

Seat No.

Total No. of Pages : 20

RE-Entrance Examination 2026**Department of Science****M. Sc. Chemistry (Inorganic/Organic/Physical/Analytical/
Industrial/Applied)****Subject Code : 58713**

Day and Date : Wednesday, 24-06-2026**Total Marks : 100****Time : 12.30 PM TO 02.00 PM**

Instructions:

- 1) All questions are compulsory.
 - 2) Each question carries 1 mark.
 - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
 - 4) Follow the instructions given on OMR sheet.
 - 5) Rough work shall be done on the sheet provided at the end of question paper.
-

1) $\left(\frac{\partial A}{\partial T}\right)_V = ?$

a) G

b) P

c) S

d) -S

- 2) The ratio of fugacity of substance in a given state to that in its standard state is known as of a substance.

a) activity

c) concentration

b) molarity

d) chemical potential

- 3) Condensation of gases in the narrow capillary pores of the adsorbent at pressures even below the saturation pressure of the gas is known as..... condensation of the gas.

a) molecular

c) complete

b) partial

d) capillary

- 10) Solvay process is used to make
- a) Potassium carbonate
 - b) Sodium carbonate
 - c) Sodium hydroxide
 - d) Sodium chloride
- 11) Which gas is evolved at the cathode in aqueous medium?
- a) Chlorine
 - b) Hydrogen
 - c) Oxygen
 - d) Nitrogen
- 12) What is the unit of current density?
- a) A/sq.ft..
 - b) A/dm²
 - c) Both a) and b)
 - d) None of these
- 13) Non-volatile compounds can be best analyzed by
- a) gas chromatography
 - b) liquid column chromatography
 - c) thin layer chromatography
 - d) size exclusion chromatography
- 14) principle is used in water purification technology.
- a) High performance liquid chromatography
 - b) Size exclusion chromatography
 - c) Ion exchange chromatography
 - d) Affinity chromatography

- 15) The detector commonly used in liquid chromatography are
- a) flame ionization detector
 - b) thermal conductivity detector
 - c) refractive index detector
 - d) both a and b
- 16) Compounds with low R_f value can be effectively separated by paper chromatography
- a) ascending
 - b) descending
 - c) radial/circular
 - d) None of these
- 17) In gas chromatography, the separation of compounds is best achieved by
- a) temperature programming
 - b) gradient elution
 - c) isocratic elution
 - d) gravimetric separation
- 18) Gradient elution means.
- a) combination of A, B, C mobile phases with varying polarity
 - b) polar mobile phase and nonpolar stationary phase
 - c) polar stationary phase and nonpolar mobile phase
 - d) mobile phase A and B with ratio 1:2
- 19) The ion exchange resins are characterized by
- a) percentage of ion active groups
 - b) number of ion active groups
 - c) gram equivalent of ions
 - d) the ability to exchange positive ions

- 25) When the foreign ions gets trapped in the growing crystal, it is called as
- a) inclusion
 - b) mechanical entrapment
 - c) surface adsorption
 - d) occlusion
- 26) Gravimetric analysis is governed by
- a) The law of mass action and reversible reactions
 - b) The principle of solubility product
 - c) The common ion effect
 - d) All of the above
- 27) What is the role of oxine in aluminium assay?
- a) Surfactants
 - b) Colloidal
 - c) Precipitating agent
 - d) Emulsifier agent.
- 28) A Gooch crucible is primarily used in the laboratory for which technique?
- a) Distillation
 - b) Sublimation
 - c) Gravimetric Analysis
 - d) Crystallization
- 29) What defines a supersaturated solution?
- a) It contains less solute than a saturated solution.
 - b) It contains the maximum amount of solute that can be dissolved at room temperature.
 - c) It contains more dissolved solute than the equilibrium saturation limit.
 - d) It is a heterogeneous mixture of two liquids.

- 42) Ethyl mercaptan is added to LPG to
- a) increase its colorific value b) make it flammable
c) timely leakage detection d) make it coloured
- 43) Petroleum resources are highest in
- a) Iraq b) Venezuela
c) India d) United Arab Emirates
- 44) Chemical cell without transference is a combination of
- a) Electrode reversible to cation and metal insoluble salt electrode
b) Two electrodes reversible to cations
c) Two electrodes reversible to anions
d) None of these
- 45) During electrolysis current produces due to.....
- a) Flow of ions b) Flow of electrons
c) Both a and b d) None of these
- 46) Photochemical reactions takes place by the absorption of
- a) UV and visible radiation b) IR radiation
c) heat energy d) none of the above
- 47) Photosynthesis is an example of.....
- a) Fluorescence
b) Phosphorescence
c) Chemiluminescence
d) Photosensitization

- 48) Condensation reaction of activated methylene compound and aldehyde or ketone is called as reaction.
- a) Michael
b) Knoevenagel
c) Wittig
d) Dickmann condensation
- 49) Rearrangement involving change in carbon skeleton through carbocation intermediate is called as
- a) Wagner-Meerwein
b) Knoevenagel
c) Diels-Alder
d) Wittig
- 50) Cinnamaldehyde can be prepared by using benzaldehyde and acetaldehyde.
- a) Aldol condensation
b) Claisen condensation
c) Perkin reaction
d) Diels-Alder reaction
- 51) Synthetic equivalent for alkyl anion is
- a) Grignards reagent
b) alkyl halide
c) Tollen's reagent
d) alkane
- 52) Propene on reaction with HBr in presence of peroxide forms
- a) 1-bromo propene
b) 2-bromo propene
c) 1,2-dibromo propene
d) 1,3-dibromo propene
- 53) Alkenes form 1:2 diols on reaction with.....
- a) dil. H_2SO_4
b) BH_3 and H_2O_3
c) cold aq. $KMnO_4$ solution
d) dilute alkali

- 54) Nicotine reacts with methyl iodide to form dimethiodide and two monomethiods but it does not form acetyl or benzyl derivatives which indicate.....
- a) Two nitrogen atoms in nicotine are tertiary
 - b) One nitrogen atom is secondary and the other is tertiary
 - c) Two nitrogen atoms in nicotine are primary
 - d) One nitrogen atom is primary and the other is tertiary
- 55) What is an alkaloid?
- a) A type of hydrocarbons
 - b) A type of isoprene unit containing molecules
 - c) Nitrogen-containing natural products
 - d) Oxygen-containing natural products
- 56) The water content of clarified cane juice is
- a) 85%
 - b) 15%
 - c) 65%
 - d) 9.5%
- 57) The density scale used to measure sugar concentration is
- a) trix
 - b) brix
 - c) pan
 - d) calendria
- 58) An antipyretic is a drug used to
- a) control sleep
 - b) induce sleep
 - c) lower body temperature
 - d) elevate body temperature

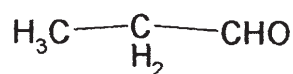
66) The expression $K_D = \frac{C_1}{C_2}$ where C_1 and C_2 denote the concentration of a solute in two solvents A and B, and K_D is the constant, is called.....

- a) equilibrium law
- b) rate law
- c) Nemst distribution law
- d) none of these

67) The formula, $K = \frac{c_1}{\sqrt{c_2}}$ indicates that the solute is present as a molecule in second solvent

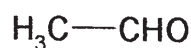
- a) single
- b) double
- c) triple
- d) none of these

68) How many peaks will be observed in ^{13}C NMR spectrum of the following molecule?



- a) 1
- b) 2
- c) 3
- d) 4

69) How many peaks will be observed in ^1H NMR spectrum of the following molecule?



- a) 1
- b) 2
- c) 3
- d) 4

70) Which among the following functional group protons show highest chemical shift in ^1H NMR?

- a) Alcohols
- b) Carboxylic acid
- c) Ketone
- d) Vinylic

- 76) What is the purpose of a standard solution in titrimetric analysis?
- a) To react with the analyte and form a product
 - b) To determine the concentration of the analyte
 - c) To calibrate the titration apparatus
 - d) To increase the sensitivity of the titration reaction.
- 77) What is the purpose of standardization in titrimetric analysis?
- a) To prepare a solution of known concentration
 - b) To determine the concentration of an analyte in a sample
 - c) To measure the volume of the titrant solution being added to the sample
 - d) To determine the concentration of the titrant solution
- 78) Which of the following chelating agents is commonly used in the preservation of food?
- a) Ethylene diamine tetraacetic acid (EDTA)
 - b) Dimercaprol
 - c) Deferoxamine
 - d) Penicillamine
- 79) Which of the following elements has the highest number of valence electrons?
- a) Sodium
 - b) Magnesium
 - c) Aluminium
 - d) Silicon
- 80) Which one of the following is organometallic compound?
- a) $\text{Co}(\text{CN})_6$
 - b) $\text{Ni}(\text{CO})_4$
 - c) $\text{Fe}(\text{CN})_6$
 - d) All of these

ROUGH WORK