

K-2

**IM.Sc-Optometry & Vision Science
Entrance examination- 2016**

Hall Ticket Number

Time : 2 hours

Total marks: 100

Please read the following instructions carefully before answering.

Instructions

1. This booklet has (18) 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 only for PART A. 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. 26-100). 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. What is the symbol for the element Selenium?
A) Si
B) Se
C) Na
D) S
2. Chips cook faster than boiled potatoes due to the chips having a
A) Smaller surface area and cooking at a lower temperature
B) Larger surface area and cooking at a lower temperature
C) Larger surface area and cooking at a higher temperature
D) Smaller surface area and cooking at a higher temperature

3. 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
4. Down's syndrome is an example of a chromosomal abnormality called:
- A) Trisomy
 - B) Monosomy
 - C) Deletion
 - D) Inversion
5. What enzyme is required for the polymerase chain reaction (PCR)
- A) Taq Polymerase
 - B) Paq polymerase
 - C) DNA polymerase
 - D) Polymerase
6. Energy cannot be carried by
- A) Longitudinal Progressive waves
 - B) Stationary Waves
 - C) Transverse Progressive waves
 - D) Electromagnetic waves
7. The main function of food vacuole is
- (A) Egestion
 - (B) Digestion
 - (C) Excretion
 - (D) Ingestion
8. The oxide of an element is gas and is soluble in water and forms an acidic solution. The element belongs to
- (A) IV Group
 - (B) V Group
 - (C) VI Group
 - (D) VII Group

9. Alkanes have a general formula

- (A) C_nH_{n+2}
- (B) C_nH_{2n+2}
- (C) C_nH_{2n-2}
- (D) C_nH_{2n}

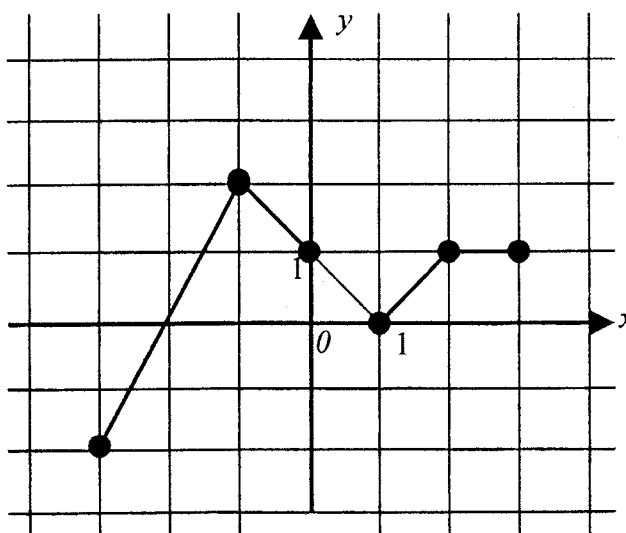
10. Which of the following microbes are responsible for nitrogen fixation in the soil

- (A) Virus
- (B) Fungi
- (C) Bacteria
- (D) Protozoa

11. Which of the following is equal to $(a+b)(a^2 - b^2)$?

- (A) $a^3 - b^3$
- (B) $a^3 - b^3 + 2ab$
- (C) $(a^2 + 2ab + b^2)(a-b)$
- (D) $a^3 - 2ab + b^3$

12. The figure below shows the graph of the function f in the xy -plane. What is the value of $f(f(-1))$?



- (A) -2
- (B) -1
- (C) 0
- (D) 1

13. An iron nail is dipped in a solution of copper sulphate in water. This solution is blue in color. The chemical reaction that takes place is, $\text{Fe}(\text{solid}) + \text{CuSO}_4(\text{aqueous}) \rightarrow \text{FeSO}_4(\text{aqueous}) + \text{Cu}(\text{solid})$. After some time the solution loses its blue color. What is the color of the nail at this time?
- (A) Green tinged blue
 - (B) Blue tinged Black
 - (C) Reddish brown
 - (D) Shiny steel color
- 14 If in a series the p^{th} term divided by the $(p-1)^{\text{th}}$ term yields the same ratio as the q^{th} term divided by the $(q-1)^{\text{th}}$ term, then the series is in:
- (A) Arithmetic Progression (AP)
 - (B) Geometric Progression (GP)
 - (C) Both AP and GP
 - (D) None of the above
- 15 You want to add a strip of copper on the circular wall of your experimental setup such that it fits the field of view of the subject at the centre of the room. The field of view of the subject is 45 degrees and radius of the room is 4m. What should be the length of the strip you should use?
- (A) π
 - (B) 2π
 - (C) 2
 - (D) 1
16. The human heart tissue is innervated by
- A) Optic
 - B) Vagus
 - C) Ocular
 - D) Trochlear
17. Hormone regulating serum calcium level is
- A) Thyroxine
 - B) Parathyroid hormone
 - C) Cortisol
 - D) Corticosterone

18. Thirty percent (30%) of the nucleotide bases in human DNA are adenine (A). What is the percentage of guanine (G) bases in human DNA?
- A) 20%
 - B) 30%
 - C) 40%
 - D) 70%
19. What was MacFarlane Burnet's major contribution to science?
- A) Better understanding of the immune response
 - B) Identification of complementary bases in DNA
 - C) Proposal of the one gene-one protein hypothesis
 - D) Identification of the importance of chromosomes
20. To make a 2.5 M Glucose solution in 100 ml, we need grams of Glucose (Mol. Wt of Glucose is 180 grams)
- A) 36
 - B) 90
 - C) 45
 - D) 54
21. Grams's staining was developed by
- A) Hans Christian Gram
 - B) Louis Pasteu
 - C) Robert Koch
 - D) Anthony Hopkins
22. Graves disease is an autoimmune disease caused by excessive production of
- A) Insulin
 - B) Glucagon
 - C) Epinephrine
 - D) Thyroid Hormone
23. Vitamin required for blood coagulation is
- A) Vitamin B12
 - B) Vitamin K
 - C) Vitamin C
 - D) Vitamin D

24. Identify the broad –spectrum antibiotic amongst the following:

- A) Penicillin
- B) Chloramphenicol
- C) Amoxicillin
- D) Fluoroquinolones

25. Marburg virus is named after

- A) A village in Cameroon
- B) A German town which was the site of an outbreak
- C) Virologist Wolf Marburg
- D) None of the above

PART B

26. Which is the main parameter of light rays of different colours that cause them to appear coloured to you?

- (A) Wavelength
- (B) Intensity
- (C) Amplitude
- (D) Phase

27. If 8V applied to a resistor caused a current flow of 2A what will be the current when 4V is applied?

- (A) 0.5A
- (B) 2A
- (C) 8A
- (D) 1A

28. A gene whose specific mutation can cause a genetic disease that is fatal in the childhood is X-linked and recessive. If the gene follows Mendelian pattern of inheritance then

- (A) Mother can be carrier
- (B) Father can be carrier
- (C) Father and Mother can be carrier
- (D) Carriers cannot exist

29. Most of the dry weight of the plants comes from

- (A) Carbon Dioxide in the air
- (B) Sunlight
- (C) Nutrients in the soil
- (D) None of the above

30. The maximum Kinetic Energy of emitted electrons in a photo electric effect does not depend on
- (A) Wavelength
 - (B) Frequency
 - (C) Intensity
 - (D) Work Function
31. The Latin name, *Aqua Fortis* is used for
- (A) Sulphuric Acid
 - (B) Phosphoric Acid
 - (C) Acetic Acid
 - (D) Nitric Acid
32. In the binomial system of nomenclature, the name of Genus when typed is
- (A) Always capitalized and abbreviated
 - (B) Always capitalized and can be abbreviated
 - (C) Never capitalized but can be abbreviated
 - (D) Never capitalized and never abbreviated
33. Scurvy is caused due to the deficiency of
- (A) Vitamin A
 - (B) Vitamin K
 - (C) Vitamin D
 - (D) Vitamin C
34. The "Mirage effect" is due to which phenomenon of light
- (A) Reflection
 - (B) Refraction
 - (C) Dispersion
 - (D) Diffraction
35. Thermophiles are the bacteria that grow in
- (A) High salt concentration
 - (B) High Temperatures
 - (C) Basic conditions
 - (D) Acidic conditions

36. Nickel is a catalyst used in
- (A) Production of Ammonia
 - (B) Hydrogenation of Vegetable Oil
 - (C) Production of Carbon Monoxide
 - (D) Acetylation of Salicylic acid
37. Kidney is responsible for the synthesis of
- (A) Erythropoietin
 - (B) Melanin
 - (C) Collagen
 - (D) Insulin
38. Aldosterone hormone is synthesized by
- (A) Pancreas
 - (B) Pituitary Glands
 - (C) Adrenal glands
 - (D) Thyroid Gland
39. Which of the following disease is caused by a virus
- (A) Polio
 - (B) Tuberculosis
 - (C) Malaria
 - (D) Athlete's foot
40. The following stain is used for staining plant cells to view under the microscope
- (A) Cell stain
 - (B) Iodine solution
 - (C) Biuret reagent
 - (D) Benedict's solution
41. Which one of this is a useless by-product of photosynthesis in plants?
- (A) Glucose
 - (B) Water
 - (C) Oxygen
 - (D) Carbon dioxide
42. Why is a "saturated" fat called saturated fat?
- (A) The Fatty acid carbon chains are saturated with Hydrogen
 - (B) The fat is saturated with water

- (C) The fatty acid chains can have more water added
(D) They saturate the body with fat when eaten
43. Total volume of blood in a normal adult human being is
- (A) 5-6 liters
(B) 3-4 liters
(C) 8-10 liters
(D) 10-12 liters
44. Which one is not correct:
- (A) Insulin : Pancreas
(B) Epinephrine: Adrenal
(C) Prolactin : Pituitary
(D) Oxytocin : Thyroid
45. 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
46. Which of the following is the richest source of energy in our diet?
- (A) Proteins
(B) Fats and oils
(C) Carbohydrates
(D) Fibre
47. Which of the metals shown is the most reactive?
- (A) Zinc
(B) Copper
(C) Magnesium
(D) Iron
48. Excess Glucose is stored in animal tissues as
- (A) Cellulose
(B) Starch
(C) Protein
(D) Glycogen

49. Which stain do we use for staining animal cells?

- (A) Iodine solution
- (B) Cell stain
- (C) Methylene blue
- (D) Ribena

50. Which one is not a symptom of diabetes:

- (A) Excess urination
- (B) Excessive thirst
- (C) Loss of weight
- (D) Night blindness

51. Which one of them is a monosaccharide:

- (A) Sucrose
- (B) Lactose
- (C) Galactose
- (D) Maltose

52. Hepatic portal system collects blood from

- (A) Liver
- (B) Lungs
- (C) Kidney
- (D) Alimentary canal

53. Jaundice is a diseased condition of

- A) Liver
- B) Lung
- C) Kidney
- D) Eye

54. What can Vitamin B12 deficiency lead to?

- (A) Night blindness
- (B) Pernicious anemia
- (C) Beri-Beri
- (D) Loss of appetite

55. Choose the correct pair :

- A) Iodine deficiency :Goitre
- B) Iron deficiency :Keratomalacia
- C) Vitamin A : Cataract
- D) Calcium deficiency : Scurvy

56. Identify the incorrect pair:

- A) Bile : Liver cells
- B) Bilirubin : Bile pigment
- C) Gall bladder : Vital for life
- D) Chyme : Semi digested food

57. Choose the correct pair :

- A) Cryoprotectant : Glycerol
- B) Reducing sugar : Sucrose
- C) Bacterial cell wall : Glycogen
- D) Quartz : Amorphous substance

58. Glucose is not found in the urine in normal individuals, since

- A) Glucose is not filtered in the kidney
- B) The levels of blood glucose are not sufficient for filtration
- C) The glucose filtered in the kidney is rapidly metabolized
- D) The filtered glucose is completely reabsorbed

59. The artery which supplies oxygenated blood to heart muscle in humans is

- A) Capsular
- B) Carotid
- C) Coronary
- D) Subclavian

60. "Pellagra" is caused due to the deficiency of

- A) Thiamine
- B) Biotin
- C) Pantothenic acid
- D) Niacin

61. Lipopolysaccharide is a cell wall component of mainly,

- A) Gram positive bacteria
- B) Gram negative bacteria
- C) Yeast cells
- D) Viruses.

62. Type 1 diabetes is also known as

- A) Non-insulin dependent diabetes
- B) Insulin dependent diabetes

- C) Glucagon dependent diabetes
- D) None of the above

63. Which protein is required for maintaining cell shape

- A) Albumin
- B) Lectin
- C) Pepsin
- D) Actin

64. Average life span of red blood cells

- A) 180 days
- B) 150 days
- C) 120 days
- D) 60 days

65. Choose the correct pair:

- A) Carbon monoxide: laughing gas
- B) Night blindness : Vitamin K
- C) Cyanide poisoning : Cytochrome C
- D) Greenhouse gas : Carbon dioxide

66. The condition in which the human bones become brittle is:

- A) Loss of calcium absorption
- B) Cholera
- C) Cataract
- D) Heart failure

67. A coenzyme is essential for the

- A) Stability of enzyme
- B) Synthesis of enzyme protein
- C) Enzyme activity
- D) Degradation of the enzyme

68. Which one of the following is not a pathogen of the gastro-intestinal tract ?

- A) E. Coli
- B) Clostridium tetani
- C) Vibrio cholerae
- D) Shigella

69. Brain centre in humans that regulate hunger
- A) Medulla oblongata
 - B) Cerebellum
 - C) Hypothalamus
 - D) Pons
70. Pentose sugar present in DNA is
- A) Ribulose
 - B) Ribose
 - C) Deoxyribose
 - D) Deoxyribulose
71. The first part of the small intestine is called
- A) Duodenum
 - B) Jejunum
 - C) Ileum
 - D) Caecum
72. The covalent bond present in proteins is
- A) Glycosidic
 - B) Phosphodiester
 - C) Peptide
 - D) Thioether
73. When citrate is added to the blood sample, blood does not clot, because
- A) Proteins are precipitated
 - B) Calcium is chelated
 - C) Red blood cells are lysed
 - D) Fibrinogen only is precipitated
74. Which one of the following vitamins contains cobalt?
- A) Vitamin D
 - B) Vitamin C
 - C) Vitamin B12
 - D) Biotin
75. Hormone that regulate liver glucose production
- A) Gastrin
 - B) Secretin

- C) Glucagon
- D) Leptin

76. Which is the major cell (in terms of numbers) participating in phagocytic function in human blood ?

- A) Neutrophil
- B) Monocyte
- C) Eosinophil
- D) Basophil

77. The conduction of the nerve impulse in a neuron takes place in

- A) Cell body
- B) Axon
- C) Dendron
- D) Synapse

78. Which one of them is anucleated

- A) Neutrophil
- B) Platelets
- C) Monocytes
- D) Erythrocytes

79. Long-term exposure to excessive levels of benzene in the air causes

- A) Blindness
- B) Headache
- C) Leukemia
- D) Schizophrenia

80. Chronic exposure to carbon tetracholoride leads to

- A) Liver and Kidney damage
- B) skin disease
- C) Bone disease
- D) None of the above.

81. Organic chemistry is the branch of chemistry deals with

- A) Biomolecules
- B) Metals
- C) Minerals
- D) Carbon

82. Radioisotope of carbon used for

- A) Age determination
- B) Sex determination
- C) X-rays
- D) MRI

83. What is the other name of vitamin C?

- A) Acetic Acid
- B) Sulfuric Acid
- C) Ascorbic Acid
- D) None

84. Which of these mammalian species has lost the gene for uricase?

- A) German Shepered dog
- B) Dalmatian dog
- C) American dog
- D) None of the above

85. If, 10000 *E.Colibacteria*, present in the culture, after 60 minutes how many *E.Coli* bacteria present in the culture:

- A) 40000
- B) 20000
- C) 70000
- D) 80000

86. Anemia is caused by the deficiency of

- A) Hemoglobin
- B) Folic acid
- C) Pantothenic acid
- D) Pyridoxine

87. Who discovered the bacteria that causes cholera?

- A) Pierre Berthelot
- B) Louis Pasteur
- C) None of the above
- D) Robert Koch

88. Infections of salivary glands by a virus leads to

- A) Tetanus
- B) Pyrohea
- C) Ulcers
- D) Mumps

89. The exchange of materials between the mother and the foetus during pregnancy is through the.....

- A) Yolk sac
- B) Amnion
- C) Chorion
- D) Placenta

90. Deoxyribonucleic acid (DNA) is a double-stranded nucleic acid molecule. For all double stands of DNA, which one of the following statements is true?

- A) The numbers of adenine (A) and guanine (G) bases are equal
- B) The numbers of thymine (T) and cytosine (C) bases are qual
- C) The numbers of adenine (A) guanine (G) thymine (T) and cytosine (C) bases are equal
- D) The numbers of guanine (G) and cytosine (C) bases are equal

91. During mitosis, the cell duplicates it's the strands of DNA found in its nucleus.

- A) Centromeres
- B) Nucleotides
- C) Chromosomes
- D) chloroplasts

92. Pharmacology is the study of...

- A) Toxicology of drugs
- B) Interactions of drugs
- C) Class of drugs
- D) All of the above

93. The largest organ of the human body is:

- A) Heart
- B) Lung
- C) Live
- D) Skin

94. Mercury is :

- A) A liquid and metal
- B) A liquid and non-metal
- C) A solid and non-metal
- D) Neither liquid nor metal

95. John buys an old scooter for Rs 5000 and spends 500 on its repairs. If he sells the scooter for Rs 6000, what is his gain percent?

- A) 9%
- B) 10%
- C) 5%
- D) 8%

96. A bag contains 2 yellow, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is yellow?

- A) $1/2$
- B) $9/11$
- C) $10/21$
- D) $7/11$

97. Three coins are tossed. What is the probability of getting at most two heads?

- A) $7/8$
- B) $1/8$
- C) $1/2$
- D) $1/7$

98. A dice is thrown. What is the probability that the number shown in the dice is divisible by 3?

- A) $1/3$
- B) $1/6$
- C) $1/4$
- D) $1/2$

99. A person crosses a 1200m long street in 10 minutes. What is his speed in Km per hour?

- A) 8.2
- B) 4.2
- C) 6.1
- D) 7.2

100. A and B walk around a circular track. A and B walk at a speed of 2 rounds per hour and 3 rounds per hour respectively. If they start at 8 am from the same point in opposite directions, how many times shall they cross each other before 9:30 am?

- A) 5
- B) 6
- C) 7
- D) 8