

Mse Molecular Human Genetics

15P/288/5

Question Booklet No. 490/79....

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

Roll No.

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Roll No.

(Write the digits in words)

Serial No. of OMR Answer Sheet

Day and Date

(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 10 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 also 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 unfair means.
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 ball-point 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 mark).*
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 the 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.

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

[No. of Printed Pages : 32+2]

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No. of Questions/प्रश्नों की संख्या : 150

Time/समय : 2 Hours/घण्टे

Full Marks/पूर्णांक : 450

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

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न 3 अंक का है। प्रत्येक गलत उत्तर के लिए एक अंक काटा जाएगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

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

यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

1. The total random kinetic energy of one gram of nitrogen at 300 K is

- (1) 133.4 joule (2) 135.6 joule
(3) 234.7 joule (4) 2.34 joule

1)

1

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2. Which of the following particles is responsible for carrying away the missing energy and momentum in a nuclear decay process?
- (1) Alpha-particle (2) Neutrino
(3) Lepton (4) Proton
3. Solar cell works on the principle of
- (1) laser technology (2) photo-conduction
(3) thermal emission (4) Tyndall effect
4. The force between two long parallel conductors is inversely proportional to
- (1) radius of conductors
(2) product of current in two conductors
(3) distance between the conductors
(4) length of conductors
5. The ground state energy of a harmonic oscillator is
- (1) $E = h\omega$ (2) $E = \frac{h\omega}{2}$ (3) $E = (2/3) h\omega$ (4) $E = \frac{h\omega}{4}$
6. In laser production the state in which more atoms are in the upper state than in the lower one is called
- (1) metal stable state (2) normal state
(3) inverted population (4) excited state

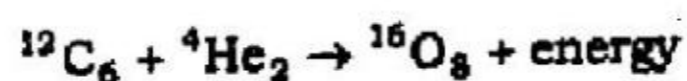
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7. A temperature difference of 5 K is equal to

- (1) a difference of 7.6 on the Celsius scale
- (2) a difference of 9.0 on the Fahrenheit scale
- (3) a difference of 2.8 on the Rankine scale
- (4) a difference of 6.5 on the Fahrenheit scale

8. The following equation is an example of which type of nuclear reaction?



- (1) Fusion
- (2) α -decay
- (3) Fission
- (4) β -decay

9. Out of the following pairs, choose the pair in which the physical quantities do not have identical dimension?

- (1) Pressure and Young's modulus
- (2) Planck's constant and angular momentum
- (3) Impulse and moment of force
- (4) Force and rate of change of linear momentum

10. The LED is usually made of materials like

- (1) GaAs
- (2) C and Si
- (3) GeAs
- (4) GeAr

11. Of the following natural phenomena, which one is known in Sanskrit as 'deer's thirst'?

- (1) Rainbow
- (2) Earthshine
- (3) Halo
- (4) Mirage

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12. Pyrometer works based on which of the following processes?
(1) Laser technology (2) Photo-conduction
(3) Thermal emission (4) Tyndall effect
13. Optical fibre operates on the principle of
(1) total internal reflection (2) Compton effect
(3) photoelectric effect (4) laser technology
14. Two thin lenses of power + 5 D and -2 D are placed in contact with each other. Focal length of the combination is
(1) + 3 m (2) - 3 m (3) 0.33 m (4) - 0.33 m
15. Which type of lens is used in a simple microscope?
(1) Biconvex (2) Biconcave (3) Plano convex (4) Cylindrical
16. Shape of molecules arises due to
(1) electrostatic force
(2) directional nature of covalent bond
(3) metallic bond
(4) hydrogen bond
17. Which of the following has T-shape?
(1) BF_3 (2) NF_3 (3) BrF_3 (4) PF_3

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- Shape of a molecule is explained by
- (1) molecular orbital theory (2) crystal field theory
(3) ligand field theory (4) VSEPR theory
- Boiling point decreases in the following order
- (1) $H_2O > H_2S > H_2Se > H_2Te$ (2) $H_2Te > H_2O > H_2Se > H_2S$
(3) $H_2Se > H_2Te > H_2S > H_2O$ (4) $H_2S > H_2Se > H_2O > H_2Te$
- In water molecule, oxygen has hybridization
- (1) sp^2 (2) sp^3 (3) dsp^2 (4) dsp^3
- Clathrate compounds involve
- (1) hydrogen bonding (2) electrostatic forces
(3) weak forces (4) covalent forces
- Eriochrome black-T is
- (1) metal indicator
(2) redox indicator
(3) acid-base indicator
(4) conductometric titration indicator
- Dimethyl oxime is used for gravimetric determination of
- (1) Al (2) Ni (3) Ga (4) Fe

1)

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24. Which is not true for a precipitate to be used as gravimetric determination?

- (1) Stability and composition should not change with temperature
- (2) Stability and composition should not change with concentration
- (3) Stability and composition should not change with solvent
- (4) Stability and composition should change with temperature

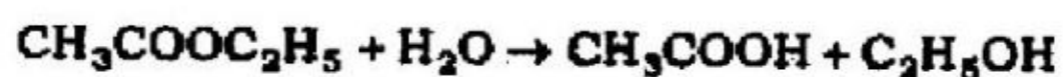
25. Which is not true for colorimetric determination?

- (1) Solution should have colour
- (2) Solution should follow Lambert-Beer law
- (3) A particular wavelength of light should be used for measurement
- (4) Absorption is independent of concentration of the solution

26. Activation energy of a reaction is

- (1) the energy released during reaction
- (2) the energy evolved when activated complex is formed
- (3) minimum amount of energy needed to overcome the potential barrier
- (4) the energy needed to form one mole of the product

27. The molecularity of reaction



is 2. The order of reaction is

- (1) 0
- (2) 1
- (3) 2
- (4) 4

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8. For a reaction $2A + B \rightarrow C + D$, the concentration of B is kept constant and that of A is tripled. The rate of reaction
- (1) will increase nine times (2) will increase three times
(3) will decrease three times (4) cannot be predicted
9. Increase in the rate of reaction due to rise in temperature is due to
- (1) increase in collision frequency
(2) lowering of activation energy
(3) increase in number of effective collisions
(4) decrease in collision frequency
10. Which one does not influence the rate of reaction?
- (1) Nature of reactant (2) Concentration of reactant
(3) Temperature (4) Molecularity
11. The role of oxygen in respiration is to
- (1) promote Krebs' cycle (2) promote glycolysis
(3) act as last electron acceptor (4) oxidise organic food
12. *Nitrosomonas* and *Nitrobacter* interaction in the nitrogen cycle where *Nitrosomonas* oxidizes ammonium ions to nitrite and *Nitrobacter* oxidizes nitrite to nitrate is an example of
- (1) Protocooperation (2) Syntropism
(3) Commensalism (4) Mutualism

- 33.** Morphologically different forms of same organisms are known as
(1) ecad (2) ecotone (3) biome (4) population
- 34.** Which of the following bacteria are employed to reduce pollution of petroleum spillage?
(1) *Pseudomonas* sp. (2) *Mycoplasma* sp.
(3) *Escherichia coli* (4) *Azotobacter* sp.
- 35.** In grassland ecosystem, the pyramid of biomass is
(1) upright (2) inverted
(3) spindle shaped (4) None of these
- 36.** Term MAB stands for
(1) Man and biotic community (2) Man and biosphere
(3) Man, antibiotics and bacteria (4) Mayer, Anderson and Bisby
- 37.** Species that occur in different geographical regions separated by special barrier are
(1) Allopatric (2) Sympatric
(3) Sibling (4) None of the above
- 38.** What name is given to conditions under which members of species live and breeds?
(1) Ecosystem (2) Habitat
(3) Niche (4) Carrying capacity

- The exchange pool in carbon cycle is
- (1) fossil fuels (2) sedimentary rocks
(3) the oceans (4) the atmosphere
- Bacteroids is a special form of bacteria involved in
- (1) photosynthesis (2) nitrogen fixation
(3) respiration (4) photorespiration
- No. of binding sites for O_2 molecules in a single leghaemoglobin molecule
- (1) 1 (2) 2 (3) 3 (4) 4
- Which of the following is not found in nitrogenase complex?
- (1) Iron (2) Molybdenum (3) Vanadium (4) Cobalt
- The percentage of alcohol in beverage is called
- (1) the proof (2) the alcohol percentage
(3) the alcohol concentration (4) the fermentation
- Study of enology deals with
- (1) probiotics (2) cheese production
(3) wine production (4) antibiotic production

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45. In industrial production of streptomycin the secondary metabolite or by product is
(1) vitamin 12 (2) vitamin C (3) vitamin 6 (4) ethanol
46. Radial symmetry is best seen in
(1) sponge (2) Mollusca (3) starfish (4) fishes
47. During digestion in protozoans, the medium is first
(1) acidic (2) basic (3) neutral (4) highly basic
48. Alternation of generation in Obelia is termed as
(1) Metamerism (2) Metamorphosis
(3) Metagenesis (4) Dimorphism
49. Planarians have extra power of regeneration due to the presence of
(1) Parenchyma (2) Rhabdites
(3) Neoblast cells (4) Interstitial cells
50. The excretory product in an insect is
(1) guanine (2) ammonia (3) urea (4) uric acid
51. Notochord is rod like and persistent throughout life in
(1) Hemichordates (2) Urochordates
(3) Cephalochordates (4) Echinoderms

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1. Tail in cyclostomes is
 (1) homocercal (2) heterocercal (3) hypocercal (4) diphyccercal
1. The accessory respiratory organ in lung fishes is
 (1) gills (2) swim bladder
 (3) lung (4) urinary bladder
4. Neoteny refers to
 (1) retention of rudimentary organs
 (2) metamorphosis
 (3) retention of larval characters in adults
 (4) degeneration of larval characters in adults
5. In birds, the last 3 to 4 tail vertebrae are fused to form
 (1) Furcula (2) Pygostyle (3) Synsacrum (4) Keel
6. Ovulated eggs of mammals are arrested at
 (1) metaphase-I stage (2) metaphase-II stage
 (3) diplotene stage (4) pachytene stage
7. Spermiogenesis in mammals result in the formation of
 (1) spermatid (2) spermatozoa
 (3) spermatogonia (4) spermatocyte

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58. In oogenesis, how many polar bodies are formed at the end of meiosis?
(1) 2 (2) 3 (3) 4 (4) 1
59. In the testes, androgens are produced by
(1) Sertoli cells (2) interstitial cells
(3) spermatocytes (4) sperm mother cells
60. Ability of spermatozoa to fertilize the ovum is called as
(1) acrosome reaction (2) fertilization
(3) capacitation (4) egg activation
61. In most cases protein kinases
(1) hydrolyze proteins (2) polymerize amino acids
(3) remove amino acids (4) add phosphate groups to proteins
62. The histone protein that joins with H2A, H3, H4 to form one tetramer unit of nucleosome is
(1) H2A (2) H2B (3) H1 (4) H3
63. Which of the following correctly matches an organelle with its function?
(1) Mitochondrion—Photosynthesis
(2) Nucleus—Cellular respiration
(3) Ribosome—Manufacture of lipids
(4) Central vacuole—Storage

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The enzyme that catalyzes the synthesis of DNA

- (1) endonuclease (2) gyrase
(3) helicase (4) DNA polymerase

Gap junctions are constructed of

- (1) connexin (2) GAPs (3) cadherin (4) integrin

An enzyme that relieves strain while double-strand DNA is being unwound

- (1) DNA helicase (2) DNA ligase
(3) DNA gyrase (4) DNA polymerase

Meselson-Stahl experiment in 1958 provides evidence for

- (1) continuous DNA synthesis
(2) discontinuous DNA synthesis
(3) conservative DNA synthesis
(4) semiconservative DNA synthesis

The discovery of Okazaki fragments suggested that DNA synthesis is

- (1) discontinuous (2) continuous
(3) semiconservative (4) All of the above

Cyclic AMP is formed from ATP by

- (1) adenylyl cyclase (2) cAMP phosphodiesterase
(3) guanylyl cyclase (4) protein kinase A

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- 70.** DNA replication takes place in
- | | |
|--------------------------------|--------------------------------|
| (1) M-phase of the cell cycle | (2) S-phase of the cell cycle |
| (3) G1-phase of the cell cycle | (4) G2-phase of the cell cycle |
- 71.** Leydig cells are found in
- | | |
|------------|----------------------|
| (1) liver | (2) testis |
| (3) kidney | (4) ovarian follicle |
- 72.** Estrogens are secreted by
- | | |
|---------------|-------------------|
| (1) pituitary | (2) corpus luteum |
| (3) testis | (4) thyroid |
- 73.** The single most abundant protein in animal tissues is
- | | | | |
|--------------|-----------|-----------------|--------------|
| (1) collagen | (2) talin | (3) fibronectin | (4) vinculin |
|--------------|-----------|-----------------|--------------|
- 74.** Which eukaryotic polymerase transcribe mRNA?
- | | |
|------------------------|-----------------------|
| (1) RNA polymerase I | (2) RNA polymerase II |
| (3) RNA polymerase III | (4) DNA polymerase I |
- 75.** Which one of the following modifications leads to protein degradation?
- | | |
|---------------------|------------------------|
| (1) Methylation | (2) Acetylation |
| (3) Phosphorylation | (4) Polyubiquitination |

80. C-value paradox tells us about

- (1) colinearity between genome size and complexity of organism
- (2) non-colinearity between genome size and complexity of organism
- (3) dosage compensation
- (4) number of chromosome

81. Dosage compensation of sex chromosome in human is brought about by

- (1) inactivity of one X-chromosome in females
- (2) hyperactivity of single X-chromosome in males
- (3) hypoactivity of both X-chromosome in females
- (4) hyperactivity of autosomes in females

82. Protein translation occurs in

- (1) nucleus
- (2) mitochondria
- (3) cytoplasm
- (4) None of the above

83. The function of peroxisome is

- (1) lipid biosynthesis
- (2) protein degradation
- (3) storage of starch
- (4) removal of free radical

84. The function of lysosome is

- (1) lipid biosynthesis
- (2) protein degradation
- (3) storage of starch
- (4) removal of free radical

What locks all transmembrane proteins in the bilayer?

- (1) Covalent bonds (2) Hydrophilic interactions
 (3) Hydrophobic interactions (4) None of the above

Variant phenotypes inherited only maternally are due to mutations in the DNA of

- (1) mitochondria (2) autosomes
 (3) X-chromosome (4) Y-chromosome

The maximum percentage of recombinant offspring can be

- (1) 25% (2) 50% (3) 75% (4) 100%

During eukaryotic recombination, the pairing of the homologous DNAs and strand invasion are catalyzed by

- (1) Rad51 and Dcm1 (2) RecA protein
 (3) Rad52 and Rad59 (4) MRX protein

During recombination, chi sites control the activities of

- (1) RuvAB complex (2) RuvC
 (3) RecBCD (4) DNA polymerases

Karyotype of a patient of Turner syndrome is written as

- (1) 45,X (2) 47,XXY (3) 47,XXX (4) 47,XYY

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91. Epicanthal folds is one of the characteristics of
- (1) Edward syndrome (2) Klinefelter syndrome
(3) Patau syndrome (4) Down syndrome
92. Patients of Cri-du-chat syndrome have aneuploidy of chromosomal arm
- (1) 13q (2) 5p (3) 21q (4) 7p
93. C-banding of human chromosomes specifically reveals
- (1) polymorphism of constitutive heterochromatin of chromosomes 1, 9, 16 and Y
(2) polymorphism of constitutive heterochromatin of chromosomes 3, 7, 12 and X
(3) polymorphism of facultative heterochromatin of chromosome X
(4) all the highly repetitive sequences
94. Dark bands of the G banded human chromosomes represent
- (1) euchromatin (2) heterochromatin
(3) high copy number repeats (4) low copy number repeats
95. The first chromosome banding technique described was
- (1) DA-DAPI banding (2) R banding
(3) G banding (4) Q banding

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The smallest human chromosome on the basis genomic size (in base pairs) is

- (1) chromosome 20
- (2) chromosome 21
- (3) chromosome 22
- (4) Y chromosome

Pleiotropy means

- (1) one gene can affect more than one trait
- (2) one trait can be affected by more than one genes
- (3) one trait can only be affected by one gene
- (4) two closely linked genes affect one trait

Extranuclear inheritance occurs due to

- (1) chromosomes that may become detached from the spindle during meiosis
- (2) chromosomes that may become detached from the spindle during mitosis
- (3) genetic material that is found in chloroplasts and mitochondria
- (4) mutations that disrupt the integrity of the nuclear membrane

Nonsense mutation is

- (1) mutation that results in codon change that do not alter the amino acid
- (2) mutation that results in a changed amino acid
- (3) mutation that results in truncated protein
- (4) mutation that results in gain of function of a protein

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- 100.** Some human diseases are caused by mutations in mitochondrial genes. Which of the following statements is false?
- (1) Mitochondrial diseases usually follow a maternal inheritance pattern
 - (2) Mutations associated with mitochondrial diseases often affect cells with a high demand for ATP
 - (3) The symptoms associated with mitochondrial diseases tend to improve with age
 - (4) Heteroplasmy plays a key role in the severity of disease symptoms
- 101.** Leber Hereditary Optic Neuropathy (LHON) occurs due
- (1) a mutation in one of several mitochondrial genes that encode respiratory chain proteins
 - (2) a mutation in the ATPase6 gene
 - (3) a mutation in a gene that encodes a tRNA for leucine
 - (4) a mutation in a gene that encodes a tRNA for lysine
- 102.** Fragile-X syndrome the consequence of
- (1) deletion of FMR1 gene on q arm of X chromosome
 - (2) tri-nucleotide repeat expansion of 5'-untranslated region of FMR1 gene
 - (3) tri-nucleotide repeat expansion of 3'-untranslated region of FMR1 gene
 - (4) tri-nucleotide repeat expansion of coding region of FMR1 gene
- 103.** Fraction of the total human genome consisting of coding sequences is
- (1) 1-2% (2) 5-10% (3) 10-20% (4) about 40%

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4. The current estimate for the total number of transcribed genes in the human genome is

- (1) about 100000
- (2) about 50000
- (3) about 30000
- (4) about 20000

5. Genetic linkage occurs because

- (1) genes that are on the same chromosome may affect the same trait
- (2) genes that are close together on the same chromosome tend to be transmitted together to offspring
- (3) genes that are on different chromosomes are independently assorted
- (4) genes that are on different chromosomes may affect the same trait

6. Recombination fraction is a measure of

- (1) genetic distance between two loci
- (2) physical distance between two genes
- (3) locus heterogeneity
- (4) epistasis

7. A single recombination event produces

- (1) four recombinant chromatids
- (2) one non-recombinant and three recombinant chromatids
- (3) two non-recombinant and two recombinant chromatids
- (4) three non-recombinant and one recombinant chromatids

108. Haplotype is

- (1) sets of alleles on the same chromosomal segment that tend to be transmitted as a block through a pedigree.
- (2) sets of alleles on the same chromosomal segment that are almost always assorted independently through a pedigree
- (3) sets of alleles on different chromosomes that are almost always assorted independently through a pedigree
- (4) haploid set of chromosomes

109. Pericentric inversion is

- (1) inversion of a chromosomal segment that does not include centromere
- (2) inversion of a chromosomal segment that includes centromere
- (3) fusion of two homologous chromosomes involving short arms where one is inverted resulting in one dicentric chromosome
- (4) fusion of two non-homologous chromosomes involving short arms where one is inverted resulting in one dicentric chromosome

110. micro-RNA is

- (1) fragmented mRNA that codes for incomplete protein
- (2) mRNA of micro-organisms
- (3) non-coding RNA that binds to tRNA
- (4) non-coding RNA that binds to complementary mRNA

1. If the egg white protein, ovalbumin, is denatured in a hard-boiled egg, then which of the following is least affected?
- (1) The primary structure of ovalbumin
 - (2) The secondary structure of ovalbumin
 - (3) The tertiary structure of ovalbumin
 - (4) The quaternary structure of ovalbumin
2. Enzyme having slightly different molecular structure but performing identical activity is
- (1) holoenzyme
 - (2) apoenzyme
 - (3) isoenzyme
 - (4) coenzyme
3. Catalytic efficiency of two enzymes can be compared by the
- (1) formation of the product
 - (2) K_m value
 - (3) molecular size of the enzyme
 - (4) pH of optimum value
4. Synthases belongs to which class of enzyme?
- (1) Ligases
 - (2) Transferases
 - (3) Epimerases
 - (4) Lyases
5. Election Commission number for alcohol dehydrogenases
- (1) 1.2.1.1
 - (2) 1.1.1.2
 - (3) 1.2.2.1
 - (4) 1.1.1.1



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- 116.** Which of the following compounds is responsible for coordinated regulation of glucose and glycogen metabolism?
- (1) NAD⁺ (2) Fructose 2,6-bisphosphate
(3) Acetyl-CoA (4) Fructose 1,6-bisphosphate
- 117.** The cells dependent solely on glucose as an energy source are
- (1) muscle cells (2) brain cells
(3) kidney cells (4) liver cells
- 118.** During vigorous exercise, pyruvate produce by glycolysis is converted to
- (1) acetate (2) lactate
(3) monosodium phosphate (4) pyruvic acid
- 119.** Saliva contains all of the following, *except*
- (1) hormones (2) amylase
(3) bacterial-killing enzymes (4) antibodies
- 120.** The conversion of pyruvate to oxaloacetate
- (1) requires biotin
(2) involves the fixation of carbon dioxide
(3) occurs in the mitochondria
(4) All of the above

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- Two major products of pentose phosphate pathway are
- (1) nicotinamide adenine dinucleotide and ribose 5-phosphate
 - (2) flavine adenine dinucleotide and glucose 5-phosphate
 - (3) FAD and CoA
 - (4) NADPH and NAD
2. A catabolic intermediate which stimulates phosphofructokinase would stimulate
- (1) gluconeogenesis
 - (2) glycolysis
 - (3) glycogen synthesis
 - (4) None of these
3. Pyruvate is initially converted to which of the following in the gluconeogenesis?
- (1) Glycerol
 - (2) Phosphoenolpyruvate
 - (3) Oxaloacetate
 - (4) Acetyl CoA
4. Citric acid accumulation would
- (1) stimulate phosphofructokinase activity
 - (2) stimulate fructose 1,6-diphosphatase activity
 - (3) inhibit phosphofructokinase activity
 - (4) Both (2) and (3)

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- 125.** Phosphofructokinase, the major flux-controlling enzyme of glycolysis is allosterically inhibited and activated respectively by
- | | |
|-----------------|---------------------|
| (1) ATP and PEP | (2) AMP and Pi |
| (3) ATP and ADP | (4) Citrate and ATP |
- 126.** In eukaryotes, fatty acid breakdown occurs in
- | | |
|--------------------------|---------------------------|
| (1) mitochondrial matrix | (2) cytosol |
| (3) cell membrane | (4) endoplasmic reticulum |
- 127.** How many ATPs are formed during complete oxidation of palmitate?
- | | | | |
|--------|--------|---------|---------|
| (1) 35 | (2) 96 | (3) 129 | (4) 131 |
|--------|--------|---------|---------|
- 128.** Membrane potential and the proton gradient
- (1) are both required to make ATP
 - (2) are sufficient, separately, to make ATP from ADP + Pi
 - (3) reinforce one another when respiratory inhibitors are present
 - (4) cancel one another when uncouplers are present
- 129.** Coenzyme Q is involved in electron transport as
- (1) directly to O₂
 - (2) a water-soluble electron donor
 - (3) covalently attached cytochrome cofactor
 - (4) a lipid-soluble electron carrier

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A purine with an amine (NH_2) group on the 6th carbon is

- (1) adenine (2) cytosine (3) thymine (4) guanine

The chromosomal DNA complexes with

- (1) three types of histone as H1, H2A and H4
(2) five types of histone as H1, H2A, H2B, H3 and H4
(3) four types of histone as H1, H2A, H3 and H4
(4) two types of histone as H1 and H4

If one cell has AT contents 40%, what will be the percentage of guanine residue?

- (1) 60%
(2) 15%
(3) 30%
(4) Guanine residue cannot be calculated

In protein synthesis in prokaryotes

- (1) the initiating amino acid is N-formyl methionine
(2) the initiating amino acid is methionine
(3) the initiating amino acid is phenyl alanine
(4) None of the above

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- 134.** The lac operon contains the z, y and structural genes
- (1) encoding beta-galactosidase, galactose permeases and thio-galactosidase transacetylase respectively
 - (2) encoding beta-galactosidase and galactose permeases
 - (3) encoding beta-galactosidase only
 - (4) None of the above
- 135.** In the presence of tryptophan in the cell, the repressor is
- (1) bound to tryptophan
 - (2) bound to DNA
 - (3) bound to both DNA and tryptophan
 - (4) bound to neither tryptophan nor DNA
- 136.** The mechanism of intake of DNA fragments from the surrounding medium by a cell is called
- (1) transformation
 - (2) transduction
 - (3) both (1) and (2)
 - (4) conjugation
- 137.** The DNA molecule to which the gene of insert is integrated for cloning is called
- (1) injector
 - (2) transformer
 - (3) vector
 - (4) None of these

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8. Which of the following is the most important discovery that leads to the development of recombinant DNA technology?

- (1) Discovery of double helix model by Watson and Crick
- (2) Discovery of DNA as genetic material
- (3) Discovery of restriction enzymes
- (4) All of these

9. Who discovered restriction enzymes?

- (1) Watson and Crick
- (2) Jacob and Monad
- (3) Nathan, Arber and Smith
- (4) Boyer and Cohen

10. Restriction enzymes capable of making internal cuts in a DNA molecule is called

- (1) restriction exonuclease
- (2) restriction endonuclease
- (3) both (1) and (2)
- (4) S1 nuclease

11. A cDNA version of a gene includes

- (1) sequence corresponding to exons
- (2) sequence corresponding to introns
- (3) sequence corresponding to introns and exons both
- (4) sequence corresponding to hnRNA

142. Match the following :

List-I

- (i) Restriction endonuclease
- (ii) DNA fingerprinting
- (iii) Polymerase chain reaction
- (iv) Monoclonal antibodies

List-II

- (p) Kary Mullis
- (q) Kohler and Milstein
- (r) Alec Jaffreys
- (s) Arber

(1) (i)-(s), (ii)-(r), (iii)-(p), (iv)-(q)

(2) (i)-(s), (ii)-(r), (iii)-(q), (iv)-(p)

(3) (i)-(q), (ii)-(r), (iii)-(p), (iv)-(s)

(4) (i)-(s), (ii)-(p), (iii)-(q), (iv)-(r)

143. Which of the following statements about a vector is correct?

- (1) All vectors are plasmids only
- (2) Plasmids, phages can be used as vectors
- (3) Fungi can also be used as vectors
- (4) Cyanobacteria can also be used as vectors

144. Which one of the following statements are not attributed to plasmids?

- (1) They are circular DNA molecule
- (2) They have antibiotic resistant genes
- (3) They have the ability of autonomous replication
- (4) They have DNA that is as long as chromosomal DNA

6. In restriction endonuclease EcoR1, 'E' stands for
- (1) Extraction
 - (2) the first letter of the genus in which it is present
 - (3) Endonuclease
 - (4) Exonuclease
7. Fruit juice or coconut milk is added to plant tissue culture media because
- (1) it is a source of micronutrients
 - (2) it is a source of macronutrients
 - (3) it is a source of growth regulators
 - (4) it helps in maintaining pH of the media
8. The bacterium used for gene transfer in plants is
- (1) *E. coli*
 - (2) Rhizobium
 - (3) *Azotobacter*
 - (4) Agrobacterium
9. Match the following :

List—I

- (i) Restriction endonucleases
- (ii) Ligases
- (iii) Probe
- (iv) Meristem culture

List—II

- (p) Small DNA segments used in DNA fingerprints
 - (q) Molecular scissors
 - (r) Virus free plants
 - (s) Molecular stichers
- (1) (i)-(q), (ii)-(s), (iii)-(p), (iv)-(r)
 - (2) (i)-(p), (ii)-(q), (iii)-(r), (iv)-(s)
 - (3) (i)-(q), (ii)-(s), (iii)-(r), (iv)-(p)
 - (4) (i)-(p), (ii)-(s), (iii)-(q), (iv)-(r)

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149. The Klenow fragment of *E. coli*, DNA polymerase I has

- (1) 5' to 3' exonuclease activity
- (2) 3' to 5' exonuclease activity
- (3) DNA ligation activity
- (4) phosphatase activity

150. A hybridoma is

- (1) a hybrid cell obtained by fusing a β -lymphocyte with a myeloma cell *in vitro*
- (2) a hybrid cell obtained by fusing a β -lymphocyte with a myeloma cell *in vivo*
- (3) a hybrid cell obtained by fusing 2 β -lymphocyte cells *in vitro*
- (4) a hybrid cell obtained by fusing any 2 body cells *in vitro*

अभ्यर्थियों के लिए निर्देश

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

1. प्रश्न पुस्तिका मिलने के 10 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, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ० एम० आर० पत्र सं० 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 लिये 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 लिये 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 सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ़ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ०एम०आर० 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।