Question Booklet No.: 6788 Question Booklet Series: **D**

ENTRANCE TEST - 2025

School of Applied Sciences & Technology

Integrated Masters Programme in Electronics (IMSC-Electronics)

Total Questions: 100 MCQs **Roll No.** | | | | | | |

Time Allowed: 110 Minutes

Important Instructions for Candidates:

1. Candidates shall compulsorily use only **blue/ black ball point pen**. In no case gel/ink pen or pencil should be used.
2. Compulsorily write your **roll number** in the space provided at the top of this page of the question booklet.
3. Fill up the necessary information in the spaces provided on OMR Answer sheet including **Question Booklet Number** and **Question Booklet Series**.
4. OMR Answer sheet has an original copy and a candidate's copy glued beneath it at the top. While making entries in the original copy, candidate should ensure that the **two copies are aligned properly** so that the entries made in the original copy against each item are exactly copied in the candidate's copy.
5. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
6. **Choose only one correct/most appropriate response** for each question among the options A, B, C and D and darken the circle of the appropriate response completely. Incompletely darkened circle is not correctly read by the OMR scanner and no complaint to this effect shall be entertained.
7. **Do not darken more the one circle of option for any question. A question with more than one darkened response shall be considered wrong.**
8. **There will be negative marking for wrong answers. Each wrong answer will lead to deduction of 0.25 marks per wrong answer from the score.**
9. Only those candidates who obtain positive score in Entrance Test shall be eligible for admission.
10. Do not make any stray mark on the OMR sheet as this may lead to errors while scanning.
11. OMR answer sheet must be handled carefully and it should not be folded or mutilated, as in such case it will not be properly evaluated by the machine.
12. No Electronic gadgets including calculators, mobiles, smart watches, blue tooth etc. shall be permitted inside the examination hall.
13. Rough work, if any, should be done on the blank sheets provided with the question booklet.
14. Ensure that the OMR Sheet is signed by the Examinee as well as by the invigilator.
15. At the end of the examination, fold the OMR Sheet along the crease on the top and tear off the top strip to separate the Original OMR Sheet from the Duplicate Copy.
16. Hand over the Original OMR answer sheet to the invigilator and retain the candidate's copy of OMR, Question Booklet and Admit card for your reference.
17. If any of the information in the response Sheet/Question Paper has been found missing or not mentioned as stated above, the candidate is solely responsible for that lapse.
18. Any deficiency on the OMR shall be the responsibility of the candidate himself/herself.

SEAL

1. Fats on alkaline hydrolysis gives:
   (a) oils
   (b) soaps
   (c) detergents
   (d) glycol + acid

2. The IUPAC name of C_2H_2 is:
   (a) Acetylene
   (b) Ethane
   (c) Ethene
   (d) Ethyne

3. Reduction of aldehydes and ketones into hydrocarbons using zinc amalgam and conc. HCl is called:
   (a) Clemmensen reduction
   (b) Cope reduction
   (c) Dow reduction
   (d) Wolf-Kishner reduction

4. Which is the product of the reaction of ketones with H_2 in the presence of a catalyst?
   (a) Alcohol
   (b) Aldehyde
   (c) Carboxylic acid
   (d) Ester

5. Which one is used as a food preservative?
   (a) Sodium acetate
   (b) Sodium propionate
   (c) Sodium benzoate
   (d) Sodium oxalate

6. They have been ___ here since dawn.
   (a) wait
   (b) waiting
   (c) waited
   (d) to wait

7. ___ book on the table is mine.
   (a) A
   (b) An
   (c) The
   (d) None of the above

8. If you "hit the books," you are going to
   (a) Physically strike them
   (b) Start a library
   (c) Study hard
   (d) Borrow volumes

9. Passage: Fatima loved the old chinar in her backyard. Every autumn, its leaves turned brilliant shades of orange and gold. One evening, she found a tiny bird with a broken wing beneath its branches. Gently, she scooped it up and brought it inside. Over the next week, she cared for it until it could fly again. On a crisp morning, she opened her window and watched as the bird soared into the sky.
   What detail shows the bird recovered?
   (a) It began to sing
   (b) It flew into the sky
   (c) It ate from her hand
   (d) It changed color

10. If two numbers are in the ratio 3 : 5 and their sum is 64, the smaller number is:
   (a) 24
   (b) 27
   (c) 36
   (d) 20

11. If 150 is 60% of a number, that number is:
    (a) 225
    (b) 250
    (c) 180
    (d) 200

12. How many ways to arrange the letters of the word "MATH"?
    (a) 12
    (b) 16
    (c) 36
    (d) 24

13. The sum of the first 20 terms of the arithmetic series 5, 8, 11,… is:
    (a) 670
    (b) 520
    (c) 780
    (d) 580

14. The data set is 4, 8, 6, 5, 3. What is the median?
    (a) 5.2
    (b) 6.2
    (c) 5
    (d) 6

15. If a data set has standard deviation 5, its variance is:
    (a) 25
    (b) $\sqrt{5}$
    (c) 5
    (d) 10

16. Two coins are tossed. Probability of exactly one head is:
    (a) 1/4
    (b) 1/3
    (c) 1/2
    (d) ¾

17. In a pie chart, if "Apples" occupy 90° of the circle, Apples represent what percentage of the total?
    (a) 10%
    (b) 15%
    (c) 25%
    (d) 30%

18. All mammals are warm-blooded. Whales are mammals. Therefore, whales are warm-blooded. This is an example of:
    (a) Inductive reasoning
    (b) Deductive reasoning
    (c) Analogical reasoning
    (d) Statistical reasoning

19. 144 : 12 :: 169 : ?
    (a) 11
    (b) 12
    (c) 13
    (d) 14

20. Which number breaks the pattern? 2, 4, 8, 16, 33, 64
    (a) 4
    (b) 8
    (c) 33
    (d) 64

21. Starting at X, you walk 5 km east, then 3 km north. How far are you from X?
(a) 2 km
(b) 5.83km
(c) 4 km
(d) 6.83 km

22. A rectangle of width 4 and height 2 is rotated 180^0. Its perimeter:
(a) doubles
(b) halves
(c) stays the same
(d) decreases 3 times

23. A rectangle of paper is folded twice (once horizontally, once vertically), then a single hole is punched near one corner. When fully unfolded, the number of holes is:
(a) 1
(b) 2
(c) 4
(d) 8

24. If you cut out and fold the classic "T-shaped" net of 5 squares, you get a:
(a) Pyramid
(b) Cube
(c) Prism
(d) Octahedron

25. Grouping four congruent right-angled triangles (legs 2, 3) appropriately can form:
(a) Rectangle of area 12
(b) Square of area 25
(c) Parallelogram of area 6
(d) Square of area 15

26. The dimensional formula of force is:
(a) $[ML^{-2}]$
(b) $[MLT^{-2}]$
(c) $[MLT^{-1}]$
(d) $[LT^{-2}]$

27. Area under velocity-time graph represents:
(a) Displacement
(b) Acceleration
(c) Pressure
(d) Force

28. Which of the following is a vector quantity?
(a) Displacement
(b) Speed
(c) Mass
(d) Time

29. Light year is a unit of:
(a) Time
(b) Mass
(c) Distance
(d) Energy

30. When a bus suddenly takes a turn, the passengers are thrown outwards because of:
(a) Inertia of direction
(b) Acceleration of motion
(c) Speed of motion
(d) Both (a) and (c)

31. Which quantity is conserved in an isolated system when two bodies collide?
(a) Kinetic Energy
(b) Momentum
(c) Acceleration
(d) Force

32. Potential energy of a spring is given by:
(a) $\frac{1}{2}kx^2$
(b) kx^2
(c) mgx
(d) $\frac{1}{2}mv^2$

33. Where will be the centre of mass on combining two masses m and M (M>m)?
(a) Towards m
(b) Towards M
(c) At the center between m & M
(d) Anywhere

34. Universal law of gravitation is given by:
(a) $F = mg$
(b) $F = G\frac{r^2}{Mm}$
(c) $F = \frac{GMm}{r^2}$
(d) $F = \frac{m}{r^2}$

35. Which is the most elastic?
(a) Iron
(b) Copper
(c) Quartz
(d) Wood

36. A pin or a needle floats on the surface of water, the reason for this is?
(a) Surface tension
(b) Less weight
(c) Upthrust of liquid
(d) None of the above

37. Pressure at depth h in a liquid of density ρ is given by:
(a) $P = \rho gh$
(b) $P = \frac{gh}{\rho}$
(c) $P = \frac{h}{\rho g}$
(d) $P = \rho g$

38. Water has maximum density at:
(a) 0°C
(b) 32° C
(c) -4° C
(d) 4° C

39. The internal energy of an ideal gas depends upon:
(a) Specific volume
(b) Pressure
(c) Temperature
(d) Density

40. First law of thermodynamics is a special case of:
(a) Newton's law
(b) Charle's Law
(c) Law of conservation of energy
(d) Law of heat exchange

41. An adiabatic process occurs at constant:
(a) Temperature
(b) Pressure
(c) Heat
(d) Temperature and Pressure

42. The restoring force of SHM is maximum when particle:
    (a) Displacement is maximum
    (b) Is half way between the mean and extreme position
    (c) Crosses mean position
    (d) Is at rest

43. If the frequency of human heart beat is 1.25 Hz, the number of heart beats in 1 minute is:
    (a) 80
    (b) 65
    (c) 75
    (d) 90

44. The time period of a simple pendulum of length L is:
    (a) $2\pi\sqrt{L}$
    (b) $2\pi\sqrt{\frac{g}{L}}$
    (c) $2\pi\sqrt{\frac{L}{g}}$
    (d) $2\pi\sqrt{\frac{1}{Lg}}$

45. Beats are produced when:
    (a) Two waves of different amplitudes meet
    (b) Two waves of slightly different frequencies interfere
    (c) Only one wave is present
    (d) Two stationary waves interact

46. The force between two charges at a distance r apart in a vacuum is:
    (a) Directly proportional to r
    (b) Inversely proportional to r
    (c) Inversely proportional to r^2
    (d) Independent of r

47. Capacitance of a parallel plate capacitor increases if:
    (a) Distance between plates increases
    (b) Dielectric constant increases
    (c) Area decreases
    (d) Plates are moved apart

48. According to Guass's law, electric flux through a closed surface depends on:
    (a) Shape of the surface
    (b) Area of the surface
    (c) Charge enclosed
    (d) Permeability of the closed surface

49. Kirchhoff's first law i.e. $\sum i = 0$ at a junction is based on the law of conservation of:
    (a) Charge
    (b) Energy
    (c) Momentum
    (d) Angular momentum

50. The magnetic lines of force inside a bar magnet:
    (a) Are from south pole to north pole of the magnet
    (b) Are from north pole to south pole of the magnet
    (c) Do not exist.
    (d) Depend upon the area of cross-section of the bar magnet.

51. Magnetic field at the center of a current carrying circular loop is :
    (a) $\frac{\mu_0 I}{2R}$
    (b) $\frac{\mu_0 IR}{2}$
    (c) $\frac{\mu_0 I}{4\pi R}$
    (d) Zero

52. If a current is passed in a spring, it:
    (a). Gets compressed
    (b). Gets expanded
    (c). oscillates
    (d). remains unchanged

53. Diamagnetic substances:
    (a). Have permanent dipoles
    (b). Are strongly magnetized
    (c). Are weakly repelled
    (d). Do not respond to magnetic field

54. A moving conductor coil in a magnetic field produces an induced e.m.f. This is in accordance with:
    (a) Ampere's law
    (b) Coulomb's law
    (c) Lenz's law
    (d) Faraday's law

55. Electromagnetic waves are:
    (a) Longitudinal
    (b) Transverse
    (c) Both longitudinal and transverse
    (d) Neither longitudinal and transverse

56. Which of the following radiations has the least wavelength?
    (a) γ-rays
    (b) β-rays
    (c) α-rays
    (d) X-rays

57. The maximum value of a.c. voltage in a circuit is 707 V. Its r.m.s. value is:
    (a) 70.7 V
    (b) 100 V
    (c) 500 V
    (d) 707 V

58. A man having height 6m. He observes image of 2m height erect, then mirror used is:
    (a) Concave
    (b) Convex
    (c) Plane
    (d) (a) or (c)

59. Brilliance of diamond is due to:
    (a) shape
    (b) cutting
    (c) reflection
    (d) total internal reflection

60. The wave theory of light was given by:
    (a) Maxwell
    (b) Planck
    (c) Huygen
    (d) Young

61. The bending of beam of light around corners of obstacles is called:
    (a) reflection
    (b) diffraction
    (c) refraction
    (d) interference

62. The majority charge carriers in p-type semiconductor are:
    (a) electrons
    (b) protons
    (c) holes
    (d) neutrons

63. The photoelectric effect supports the idea that light:
    (a) Has only wave nature
    (b) Is an electromagnetic wave
    (c) Has particle nature
    (d) Travels in straight lines

64. The de-Broglie wavelength of a particle is given by:

(a) $\lambda = \frac{h}{mv}$

(b) $\lambda = \frac{mv}{h}$

(c) $\lambda = hmv$

(d) $\lambda = \frac{1}{hv}$

65. The function of a rectifier is to:

(a) Store charge

(b) Amplify signal

(c) Convert AC to DC

(d) Convert DC to AC

66. The proton and neutron are collectively called:

(a) Deutron

(b) Positron

(c) Meson

(d) Nucleon

67. Dalton's atomic theory did not explain:

(a) Law of conservation of mass

(b) Existence of isotopes

(c) Law of definite proportions

(d) Concept of atoms and molecules

68. The electronic configuration of copper ($_{29}$Cu) is:

(a) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^9, 4s^2$

(b) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^1$

(c) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 4p^6$

(d) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}$

69. The law of multiple proportions was proposed by:

(a) Lavoisier

(b) Dalton

(c) Proust

(d) Gay-Lussac

70. Evaporation of water is:

(a) An endothermic change

(b) An exothermic change

(c) A process where no heat change occurs

(d) A process accompanied by chemical reaction

71. Hess law is applicable for the determination of heat of:

(a) Reaction

(b) Formation

(c) Transition

(d) All of the above

72. The unit of molality is:

(a) Mole per litre

(b) Mole per kilogram

(c) Per mole per litre

(d) Mole litre

73. Arrhenius equation is:

(a) $k = Ae^{-\frac{Ea}{RT}}$

(b) $k = Ae^{\frac{Ea}{RT}}$

(c) $k = A + \frac{Ea}{RT}$

(d) $k = Eae^{AT}$

74. Order of a reaction is decided by:
(a) pressure
(b) temperature
(c) molecularity
(d) relative concentration of reactants

75. A catalyst increases the rate of a chemical reaction by:
(a) Increasing the activation energy
(b) Decreasing the activation energy
(c) Reacting with reactants
(d) Reacting with products

76. Buffer solution is prepared by mixing:
(a) Strong acid and its salt of strong base
(b) Weak acid and its salt of weak base
(c) Strong acid and its salt of weak base
(d) Weak acid and its salt of strong base

77. pH of a solution can be expressed as:
(a) $-\log_e(H^+)$
(b) $-\log_{10}(H^+)$
(c) $\log_e(H^+)$
(d) $\log_{10}(H^+)$

78. Oxidation involves:
(a) Loss of electrons
(b) Gain of electrons
(c) Loss of oxygen
(d) Gain of hydrogen

79. The oxidant which is used as an antiseptic is:
(a) $KBrO_3$
(b) $KMnO_4$
(c) CrO_3
(d) KNO_3

80. Which metal is used as a coating on steel to prevent corrosion?
(a) Na
(b) Ca
(c) K
(d) Zn

81. Corrosion of iron is an example of:
(a) Physical change
(b) Precipitation
(c) Redox reaction
(d) Sublimation

82. Which element shows maximum electronegativity?
(a) Oxygen
(b) Nitrogen
(c) Chlorine
(d) Fluorine

83. Correct formula for potassium ferrocyanide is:
(a) $K_4[Fe(CN)_6]$
(b) $K_2[Fe(CN)_6]H_2O$
(c) $K_2[Fe(CN)_6]$
(d) $K_2[Fe(CN)_8]$

84. The elements with atomic number 10, 18, 36, 54 and 86 are all:
(a) Light metals
(b) Inert gases
(c) halogens
(d) rare-earths

85. The atomic radii in periodic table among elements from right to left:
    (a) decreases
    (b) increases
    (c) remains constant
    (d) first decreases and then increases

86. The strongest bond is ..... bond.
    (a) Ionic
    (b) covalent
    (c) hydrogen
    (d) metallic

87. A covalent bond between two atoms is formed by which of the following:
    (a) Electron nuclear attraction
    (b) Electron sharing
    (c) Electron transfer
    (d) Electrostatic attraction

88. The hybridization of carbon in CH_4 is:
    (a) sp
    (b) sp^2
    (c) sp^3
    (d) dsp^2

89. Na^+ ion is isoelectric with:
    (a) Li^+
    (b) Mg^{+2}
    (c) Ca^{+2}
    (d) Ba^{+2}

90. Temporary shift of electrons under the influence of a reagent is called:
    (a) Inductive effect
    (b) Resonance
    (c) Electromeric effect
    (d) Hyperconjugation

91. An electrophile is:
    (a) Electron-rich
    (b) Electron-deficient
    (c) Nucleophile
    (d) Neutral

92. A carbanion is:
    (a) Positively charged carbon
    (b) Carbon with an unpaired electron
    (c) Carbon with a negative charge
    (d) None of the above

93. Hyperconjugation involves:
    (a) σ-π overlap
    (b) π-π overlap
    (c) σ- σ overlap
    (d) None of the above

94. Halogenation of alkanes is an example of:
    (a) Electrophilic substitution
    (b) Nucleophilic substitution
    (c) Free-radical substitution
    (d) Oxidation

95. The attacking (electrophilic) species in sulphonation of benzene is:
    (a) SO_2
    (b) SO_3
    (c) SO_4^{2-}
    (d) HSO_3^-

96. Baeyer's reagent is:
    (a) Alkaline permanganate solution
    (b) Acidified permanganate solution
    (c) Neutral permanganate solution
    (d) Aqueous bromine solution

97. Nitration of Toluene takes place at:
   (a) o- position
   (b) m- position
   (c) p- position
   (d) o- and p- position

98. Picric acid is:
   (a) Trinitro aniline
   (b) Trinitro toluene
   (c) A volatile liquid
   (d) 2, 4, 6 trinitrophenol

99. Which of the following shows hydrogen bonding in liquid state?
   (a) Diethyl ether
   (b) Methanol
   (c) Benzene
   (d) Acetone

100. Lucas test is needed for:
   (a) Alcohols
   (b) Amines
   (c) Diethylether
   (d) Glacial acetic acid