

IM.Sc-Optometry & Vision Science
Entrance Examination- 2013

Hall Ticket Number

Time : 2 hours

Total marks: 75

Please read the following instructions carefully before answering.

Instructions

1. This booklet has (8) pages. Please check thoroughly for all the pages.
2. Enter the Hall ticket number on the first page of this booklet as well as on the OMR sheet.
3. There is negative marking. For each wrong answer 0.33 marks will be deducted.
4. There are two PARTS in the question paper – PART A (Question nos. 1-25. and PART B (Question nos. 26-75. In case of a tie, marks obtained in PART A will be considered for resolving the tie.
5. Calculators are not permitted

PART A

1. Cell biology means -
 - A. how molecules interact in cells
 - B. how tissues and organs of an individual organism function and interact
 - C. how cells function
 - D. how nucleus interact
2. Hepatitis is an inflammatory condition of:
A. Brain B. Liver C. Kidneys D. Heart
3. The function of tRNA is to
 - A. Transport of amino acids for protein synthesis
 - B. Carry codons to the ribosomes
 - C. Translate RNA
 - D. Transcribe the DNA code
4. Which of the metal below has the highest density?
A. Iron B. Calcium C. Silver D. Gold

5. The four main elements in the human body are
 A. sulphur, nitrogen, oxygen and hydrogen
 B. carbon, nitrogen, oxygen and hydrogen
 C. carbon, sulphur, nitrogen and hydrogen
 D. carbon, sulphur, oxygen and hydrogen
6. A "body continues to be in its state of rest or uniform motion in a straight line unless acted upon by a force" is a statement of :
 A. Newton's second law of motion B. Newton's law of gravitation
 C. Newton's law of friction D. Newton's first law of motion
7. The values of $\sin(\Delta x / x)$ and $1 / x$, when $x \rightarrow 0$:
 A. 1, 0 B. 1, 1 C. 0, ∞ D. 1, ∞
8. An object is placed 20 cm away from a curved surface of radius of curvature, $RC=10$ cm and refractive index, $RI=2.0$. If the RI of air is 1.0, then the image of the object will be formed at:
 A. 20 cm B. 40 cm C. -20 cm D. -40 cm
9. What is the speed of light of $\lambda = 550$ nm in a fused quartz of refractive index, $n=1.5$?
 A. 2×10^8 m/sec B. 3×10^8 m/sec C. 4×10^8 m/sec D. 5.5×10^8 m/sec
10. Three coplanar vectors are expressed with respect to a certain rectangular co-ordinate system of a given reference frame as: $a = 4i - j$, $b = -3i - 2j$ and $c = 2j$. The value of "r", which is the sum of these vectors is:
 A. $i + j$ B. $i - 2j$ C. $i - j$ D. $i + 2j$
11. The average translational kinetic energy per molecule in a gas at room temperature, $T = 300$ °K is:
 A. 2.7×10^{-21} J/molecule B. 6.21×10^{-21} J/molecule
 C. 3.1×10^{-21} J/molecule D. 4.14×10^{-21} J/molecule
12. The value of " γ " for monoatomic, diatomic and polyatomic gases are:
 A. 1.67, 1.33, 1.40 B. 1.33, 1.67, 1.40
 C. 1.40, 1.67, 1.33 D. 1.67, 1.40, 1.33
13. The moment of inertia for a solid sphere about the diameter and solid cylinder about the cylindrical axis is:
 A. $2MR^2/5$, $2MR^2/3$ B. $MR^2/2$, $2MR^2/5$
 C. $2MR^2/5$, $MR^2/2$ D. $2MR^2/3$, $2MR^2/5$
14. In the Bohr model of the hydrogen atom, the electrons circulate around the nucleus in a path of radius, 5.1×10^{-11} m at a frequency, $\nu = 6.8 \times 10^{15}$ rev/sec. The current flow rate is:
 A. 1.1×10^{-2} Amp B. 1.1×10^{-3} Amp
 C. 1.1×10^{-4} Amp D. 1.1×10^{-5} Amp
15. Find the correct pair among the following pairs of vector multiplication:
 A. $i \cdot i = 1$ and $i \times i = -j$ B. $j \cdot j = 0$ and $j \times j = 0$
 C. $k \cdot k = 1$ and $k \times k = -j$ D. $k \cdot i = 0$ and $k \times k = 0$
16. Plants require Magnesium for:
 A. Holding cells together B. Transpiration
 C. Photosynthesis D. Development of Cell wall

17. The protein coat of a virus is called:
 A. Cosmid B. Plasmid C. Capsid D. Plastid
18. What reaction combines small molecules to form large molecules
 A. Anabolic reaction B. Catabolic reaction
 C. Anabolism D. Hydrolase reaction
19. This hormone is secreted from pancreas when glucose levels are low in the blood -
 A. Leptin B. Glucagon C. Insulin D Adiponectin
20. Reproduction in most of the bacteria is by a process known as
 A. Binary fission B. Budding C. Sexual D. Sporulation
21. Which one of these is a correct sequence of the flow of genetic information in a biological system:
 A. Replication, Translation, Transcription
 B. Replication, Transcription, Translation
 C. Translation, Transcription, Replication
 D. Translation, Replication, Transcription
22. Which one of the following is correct about Cosmid?
 A. Extra genetic material in mycoplasma
 B. Circular DNA found in bacteria
 C. Extra DNA in bacteria
 D. Fragment of DNA inserted in bacteria for forming copies.
23. During translation initiation in prokaryotes, a GTP molecule is needed in
 A. association of 30S, mRNA with formyl-met-t RNA
 B. association of 50S subunit of ribosome with initiation complex
 C. formation of formyl-met-Trna
 D. binding of 30 subunit of ribosome with mRNA
24. In *Drosophila*, the sex is determined by:
 A. The ratio of pairs of X-chromosomes to the pairs of autosomes
 B. X and Y chromosomes
 C. The ratio of number of X-chromosomes to the sets of autosomes
 D. Whether the egg is fertilized or develops parthenogenetically
25. What does "lac" refer to in lac operon?
 A. Lactose B. Lactase
 C. Lac insect D. The number 1,00,000

PART -B

26. The maximum number of hydrogen bonds that a molecule of water can have is
 A. 1 B. 2 C. 3 D. 4
27. For a 10% solution of NaCl in 100 ml, you need Grams of NaCl
 A. 10.0 B. 5.85 C. 58.5 D. 100.0
28. All the terminator codons begin with the nucleotide of
 A. Adenine B. Uracil C. Guanine D. Cytosine

29. Which of the following is the richest source of energy in our diet?
 A. Proteins B. Fats and oils C. Fibre D. Carbohydrates
30. The sequence of structural gene in lac operon concept is
 A. lac Y, lac Z, lac A B. lac Z, lac Y, lac A
 C. lac A, lac Y, lac Z D. lac A, lac Z, lac Y
31. The bacteria, *E. coli*, doubles in 20 mins. How many bacteria are present at the end of 2 hours, if you start with 1,000 *E. coli* bacteria?
 A. 32,000 B. 128,000 C. 16,000 D. 64,000
32. Which of the following molecules functions to transfer information from the nucleus to the cytoplasm?
 A. DNA B. RNA C. Proteins D. Lipids
33. The Gram negative bacteria detect and respond to chemicals in their surrounding by _____
 A. Lipopolysaccharide B. Muramic acid
 C. Porins D. Volutin granules
34. A very common indicator of water pollution is:
 A. *Entamoeba histolytica* B. *Escherichia coli*
 C. *Eichhornia crassipes* D. *Lemna paucicostata*
35. One of the environmental effects of "Green House Gas" is:
 A. An increase in the temperature B. An increase in atmospheric pressure
 C. An increase in rainfall D. An increase in Oxygen production
36. In a zero-order reaction for every 10° rise of temperature, the rate is double. If the temperature is increased from 10°C to 100°C , the rate of the reaction will become
 A. 64 times B. 128 times C. 256 times D. 512 times
37. The best vacuum obtained so far in the laboratory is 10^{-10} mm Hg. How many molecules of the gas remain per cubic cm at 27°C in the chamber?
 A. 2.5×10^{10} B. 2.5×10^{11} C. 2.5×10^{12} D. 2.5×10^{13}
38. If the length " l " and the radius " r " of a copper wire having a resistance, R , is doubled, the new resistance of the wire will be:
 A. $\frac{1}{2} R$ B. $2R$ C. $\frac{1}{4} R$ D. R
39. A capacitor of $1000 \mu\text{F}$ is connected to a DC source of voltage 100 V . The energy stored by the capacitor is:
 A. 2 J B. 20 J C. 200 J D. 2000 J
40. The attraction force between two wires carrying current is defined in terms of $\text{Nt} / \text{length}$. Suppose two 1 meter long wires, separated by a distance, d , is 1m and carrying equal current, then the force of attraction is:
 A. $2 \times 10^{-7} \text{ Nt/m}$ B. $4 \times 10^{-7} \text{ Nt/m}$ C. $2 \times 10^7 \text{ Nt/m}$ D. $4 \times 10^7 \text{ Nt/m}$
41. Time required for 100 percent completion of a zero order reaction is
 A. $2k/a$ B. $a/2k$ C. a/k D. ak
42. Image formed by a pair of concave and convex lenses are:
 A. Virtual and Real B. Real and Real
 C. Real and Virtual D. Virtual and Virtual

43. If the incident light falling on a reflecting surface, which is rotated by an angle α , then the angle of the reflected light will be:
 A. α B. 2α C. $-\alpha$ D. -2α
44. Down's syndrome is an example of a chromosomal abnormality called:
 A. Trisomy B. Monosomy C. Deletion D. Inversion
45. Scurvy is a disease caused due to :
 A. Deficiency B. Radiation C. Mutation D. Infection
46. Which of the following is never contained in food chain?
 A. Consumer B. Habitats C. Herbivore D. Omnivore
47. Water soluble vitamins are:
 A) Vit. C & Vit. B B) Vit. B & Vit. D
 C) Vit. C & Vit. E D) Vit. D & Vit. E
48. The presence of starch in potato can be detected by :
 A. Cell stain B. Iodine solution C. Biuret reagent D. Benedicts solution
49. Ethyl benzene CANNOT be prepared by _____.
 A. Clemmensen reduction B. Wurtz reaction
 C. Wurtz-Fittig reaction D. Friedel-Crafts reaction
50. The following always happens in a chemical reaction
 A. A color change occurs B. A gas is given off
 C. Heat energy is absorbed D. A new substance is formed
51. On electrolysis acids release :
 A. Ions B. Mesotrons C. Neutrons D. Positrons
52. Quicklime is a common name for which of the following chemical?
 A. CaO B. Ca(OH)₂ C. CaCl₂ D. CaCO₃
53. Normality is a term used in the context for :
 A. Mixtures B. Acids C. Organic solvents D. Inorganic solvents
54. Hydrolytic reaction of fat with caustic soda is known as :
 A. Esterification B. Saponification
 C. Carboxylation D. Acetylation
55. NaH is an example of:
 A. Ionic Hydride B. Covalent hydride
 C. Complex Hydride D. Interstitial hydride
56. The percentage of nitrogen in ammonia is :
 A. 32 B. 82 C. 55 D. 25
57. C₂H₆ is an:
 A. Alkane B. Alkali C. Alkyne D. Alkene
58. Ribozyme is:
 A. RNA without phosphate B. RNA with sugar
 C. RNA with enzyme activity D. RNA with extra phosphate

59. Bacteria that converts nitrates to nitrites and then nitrites to free nitrogen are known as:
 A. Nitrogen Fixing bacteria B. Ammonifying bacteria
 C. Saprophytic bacteria D. Denitrifying bacteria
60. Which one of them is a monosaccharide:
 A. Sucrose B. Lactose C. Galactose D. Maltose
61. The most abundant protein in the animal world is:
 A. Insulin B. Trypsin C. Collagen D. Haemoglobin
62. Thickening of arteries due to the deposition of fat is known as:
 A. Thrombosis B. Rhinitis C. Stenosis D. Atherosclerosis
63. Rickets can be prevented by taking:
 A. Carrots B. Oranges C. Calciferol D. Green leafy vegetables
64. Bile salts are produced in the liver but stored in:
 A. Liver B. Lungs C. Pancreas D. Gall Bladder
65. Islet of Langerhans are found in:
 A. Kidney Cortex B. Spleen C. Anterior Pituitary D. Endocrine Pancreas
66. Hemoglobin retains oxygen and releases it in:
 A. Lungs B. Heart C. Tissues D. Liver
67. The Fahrenheit and Celsius scale readings of temperature coincide at:
 A. -40°C B. 460°C C. 0°C D. -2730°C
68. If no heat is transferred into or out of a system, then it is known as:
 A. Isobaric B. Isochloric C. Adiabatic D. Isothermal
69. Mustard belongs to the family:
 A. Solanaceae B. Cruciferae C. Poaceae D. Amaryllidaceae
70. Tobacco mosaic disease is caused by :
 A. Bacteria B. A virus C. Genetic abnormalities D. Radiation
71. The study of biodiversity means -
 A. how animals carry out their functions
 B. interactions of animals with each other & their physical environment
 C. variety of living forms and animal habits
 D. animal structure and function
72. Motile zygote of Plasmodium occurs in
 A. Human RBCs B. Human liver
 C. Gut of female Anopheles D. Salivary glands of Anopheles
73. Which of the following animal belongs to class Crustacean:
 A. Cockroach B. Cyclops C. Mosquito D. Grasshopper
74. Which one is not a symptom of diabetes:
 A. Loss of weight B. Excessive thirst C. Excess urination D. Night blindness
75. Hepatic portal system collects blood from
 A. Liver B. Lungs C. Kidney D. Alimentary canal