

Roll Number: _____ Name: _____

Answer Sheet Serial No: _____ Signature: _____

Total Time: 3 hours 30 minutes

Total Marks: 200

NOTE: THERE ARE 100 QUESTIONS, PRINTED ON 12 PAGES, PLEASE CHECK ALL THE PAGES BEFORE ATTEMPTING THE PAPER.

- 1) Which of the following contains the same number of molecules as 22 gram of carbon dioxide?
 - A) 9 g of water
 - B) 2 g of hydrogen gas
 - C) 32 g of oxygen gas
 - D) 71 g of chlorine gas
- 2) Molecular mass of the compound is 60 and its empirical formula is CH_2O . What will be the molecular formula of the compound?
 - A) $C_2H_4O_2$
 - B) $C_3H_6O_3$
 - C) $C_4H_8O_4$
 - D) $C_5H_{10}O_5$
- 3) Greater the wavelength associated with the photon
 - A) Greater is its energy
 - B) Smaller is its energy
 - C) Its energy will be variable
 - D) Its energy will remain constant
- 4) Identify the compound given below which has bonds formed by overlapping of sp and p orbitals:
 - A) $BeCl_2$
 - B) BF_3
 - C) H_2O
 - D) NH_3
- 5) Which of the following elements has highest ionization energy?
 - A) O
 - B) C
 - C) N
 - D) Be
- 6) Which of the following shows marked deviation from ideal behaviour at a given temperature and pressure?
 - A) CO_2
 - B) He
 - C) N_2
 - D) H_2
- 7) Exceptionally low acidic strength of HF is due to:
 - A) Strong polar bond between H & F
 - B) Smaller size of fluorine
 - C) More electronegativity of fluorine
 - D) Strong hydrogen bonding
- 8) Which of the following compounds has lowest boiling point?
 - A) Water
 - B) Ethanol
 - C) Hydrogen sulphide
 - D) Acetic acid
- 9) A pressure cooker reduces cooking time because:
 - A) A large heat is used
 - B) Heat is more evenly distributed
 - C) The higher pressure softens food inside
 - D) The boiling point of water rises inside
- 10) Which of the following ionic compounds has the highest value of lattice energy?
 - A) NaF
 - B) LiCl
 - C) NaI
 - D) KI
- 11) Which one of the following is the example of polar molecular solids?
 - A) Ice
 - B) Iodine
 - C) Copper
 - D) Phosphorous
- 12) Which of the following ions forms most stable complex compound?
 - A) Cu^{2+}
 - B) Fe^{2+}
 - C) Fe^{3+}
 - D) Mn^{2+}
- 13) All of the following compounds are organic except:
 - A) KOCH
 - B) C_2H_5OH
 - C) CH_3COCH_3
 - D) CH_3OH
- 14) The isomers of a substance must have:
 - A) Same molecular mass
 - B) Same chemical properties
 - C) Same structural formula
 - D) Same functional group
- 15) Which of the following compounds has highest boiling point?
 - A) Cyclohexane
 - B) Cyclopentane
 - C) Cycloheptane
 - D) Cyclobutane

- 16) Propyne reacts with aqueous sulphuric acid in the presence of HgSO_4 to form:
- Acetone
 - 1-Propanol
 - 2-Propanol
 - Acetaldehyde
- 17) The electrophile which is considered to be the active agent in the nitration of benzene is:
- NO_2^+
 - NO_2
 - NO^+
 - HNO_2^+
- 18) Which compound reacts most rapidly by an $\text{S}_{\text{N}}1$ mechanism?
- Chloromethane
 - 1-chloroethane
 - 2-chloro-2-methylpropane
 - 2-chloropropane
- 19) Which of the following alkyl halides has the highest boiling point?
- n-butyl iodide
 - isobutyl iodide
 - isopropyl bromide
 - n-propyl bromide
- 20) Which of the following will not affect the $\text{S}_{\text{N}}1$ mechanism?
- Nature of solvent
 - Carbocation
 - Nature of nucleophile
 - Carbanion
- 21) Which of the following compounds is most acidic?
- Water
 - Ethanol
 - Phenol
 - Cyclohexanol
- 22) Buffer capacity is maximum when both components have:
- High concentration
 - Equal concentration
 - Low concentration
 - High and equal concentration
- 23) If the solubility product (K_{sp}) value is large, the salt in water is:
- More soluble
 - Less soluble
 - Moderately soluble
 - No concentration
- 24) The unit of rate constant k is $\text{dm}^3 \text{mole}^{-1} \text{s}^{-1}$ for a chemical reaction, the order of reaction is:
- 1
 - 3
 - 0
 - 2
- 25) A system that can exchange or transfer both matter and energy with the surroundings is:
- Isolated system
 - Closed system
 - Open system
 - Adiabatic system
- 26) The sum of the number of molecules or atoms of water is:
- Specific heat
 - Heat capacity
 - Latent heat
 - Internal energy
- 27) Which of the following elements has the same oxidation number in all of its known compounds?
- Beryllium
 - Chlorine
 - Nitrogen
 - Bromine
- 28) A cathode has the reduction potential:
- Less than the anode
 - More than the anode
 - Same as that of anode
 - Zero
- 29) A radius greater than its parent atom is called:
- Cationic radii
 - Atomic radii
 - Covalent radii
 - Anionic radii
- 30) What is the composition of alloy, German silver?
- $\text{Cu} + \text{Zn} + \text{Ni}$
 - $\text{Cu} + \text{Ag} + \text{Ni}$
 - $\text{Cu} + \text{Sn} + \text{Zn} + \text{Pb}$
 - $\text{Al} + \text{Cu} + \text{Mg} + \text{Mn}$
- 31) One mole of a reactant reacts with a rate of $0.6 \text{ mol dm}^{-3} \text{ s}^{-1}$. What is the rate constant of this reaction if reaction is first order?
- 1 s^{-1}
 - 0.3 s^{-1}
 - 0.6 s^{-1}
 - 0.9 s^{-1}
- 32) What will be the product when phenol reacts with concentrated HNO_3 ?
- Picric acid
 - Para-Nitrophenol
 - Ortho-Nitrophenol
 - All of the above
- 33) Acetone reacts with hydrogen cyanide (HCN) to form a cyanohydrin. It is an example of:
- Electrophilic addition
 - Electrophilic substitution
 - Nucleophilic substitution
 - Nucleophilic addition
- 34) Benedict's solution is the combination of:
- $\text{Cu}(\text{OH})_2 + \text{NaOH} + \text{Tartaric acid} (\text{C}_4\text{H}_6\text{O}_6)$
 - $\text{Cu}(\text{OH})_2 + \text{NaOH} + \text{Citric acid} (\text{C}_6\text{H}_8\text{O}_7)$
 - $\text{Ag}(\text{NH}_3)_2\text{OH} + \text{NaOH} + \text{H}_2\text{SO}_4$
 - $\text{NaCl} + \text{NaOH} + \text{Citric acid}$

- 35) Which of the following statements is false about the acid-strength of acetic acid?
- Acetic acid is a stronger acid than monochloroacetic acid.
 - Acetic acid is a stronger acid than propionic acid.
 - Acetic acid is a weaker acid than Trichloroacetic acid.
 - Acetic acid is a weaker acid than formic acid.
- 36) The linear arrangement of amino acid units in proteins is called:
- Secondary structure
 - Tertiary structure
 - Primary structure
 - Quaternary structure
- 37) The amount of products that is actually produced during a chemical reaction by performing experiment is called _____.
- Mole
 - Actual yield
 - Theoretical yield
 - Percent yield
- 38) The shape of ammonia (NH_3) is _____.
- Trigonal bi pyramidal
 - Trigonal pyramidal
 - Trigonal planar
 - Square planar
- 39) The thermal decomposition of nitrogen pentoxide in gaseous state follows, which one of the following order of reaction?
- $$\text{N}_2\text{O}_5(g) \rightarrow 2\text{NO}_2(g) + 1/2\text{O}_2(g)$$
- First order
 - Second order
 - Fractional order
 - Third order
- 40) The temperature above which two conjugate solutions merge into one another is called _____.
- Critical solution temperature
 - Critical solution point
 - Absolute solution temperature
 - Absolute solution point
- 41) In which of the following molecule hydrogen bond is not present?
- H_2O
 - HF
 - CH_4
 - Ni_2
- 42) The distillation carried out under reduced pressure is called _____.
- Steam distillation
 - Simple distillation
 - Fractional distillation
 - Vacuum distillation
- 43) Which one of the following pairs of compounds is not isomorphous in nature?
- NaF and MgO
 - KNO_3 and NaNO_3
 - ZnO and CdS
 - AgNO_3 and KNO_3
- 44) The value of solubility products depends only on _____.
- Temperature
 - Solvent
 - Pressure
 - Catalyst
- 45) All alkaline metals are white in colour except _____.
- Beryllium
 - Magnesium
 - Calcium
 - Strontium
- 46) Optical activity of a compound is measured by an instrument called _____.
- Hydrometer
 - Barometer
 - Calorimeter
 - Polarimeter
- 47) The structural isomerism in which isomers are in dynamic equilibrium with each other is:
- Chain isomerism
 - Position isomerism
 - Metamerism
 - Tautomerism
- 48) Isopropyl benzene is also called _____.
- Cumene
 - Xylene
 - Toluene
 - Cresol
- 49) The first ionization energy of Al is less than Mg. This is due to:
- Electron in the $3p^1$ of Al
 - Al is less metallic than Mg
 - Mg comes first than Al
 - ionization energy from Mg to Al decreases
- 50) Which one has Prussian blue colour?
- Ferric hexa cyano ferrate (II)
 - Iron (III) hexa cyano ferrate (II)
 - Sodium hexa cyano ferrate (III)
 - Both (A) & (B)
- 51) Which one is a stronger Lewis Base?
- Phenol
 - Aniline
 - Pyridine
 - Both (A) & (B) have equal strength
- 52) Photon of which of the following series will have largest wave length?
- Bracket series
 - Pfund series
 - Balmer series
 - Paschen series
- 53) Which one of the following elements has the largest second ionization energy?
- K
 - Ca
 - Cl
 - Bi

Read the passage and answer the question Q71: Comprehension of medical books is considered as one of the most difficult processes among understanding technical terms of diversified fields. Many studies have considered reading as a guessing activity; which means regardless of the student's level, the text will frequently contain numerous difficult words. The ability to guess and infer the meanings of unknown terminology might be viewed as a skill that should be developed.

- 71) All is true except:
- A) Acquiring technical jargon is difficult in technical professions, such as medical.
 - B) The only reading approach used by medical students is inferring the meaning of challenging words
 - C) The technical terminology makes comprehension of medical text challenging.
 - D) None of the above

Read the passage and answer the question Q72: People say that certain cancers are protected against by tomatoes and processed tomato products like tomato sauce and canned tomatoes. Lycopene has been found to be responsible for tomato's and tomato product's ability to prevent certain cancer. Lycopene is the vivid red pigment that gives red hue to tomatoes and other red fruits. The processed tomatoes are found to have more Lycopene. Tomato paste contains four times as much Lycopene as fresh tomatoes do because Lycopene is strongly linked to vegetable fiber and is soluble in water. Further, oil helps in absorption of Lycopene because it is a fat-soluble substance.

- 72) It can be understood from the passage that as far as Lycopene intake is concerned:
- A) It is a pigment which is solved quickly in water and juice.
 - B) Lycopene hardly offers any protection against cancer.
 - C) Tomato products contain high concentrations of Lycopene and fat.
 - D) There is a correlation between the Lycopene consumption and the prevention of some cancer types.

Read the passage below and answer Q73-75

The water resources of our country are very much underutilized. The main reason behind this is the lack of capital and technology. A large portion of our water resources is wasted due to floods, unwise use of water for irrigation and domestic use. We can make full use of our water resources by building dams on rivers and through awareness campaign among people not to waste water resources.

- 73) Building of dams is an essential step in the conservation of water resources.
- A) Definitely true
 - B) Probably true
 - C) Data is inadequate
 - D) Probably false
- 74) Occurrence of floods add to the water resources.
- A) Definitely true
 - B) Probably true
 - C) Probably false
 - D) Definitely false
- 75) The country does not have enough funds to develop water resources.
- A) Definitely true
 - B) Probably true
 - C) Data is inadequate
 - D) Probably false
- 76) In a certain language, REMOTE is coded as ROTEME, which word would be coded as PNIICC?
- A) PINCIC
 - B) PNICIC
 - C) PICNIC
 - D) PICCIN
- 77) Five bags are lying in a pile one above the other. If A is above B, C is above D but below E and D is above A, which bag is in the middle.
- A) E
 - B) D
 - C) A
 - D) B
- 78) Find the term which does not fit into the sequence:
1CV, 5FU, 9IT, 15LS, 17OR
- A) 17OR
 - B) 5FU
 - C) 9IT
 - D) 15LS
- 79) Which one of the following is not the characteristic of viruses?
- A) They do not respire.
 - B) They do not excrete.
 - C) They do not have the ability to reproduce.
 - D) They can be crystallized.
- 80) In 1935 W.M. Stanley prepared an extract of:
- A) Tobacco mosaic virus (TMV)
 - B) Human immunodeficiency virus (HIV)
 - C) Flu virus
 - D) Polio virus
- 81) Human immunodeficiency virus (HIV) particles surround with a coat known as viral envelop or membrane made up of:
- A) Glycoprotein
 - B) Glycolipid
 - C) Lipoprotein
 - D) Sulpholipid

- 120) All of the following are the characteristics of cartilage except:
- It is a type of connective tissue
 - The precursor cells are chondrocytes
 - It contains blood vessels
 - It heals very slowly
- 121) Which one of the following is not related to Arthritis?
- Inflammation of joint
 - An autoimmune disease
 - The leading cause of disability in patients over the age of 65
 - Inflammation of nerve
- 122) An exception to Mendel's law is:
- Linkage
 - Dominance
 - Purity of gametes
 - Independent assortment
- 123) The hollow elongated tube formed when muscle fiber penetrates deep into the cell is known as:
- A tubule
 - M tubule
 - T tubule
 - Z tubule
- 124) The type of neuron that carries nerve impulse from tissue and organ to the spinal cord and brain is:
- Sensory neuron
 - Motor neuron
 - Intermediate neuron
 - Associative neuron
- 125) Hormones are usually:
- Genetical messengers
 - Physical messengers
 - Chemical messengers
 - Biological catalyst
- 126) Which of the following lobes of the pituitary gland is known as master gland of the body?
- Anterior gland
 - Posterior gland
 - Intermediate gland
 - Antero-posterior gland
- 127) Which of the following hormones is responsible for reducing the blood glucose level?
- Thyroid hormone
 - Insulin hormone
 - Glucagon hormone
 - ADH hormone
- 128) If the homozygous white-eyed *Drosophila* female is crossed with red-eyed *Drosophila* male, what is the probability of the male offspring having white color eye:
- 0%
 - 25%
 - 50%
 - 100%
- 129) The term "survival of the fittest" was used by:
- Lamarck
 - Darwin
 - Herbert Spencer
 - Mayer
- 130) The raw material that is used by natural selection for better survival is/are:
- Variation only
 - Mutation only
 - Similarity only
 - Variation and mutation
- 131) The *Archaeopteryx* is a fossil bird which possesses the characters of both:
- Fishes and Amphibians
 - Amphibians and Reptiles
 - Reptiles and birds
 - Birds and mammals
- 132) A condition characterized by hypothyroidism and enlargement of thyroid gland is known as:
- Graves disease
 - Gigantism
 - Goiter
 - Exophthalmia
- 133) The percentage of carbon dioxide carried as carboxyhaemoglobin is:
- 70%
 - 23%
 - 15%
 - 7%
- 134) A small biological unit that can evolve over time is _____
- a specie
 - a population
 - an organism
 - cell
- 135) The most abundant element present in human body is _____
- sulphur
 - nitrogen
 - carbon
 - manganese
- 136) Mammals become dominant in:
- Cenozoic Period
 - Jurassic Period
 - Mesozoic Period
 - Paleozoic period
- 137) A haemoglobin molecule consists of _____ Amino acids:
- 874
 - 474
 - 674
 - 574
- 138) Steroid is formed by backbone of four fused carbon rings containing:
- 14 carbon atoms
 - 16 carbon atoms
 - 17 carbon atoms
 - 18 carbon atoms

194) A projectile is thrown at an angle of 45° with horizontal and its range is R_1 . Another projectile is thrown at an angle of 45° with vertical and its range is R_2 . The relation between R_1 and R_2 is:

- A) $R_1 = 2R_2$
- B) $R_1 = 2R_2$
- C) $R_1 = R_2$
- D) $3R_1 = R_2$

195) A cyclist comes to a skidding stop in 10m. During this process, the opposing force on the cycle due to the road is 200N. How much work does the road do on the cycle?

- A) -1500J
- B) -2000J
- C) 2000J
- D) 1500J

196) The energy of simple harmonic oscillator at a displacement "x" is partly kinetic and partly potential. The total energy of a simple harmonic oscillator remains constant everywhere. Which one of the following option will be correct about the simple harmonic oscillator?

- A) Kinetic energy is maximum at extreme position
- B) Potential energy is maximum at extreme position
- C) Both kinetic and potential energies are minimum at mean position
- D) Potential energy is maximum at mean position

197) The speed of a wave on a particular string is 24ms^{-1} . If the string is 6.0m long, to what driving frequencies will it resonate?

- A) 1Hz, 2Hz, 3Hz
- B) 2Hz, 4Hz, 6Hz
- C) 3Hz, 6Hz, 9Hz
- D) 5Hz, 10Hz, 15Hz

198) The apparent change in the frequency of sound caused by the relative motion of either the source of sound or listener or both is called:

- A) Compton effect
- B) Zeeman effect
- C) Stark effect
- D) Doppler effect

199) The time period of a simple pendulum with mass m, is T. When the pendulum's mass m is replaced by another ball of mass 3 times the older mass such that the length of pendulum is not changed then its new time period will be:

- A) T
- B) 3T
- C) T/3
- D) 2T

200) The velocity of a wave is v, its time period is T and f is its frequency. Then the correct equation for frequency is

- A) $T = v/f$
- B) $1/f = v \times T$
- C) $1/f = 1/T$
- D) $T = v/T$

THE END