is the same for molecules of all gases at a given temperature :

(1) Mass (2) Speed

(3) Momentum (4) Kinetic energy

07. Which one the following phrases best describes images formed by diverging lenses ?

(1) Always smaller than the object

(2) Always larger than object

(3) Always inverted

(4) Always virtual

08. An object is placed at the center of curvature of a concave spherical mirror. Which of the following description best describes the image produced in this situation ?

(1) Upright, larger, real (2) Inverted, same size, real

(3) Upright, larger, virtual (4) Inverted, smaller, real

09. A ball is held 1.5m in front of a plane mirror. How far is the image of the ball from the ball ?

(1) 0 m (2) 0.75 m (3) 1.5 m (4) 3.0 m

10. Ram walks directly towards a plane mirror at a speed of 0.25 m/s. Determine the speed of the image relative to him. :

(1) 0.13 m/s (2) 0.25 m/s (3) 0.50 m/s (4) 0.75 m/s

11. Which of the following properties show that is a transverse wave :

(1) Reflection (2) Interference

(3) Diffraction (4) Polarization

12. When light is refracted which of the following does not change :

(1) Amplitude (2) Intensity

(3) Frequency (4) Velocity

13. Which one of the following transitions between two energy states requires the largest energy to excite the electron ?

(1) from n =0 to n = 50 (2) from n =1 to n = 2

(3) from n =1 to n = 4 (4) from n =100 to n = 101

14. What happens to an atom when it emits a photon ?

(1) The mass of the atom increases

(2) The mass of the atom remains the same

(3) The mass of the atom decreases

(4) The mass of the atom temporarily becomes negative

15. A hydrogen atom is in state for which the principle quantum number is six and the magnetic quantum number is three. What are the possible values for the orbital quantum number ?

(1) 0 or 3 only (2) 3 or 5 only

(3) 4 or 6 only (4) 3,4 or 5 only

16. Electronegativity of Co, Co^{2+} and Co^{3+} varies as :

(1) $Co > Co^{2+} > Co^{3+}$ (2) $Co^{2+} > Co > Co^{3+}$

(3) $Co^{3+} > Co^{2+} > Co$ (4) $Co^{3+} > Co > Co^{2+}$

17. A linear molecule is :

(1) CO (2) NO (3) CO_2 (4) NO_2

18. The paramagnetic molecule is :

(1) N_2 (2) Li_2 (3) O_2 (4) F_2

19. $C\bar{N}$ poisoning is inhibited by :

(1) Injection of $NaNO_2$

(2) Injection of $NaNO_3$

(3) Drinking of an aqueous solution of $CuSO_4 . 5H_2O$

(4) Drinking of excess of H_2O

20. Geometry of trimethylamine is :

(1) Tetrahedral (2) Pyramidal

(3) Linear (4) V-shape

21. Wilson disease is caused by the toxicity of :

(1) Cobalt (2) Nickel

(3) Copper (4) Aluminium

22. Correct statement is :

(1) High Spin Fe (ii) is larger than low spin Fe (ii)

(2) High Spin Fe (ii) is smaller than low spin Fe (ii)

(3) Hemerythsin contains Cobalt

(4) Co (iii) is a potential nucleophile

23. 2, 4- dinitrophenyl hydrazine is used for the detection of :

(1) Aromatic amine (2) Nitro group

(3) Secondary alcohol (4) Keto group

24. The catalyst ZSM-5 is used as a catalyst in the preparation of :

(1) BenZene (2) Toluene

(3) P-Xylene (4) Trimethylamine

25. Cis and trans isomers can be detected by the use of technique like :

(1) IR (2) EPR

(3) Mössbauer (4) Paper Chromatography

26. Natural rubber contains :

(1) Propanol (2) Propene- 2

(3) Isoprene (4) Butene- 2

27. Perchlosic acid in H_2SO_4 behave as :

(1) Weak acid (2) Strong acid

(3) Weak base (4) Strong base

28. Itai - Itai disease was first detected in :

(1) Italy (2) Japan

(3) Africa (4) China

29. The concentration of ozone in atmosphere is reduced by its reaction with :

(1) CO (2) NO (3) CO_2 (4) O_2

30. Over all order of a reaction of type V = K[A] [B] is :

(1) Zero (2) 1 (3) 2 (4) ∞

31. Miller and Lirey in their experiment took :

(1) H_2 and CH_4 (2) CH_4 and H_2O

(3) CH_3 and H_2O (4) H_2, CH_4, NH_3 and H_2O

32. The first macro molecules to appear during prebiotic molecular evolution were :

(1) Fats (2) Proteins

(3) Carbohydrates (4) Amino Acids

33. Mucopeptide present in bacterial cell wall is a polymer made up of alternating units of NAG and NAM joined by :

(1) α , 1-4 linkages (2) α , 1-6 linkages

(3) β, 1-4 linkages (4) β, 1-6 linkages

34. Mesosomes in bacteria act as a :

(1) Mitochondria

(2) Endospore

(3) Initiator in DNA replication and septum formation

(4) Sporangia

35. Which of the following are wall-len microbes ?

(1) *Chlorella and E coli* (2) *Aphanothece and Bacillus*

(3) *Dunaliella and Mycoplasma* (4) *Dunaliella and Caulobacter*

36. Single stranded DNA is present in :

(1) TMV (2) Reoviruses

(3) λ Phage (4) $\phi \times 174$

37. Which of the following is thought to serve as mobile carriers to connect the two photosystems in photosynthesis ?

(1) Fd (2) Cyt b 6 f complex

(3) FNR (4) PC

38. Which of the following pigment is referred as 'vegetable chameleon' :

(1) Chlorophyll (2) Carotene

(3) Anthocyanin (4) Xanthophyll

39. Oxygen from water is evolved at PSII due to change in oxidation states of :

(1) Fe (2) Mg (3) Mn (4) Cu

40. Which of the following ratio for chlorophyll and Carotenoid, indicated shade plants :

(1) 2.5 (2) 5.5 (3) 1.4 (4) 4.8

41. 'Kranz anatomy' is characteristic feature of :

(1) Sugercane (2) Papaya

(3) Tomato (4) Polato

42. The net gain of energy from one gram mole glucose during aerobic respiration is :

(1) 36 ATP (2) 38 ATP (3) 40 ATP (4) 35 ATP

43. Germinating plant seeds will have RQ as :

(1) Infinity (2) Zero

(3) More than one (4) Less than on

44. Which of the following are Coenzymes ?

(1) NAD, NADP, FAD, FMN (2) Vitamins, Iron, Copper

(3) NAD, Potasium, COA (4) $NADPH_2$, Calcium, Cobalt

45. Which of the following is highest N_2-fixer ?

(1) *Azospirillum* (2) *Nostoc*

(3) *Rhizobium* (4) *Azotobacter*

46. Which of the following combinations of phylum and description is incorrect ?

(1) Echinodermata-bilateral symmetry as a larva, coelom present

(2) Nematoda-roundworms, pseudocoelomate

(3) Cnidaria-radial symmetry, polyp and medusa body forms

(4) Platyhelmithes-flatworms, coelom present

47. Acoelomates are characterized by :

(1) The asbsence of a brain

(2) The asbsence of mesoderm

(3) A coelom that is not completely lined with mesoderm

(4) A solid body without a cavity surrounding internal organs

48. Which of the following characteristics is probably most responsible for the great diversification of insects on land ?

(1) Segmentation

(2) Antennae

(3) Exoskeleton

(4) Bilateral symmetry

49. Planarians have extra power of regeneration due to the presence of :

(1) Parechyma

(2) Rhabdites

(3) Neoblasts

(4) Interstitial cells

50. Mammals and living birds share all of the following characteristics except :

(1) Endothermy

(2) Descent from a common amniotic ancestor

(3) A dorsal, hollow nerve cord

(4) An archosaur common ancestor

51. Unlike eutherians, both monotremes and marsupials :

(1) Lack nipples

(2) Have some embryonic development outside the mother's uterus

(3) Lay eggs

(4) Are found in Australia and Africa

52. Which of the following is **not** an observation or inference on which natural selection is based ?

(1) There is heritable variation among individuals

(2) Poorly adapted individuals never produce offspring

(3) Species produce more offspring than the environment can support

(4) Individuals whose characteristics are best suited to the environment generally leave more offspring than those whose characteristics are less suited

53. DNA sequence in many human genes are very similar to the sequences of corresponding genes in chimpanzees. The most likely explanation for this result is that :

(1) Humans and chimpanzees share a relatively recent common ancestor

(2) Human evolved from chimpanzees

(3) Chimpanzees evolved from humans

(4) Convergent evolution led to the DNA similarities

54. *Dryopithecus africanus* lived about :

(1) 5-10 million (2) 10-15 million

(3) 15-20 million (4) 20-25 million

55. Able or skilful man ; The tool maker or Handy man are *the* names gives to :

(1) *Homo habilis*

(2) *Homo erectus*

(3) *Homo sapiens neanderthalenesis*

(4) *Homo sapiens fossilis*

56. Peaks of LH and FSH production occur during :

(1) The beginning of the follicular phase of the ovarian cycle

(2) The period just before ovulation

(3) The end of the luteal phase of the ovarian cycle

(4) The secretory phase of the menstrual cycle

57. For which of the following is the number the same in spermatogenesis and oogenesis ?

(1) Functional gametes produced by meiosis

(2) Meiotic divisions required to produce each gamete

(3) Gametes produced in a given time period

(4) Different cell types produced by meiosis

58. During human gestation, rudiments of all organs develop :

(1) In the first trimester

(2) In the second trimester

(3) In the third trimester

(4) During the blastocyst stage

59. The cortical reaction of sea urchin eggs functions directly in :

(1) The formation of a fertilization envelope

(2) The production of a fast block to polyspermy

(3) The release of hydrolytic enzymes from the sperm

(4) The fusion of egg and sperm nuclei

60. In the early development of an amphibian embryo, Spemann's "organizer" is located in the :

(1) Neural tube

(2) Notochord

(3) Archenteron roof

(4) Dorsal lip of the blastopore

61. Colchicines treated cells are arrested in which stage :

(1) S phase

(2) Prophase

(3) Metaphase

(4) G1 phase

62. Which of the following statement is **not** true ?

(1) The ratio of T to A in double-stranded DNA is 1:1

(2) The ratio of T in double-stranded DNA to U in single stranded RNA is 1:2

(3) The ratio of Uto A in single stranded RNA is 1:1

(4) The ratio of Gto C in double stranded DNA is 1:1

63. The action potential results from :

(1) Decrease in negative charge inside the nerve fibre

(2) Increase in positive charge outside the nerve fibre

(3) Opening of voltage gated sodium channels

(4) Activation of the sodium potassium pump

64. DNA polymerization requires the presence of template and a free 3'OH end, this end may be generated by :

(P) Synthesis of an RNA primer at the origin or at Okazaki fragment start points

(Q) Nicking one strand of duplex DNA followed by strand displacement

(R) By loop formation at the 3' end (self priming)

(S) Binding of a terminal nucleotide carring protein to the 3' end of templet

(1) P,Q,R,S

(2) R,S

(3) P,R

(4) P,Q

65. Movement of a DNA fragment from one site of the genome to another is called :

(1) Mutation
(2) Transposition
(3) Translocation
(4) Reversion

66. Mutation is the change in :

(1) Genetic drift
(2) Gene frequency
(3) Base pairs in the DNA
(4) None of them

67. Polymerisation rate of Taq polymerase is 1Kb per minute, if we want to amplify a gene of size 9000 bp. What should be the extension time for a single cycle PCR reation :

(1) 90 sec (2) 9 sec (3) 9 min (4) 90 min

68. Which one of the following statement regarding Ca^{2+} is correct ?

(1) The concentration of cytosolic Ca^{2+} is trasiently decreased by activation of phospholipase C.

(2) The effects of Ca^{2+} is most often mediated by calmodulin

(3) Intracellular Ca^{2+} is mostly free

(4) Intracellular concentration of Ca^{2+} is higher than that of the extracellular fluid

69. Which of the choices are true ?

(P) Kinesin walks from (-) end to the (+) end

(Q) Dynein walks from (+) end to the (-) end

(R) Kinesin walks on microtubles

(S) Dynein walks on microtubles

(1) P only
(2) P and Q
(3) P,Q,R and S
(4) Q and R

70. COP-I coated vesicle involved in :

(1) Anerograde transport
(2) Retrograde transport
(3) Transport from ER to golgi
(4) Uptake of extracellular materials

71. Receptor tyrosine kinases :

(P) Have a cytoplasmic kinase domain
(Q) Forms tetramer upon ligand binding
(R) Change conformation of their cytoplasmic domains upon ligand binding
(S) Catalystically active after the conformational change

(1) P and Q
(2) Q and R
(3) P,R and S
(4) P,Q,R and S

72. Which of the following does **not** occurs when cell enters M phase :

(1) Chromatin condenses

(2) Spindle is formed

(3) Histone H1 is dephoshorylated

(4) The nuclear envelop, the endoplasmic reticulum and the golgi break down

73. Crossing over at the time of meiosis I will cause :

(1) Independent assortment of gene

(2) Linkage between genes

(3) Recombination of linked genes

(4) Both independent assortment and recombination of genes present on non-homologue chromosome

74. Comparative genomic hybiridization is a technique to look for certain type of genetic changes in cancer cells by comparing the DNA from the cancer cells with that of corresponding normal cells. Which types of genetic changes are detected here ?

(1) Gene deletion and amplification

(2) Base mismatch

(3) Promoter methylation

(4) Loss of single base

75. The fact that DNA polymerase I from E. colihas a 5'-3' exonuclease activity :

(1) Implies that the enzyme has multiple subunits

(2) Makes the enzyme to able to detect thymine dimers in double stranded DNA

(3) Implies that DNA polymerase I can use both DNA and RNA as primers

(4) Enables the enzyme to play an important role in DNA replication

76. Mitochondrial DNA is replicated from :

(1) Two different ori sites in same direction

(2) A single ori site bidirectionally

(3) Two different ori sites at different times in opposite directions

(4) Many sites bidirectionally

77. Which of the following genome features increase as the complexity of an organism increase ?

(P) Genome size

(Q) Number of genes

(R) Density of genes in the genome

(S) Average size of individual genes

(1) P,Q

(2) P,S

(3) P,Q,S

(4) Q,R,S

78. Gene duplication :

(P) Has occurred many times in eukaryotic genomes

(Q) Critical for creating new genes

(R) Creates gene families

(S) Occurs only within gene cluster

(1) P,Q (2) P,S

(3) P,Q,S (4) P,Q,R

79. C-Bands are deeply stained chromosomal regions which represents :

(1) Euchromatin

(2) Constitutive heterochromatin

(3) Cytosine dominant region of chromosome

(4) Metaphase chromosome

80. Human genomic DNA is digested into fragments approximately 1Kb in size, denature and then renatured. Which of the following statement is true ?

(1) All fragment will renaturate at the same rate

(2) Fragments composed largely of repetitive DNA sequences will renature fastest

(3) Fragments composed largely of non- repetitive DNA sequences will renature fastest

(4) Fragments with high A: T content will renature fastest

81. The TATA box plays a key role in assembling active transcription complex by :

(1) Binding with TATA box-binding protein

(2) Binding with DNA protein

(3) Binding with RNA protein

(4) It does not bind with any protein

82. Histone acetylation increases transcription of gene because :

(1) It increases the DNA-histone interaction

(2) The acetyl groups on histones are recognized by RNA polymerase

(3) Histone acetylation loosens the DNA-histone complex, thereby making it more accessible to RNA polymerase

(4) Histone acetylation induces DNA bending which is recognized by RNA polymerase

83. Albinism is a recessive human trait. If a normal produces an albino child, what is the probability that their next child will be albino ?

(1) 1/4 (2) 1/8 (3) 1/16 (4) 1/64

84. Which of the following chromosomal changes is usually the most damaging when in the homozygous condition ?

(1) Deletion (2) Duplication

(3) Translocation (4) Inversion

85. Which is **not** a step in southern blotting procedure ?

(1) Ligation of the DNA into a vector

(2) Separation of the DNA fragments on a gel

(3) Transfer of the DNA fragments to a nitrocellulose membrane

(4) Hybridization of the membrane with labelled probe

86. The phenotypes ratio in F2 of a monohybrid cross is :

(1) 3:1 (2) 1:2:1 (3) 9:3:3:1 (4) 2:1

87. The monohybrid genotypic ratio 1:2:1 in F2 generation indicates :

(1) Segregation (2) Independent assortment

(3) Dominance (4) Incomplete dominance

88. The back cross is :

(1) A cross between F1 individual and F2 individual

(2) A cross between an F1 individual with another F1 individual

(3) Cross between F1 and one of the two parents

(4) Cross between F2 with one of the parents

89. A haploid set of all the genes parent in a gamete is called :

(1) Genotype (2) Phenotype

(3) Genome (4) Linkage group

90. A dominant trait is expressed in :

(1) Homozygous state only

(2) Heterozygous state only

(3) Neither homozygous nor heterzygous states

(4) Both homozygous and heterozygous states .

91. *Source of* Mendelian inheritance is :

(1) Linkage (2) Independent assortment

(3) Mutations (4) Dominant traits

92. Crossing over occurs during :

(1) Pachytene (2) Diplotene

(3) Diakinesis (4) Leptotene

93. Crossing over is more frequent in :

(1) Males (2) Females

(3) Both (4) None of these

94. Chromosome ends are called :

(1) Satellites (2) Telomeres

(3) Centromeres (4) Kinetochores

95. Chromatid is :

(1) One half of chromosome (2) Haploid chromosome

(3) Complete chromosome (4) Duplicate chromosome

96. A chromosome with sub-terminal centromere is :

(1) Acentric (2) Acrocentric

(3) Metacentric (4) Telocentric

97. A normal woman is married to a colour blind man. The children are expected to be :

(1) All normal

(2) 50% sons are colour blind

(3) All daughters are normal but carrier whereas all sons are normal phenotypically as well genotypically

(4) 50% daughters are colour blind

98. Klinefelter's syndrome is characterized by chromosome :

(1) 46 (2) 45 (3) 47 (4) 48

99. The sex chromosome complement of Turner's syndrome is :

(1) Normal female

(2) Normal male

(3) A female with rudimentary ovaries and underdeveloped breast

(4) A male with rudimentary testes and undeveloped penis

100. A supermale has a genetic constitution of :

(1) XY (2) XXY

(3) XXYY (4) XYY

101. Process of genetic mutation is :

(1) Reversible (2) Irreversible

(3) Partially reversible (4) Continuous

102. Which one can reverse the harmful effect of previous mutation ?

(1) Intergenic mutation (2) Intragenic mutation

(3) Suppressor mutation (4) Indirect suppression

103. Deletion of certain genes cause :

(1) Gene mutation (2) Chromosome mutation

(3) Gene modification (4) Aneuploidy

104. Genes for cytoplasmic male sterility in pants are located in :

(1) Chloroplast genome (2) Mitochondrial genome

(3) Nuclear genome (4) Cytosol

105. A mutation at a gene locus changes a character due to change in :

(1) DNA replication (2) Protein synthesis pattern

(3) RNA transcription pattern (4) Protein structure

106. Map distance of genes is calculated by :

(1) Number of mutant genes

(2) Cross over percentage

(3) Non-cross-over percentage

(4) Recombination frequency of each gene locus

107. Phenylketonuria is genetic disorder caused by a defect in metabolism of :

(1) Fatty acid
(2) Polysaccharides
(3) Amino acid
(4) Vitamins

108. Philadelphia chromosome occurs in patients suffering from :

(1) Leukemia
(2) Rickets
(3) Hepatitis
(4) Albinism

109. Linkage prevents :

(1) Homozygous condition
(2) Segregation of alleles
(3) Hybrid formation
(4) Heterozygous condition

110. Mendel did not observe linkage due to :

(1) Mutation
(2) Synapsis
(3) Crossing over
(4) Independents assortment

111. Histidine is often found at the active site of enzyme because :

(1) It has a cyclic group
(2) It can form hydrogen bonds
(3) It has pKa of 6.8
(4) It is an amino acid

112. Haemoglobin and Myoglobin both have all of the following characteristics except :

(1) Consists of subunits designed to provide hydrogen bond and non polar interactions with other subunits

(2) Highly alpha helical

(3) Blind one molecules of heme per globulin molecule

(4) Bind heme in a hydrophobic pocket

113. DNA molecules contains a lysine residue that is important for binding to DNA. Mutations were found that converted this lysine to either glutamate, glycine, valine, or arginine. Which mutations would be predicted to be the most and least harmful to the ability of the enzyme to bind DNA :

	MOST	LEAST
(1)	Glycine	Arginine
(2)	Arginine	Glycine
(3)	Glutamate	Valine
(4)	Glutamate	Arginine

114. According to the RNA- World theory :

(1) RNA molecules were the first organic molecules formed on earth

(2) Life evolved on another planet called the RNA- World

(3) All RNA molecules in cell are 'ribozymes'

(4) Primitive RNA molecules are evolved before protein and DNA

115. A structural characteristic common to lipids which allow them to function as a good energy source is :

(1) They are all hydrophobic

(2) They are all hydrophilic

(3) They have large numbers of Carbon- Phosphorus bonds

(4) They have large numbers of Carbon - Carbon bonds

116. The beta oxidation of molecules of palmitic acid :

(1) Yields 8 molecules of Acetyl CoA

(2) Yields 16 molecules of Acetyl CoA only

(3) Yields Carbon dioxide and water only

(4) Does not involve oxygen

117. Which of the following is **not** correct about fatty acid degradation and biosynthesis ?

	Degradation	**Biosynthesis**
(1) Location of pathway in cell	mitochondrion	Cytosol
(2) Electron acceptor or donor used	FAD, NAD+	NADPH
(3) Participation of CO_2	No	Yes
(4) Carrier of intermediate acyl groups	ACP-$(SH)_2$	CoA-SH

118. Thermogenin, the natural uncoupler in brown fat mitochondria, generates heat based on its ability to :

(1) Inhibit electron transport by binding to b-type cytochromes

(2) Allow protons to re-enter into the mitochondrial matrix

(3) Inhibit ATP production by binding to the ATP synthase

(4) Block electron transport by flavoproteins

119. Choose the mismatch

	INHIBITOR	**FUNCTION**
(1)	Malonate	prevent oxidation of succinate
(2)	Cyanide	inhibits Cytochrome oxidase
(3)	Oligomycin	inhibit ATP synthase
(4)	Rotenone	blocks CoQ-cyt c oxidoreductase

120. What happens in Uncompetitive inhibition :

(1) Vmax remains constant and Km increases

(2) Vmax decreases and Km remains constant

(3) Both Vmax and Km increases

(4) Apparent Vmax and Km both decreases

121. Lysine is an amino acid with three ionizable groups. These are the α-COOH, 2 α -amino and ε- amino groups with pKa values of 2.2, 9.2 and 10.8 respectively. The isoelectric point (pI) for lysine is :

(1) 5.7 (2) 6.5 (3) 9.2 (4) 10.0

122. The production of ATP from ADP, without involving oxidation of NADH, is called :

(1) Oxidative phosphorylation

(2) Electron transport reaction

(3) Substrate level phosphorylation

(4) β-oxidation

123. In photosynthesis primary photochemistry and charge separation takes place at :

(1) Electron transport chain

(2) Photosystem I

(3) Photosystem II

(4) Photosystem I and II both

124. Beside nucleus, DNA is also present in :

(1) Ribosomes

(2) Lysosomes

(3) Mitochondria

(4) Golgi Complex

125. CpG Island is usually found in the :

(1) Promoter region of eukaryotic genes

(2) Exons of eukaryotic genes

(3) Promoter region of prokaryotic genes

(4) Plasmids

126. Under the anaerobic condition pyruvate is converted into which one of the following products ?

(1) Acetyl CoA
(2) Lactate
(3) Phosphoglycerate
(4) Citric acid

127. Deamination of adenine leads to the formation of :

(1) Xanthine
(2) Hypoxanthine
(3) Uracil
(4) Cytocine

128. The primer of lagging strand during DNA replication is removed by :

(1) DNA primase
(2) 3' to 5' exonuclease activity of pol III
(3) 5' to 3' exonuclease activity of DNA pol I
(4) 3' to 5' exonuclease activity of DNA

129. Which of the following is commom to both *E.coli* and eukaryotic chromosomes ?

(1) DNA is circular
(2) DNA is contained in the supercoiled
(3) DNA is contained in the nucleus
(4) DNA is packaged into the nucleosomes

130. Which of the following is a cofactor :

(1) NAD
(2) NADP
(3) Mg^{++}
(4) All of the above

131. In C_4 plants, phosphenol pyruvate carboxylase is located in :

(1) Cytosol
(2) Chloroplast
(3) Peroxisome
(4) Mitochondria

132. Which of the following lipoproteins is termed 'good' cholesterol ?

(1) HDL
(2) Triglycerides
(3) LDL
(4) VLDL

133. The 3' end of each Okazaki fragment is joined to the 5' end of the next fragment by :

(1) DNA repair enzymes
(2) RNA polymerase
(3) Helicase
(4) DNA ligase

134. Which of the following does **not** happens during hnRNA processing ?

(1) Ribosomes bind and begin translation
(2) A poly A tail is added
(3) A 7-methylguanosine cap is added to the 5' end of the RNA
(4) Introns are spliced out

135. The wobble hypothesis states that :

(1) There are too many tRNAs present to account for the number of amino acids

(2) tRNAs wobble when attached to an mRNA

(3) Several mRNA codons may pair with a single transfer RNA

(4) an mRNA codon may pair with more than one transfer RNA

136. The genetically modified crop known as 'golden rice' contains genes for biosynthesis of :

(1) riboflavin

(2) nicotinamide

(3) vitamin A

(4) β - carotene

137. Discovery of Interference RNA fetched Nobel prize of 2006 in 'Physiology or Medicine' to :

(1) Khorana & Watson

(2) Doherty & Zinkernagel

(3) Yonath & Ramakrishnan

(4) Fire & Mello

138. Recombination activating genes 1&2 are exclusively expressed in :

(1) Macrophages

(2) Dendritic cells

(3) Lymphocytes

(4) Eosinophils

139. Hematopoietic stem cells are :

(1) Mutipotent
(2) Unipotent
(3) Pluripotent
(4) Totipotent

140. Gene therapy for ' Bubble baby disease' in children involves :

(1) Terminal deoxynucleotidyl transferase
(2) Plasminogen activator
(3) Adenosine deaminase
(4) Factor VII

141. The 2012 Noble prize in Physiology or medicine for study of induced stem cells was awarded to :

(1) Yamanaka & Gurdon
(2) Tonegawa & Hozumi
(3) Brenner, Horvitz & Sulston
(4) Hershko & Ciechanover

142. RNAi was first discovered in :

(1) *Coenorhabditis elegans*
(2) *Bacillius thuringiensis*
(3) *Azospirillum braziliense*
(4) *Escherichia Coli*

143. Following cells are used as fusion partner for hybridoma technology :

(1) SP2O (2) K562 (3) Jurkat (4) U937

144. Following worker demonstrated that Immunoglobulin genes undergo rearrangement :

(1) E. Metchnikoff (2) J. Bordet

(3) S. Tonegawa (4) N. Jerne

145. *Sulfolobus acidocaldarius* is employed in metal extraction because it :

(1) *Oxidizes Copper* (2) *Oxidizes Sulphur and Iron*

(3) *Oxidizes Uranium* (4) *Oxidizes Molybdenum*

146. Sigma factor is released from bacterial RNA polymerase after adding about :

(1) 100 nucleotides (2) 50 nucleotides

(3) 10 nucleotides (4) 5 nucleotides

147. Nicks in DNA strands can be sealed by :

(1) Alkaline phosphatase (2) RNase

(3) Taq DNA polymerase (4) Ligase

148. Which one of the following lacks 3' → 5' exonuclease activity :

(1) RNA polymerase (2) DNA polymerase I

(3) DNA polymerase III (4) Klenow enzyme

149. The first basal transcription factor to bind to TATA box is :

(1) TF II E (2) TF II F (3) TF II D (4) TF II B

150. Cernunnos is a :

(1) Non- homologous end-joining factor

(2) Nuclease

(3) Ligase

(4) Polymerase

ROUGH WORK
रफ़ कार्य

ROUGH WORK
रफ़ कार्य

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 30 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में ***लिफाफा रहित प्रवेश-पत्र के अतिरिक्त,*** लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. *उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।*
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. *उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।*
6. *ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।*
7. *उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।*
8. *प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।*
9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. *ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।*
11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल **ओ एम आर उत्तर-पत्र** परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।