GUJCET-E-2015

Test Booklet No. [redacted] **Test Booklet Code** **C**

This booklet contains 48 pages.

DO NOT open this Test Booklet until you are asked to do so.

Important Instructions :

1) This test consists 120 questions of Physics, Chemistry and Biology. Each question carries 1 mark. For each correct response the candidate will get 1 mark. For each incorrect response ¼ mark will be deducted. Maximum marks is **120.**
2) This Test is of **3 hours** duration.
3) Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle '●'.
4) Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5) **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room / Hall. The candidates are allowed to take away this Test Booklet with them.**
6) The CODE for this Booklet is **C.** Make sure that the CODE printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7) The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8) Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet / Answer Sheet.
9) Use of White fluid for correction is not permissible on the Answer Sheet.
10) Each candidate must show on demand his / her Admission Card to the Invigilator.
11) No candidate, without special permission of the Superintendent or Invigilator, should leave his / her seat.
12) Use of Manual Calculator is permissible.
13) The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak - 01). Cases where a candidate has not signed the Attendance Sheet (Patrak - 01) be deemed not to have handed over the Answer Sheet and dealt with as an unfair means case.
14) The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15) No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16) The candidates will write the Correct Test Booklet Code as given in the Test Booklet / Answer Sheet in the Attendance Sheet (Patrak - 01).

Candidate's Name : [redacted]

Note:The Information provided here is only for reference .It may vary the Original.

PHYSICS

1) One moving electron when comes closer to other stationary electron, then its kinetic energy and potential energy respectively _____ and _____.

(A) increases, increases
(B) increases, decreases
(C) decreases, increases
(D) decreases, decreases

2) An inclined plane of length 5.60 m making an angle of 45° with the horizontal is placed in an uniform electric field $E = 100\ Vm^{-1}$. A particle of mass 1 kg and charge 10^{-2} C is allowed to slide down from rest position from maximum height of slope. If the co-efficient of friction is 0.1, the time taken by the particle to reach the bottom is _____.

(A) 1 s
(B) 1.41 s
(C) 2 s
(D) None of these

3) Charges 1 μc are placed at each of the four corners of a square of side $2\sqrt{2}$ m. The potential at the point of intersection of the diagonals is _____ ($K = 9 \times 10^9$ SI unit)

(A) 18×10^3 V
(B) 1800 V
(C) $18\sqrt{2} \times 10^3$ V
(D) None of these

4) A point charge q is situated at a distance r on axis from one end of a thin conducting rod of length L having a charge Q[Uniformly distributed along its length]. The magnitude of electric force between the two is _____.

(A) $\frac{KQq}{r^2}$
(B) $\frac{2KQ}{r(r+L)}$
(C) $\frac{KQq}{r(r-L)}$
(D) $\frac{KQq}{r(r+L)}$

(Space for Rough Work)

5) If alpha particle and deutron move with velocity v and $2v$ respectively, the ratio of their de - Broglie wave length will be _____.

(A) 2 : 1 (B) $1:\sqrt{2}$

(C) 1 : 1 (D) $\sqrt{2}:1$

6) de - Broglie wave length of atom at TK absolute temperature will be

(A) $\frac{h}{\sqrt{3mKT}}$ (B) $\frac{h}{mKT}$

(C) $\frac{\sqrt{2mKT}}{h}$ (D) $\sqrt{2mKT}$

7) If the wave length of light is 4000A°, then the number of waves in 1 mm length will be _____.

(A) 2500 (B) 25

(C) 250 (D) 25000

8) The frequencies of X rays, γ rays and Ultra violet rays are respectively p, q and r then

(A) $p > q, q > r$ (B) $p < q, q > r$

(C) $p < q, q < r$ (D) $p > q, q < r$

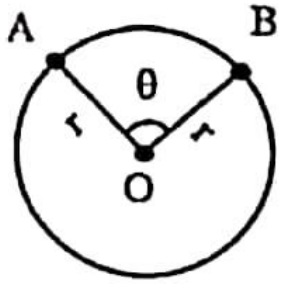
9) Photons having energy 1eV and 2.5 eV successively incident on a metal, having work function is 0.5 eV. The ratio of maximum speed of emitted electrons is

(A) 2 : 1 (B) 1 : 2

(C) 3 : 1 (D) 1 : 3

(Space for Rough Work)

10) A and B are two points on a uniform ring of radius r. The resistance of the ring is R. $\angle AOB = \theta$ as shown in the figure. The equivalent resistance between points A & B is _____.



(A) $\frac{R(2\pi-\theta)}{4\pi}$

(B) $\frac{R\theta}{2\pi}$

(C) $R\left(1-\frac{\theta}{2\pi}\right)$

(D) $\frac{R}{4\pi^2}(2\pi-\theta)\theta$

11) Two wires of equal length and equal diameter and having resistivities ρ_1 and ρ_2 are connected in series. The equivalent resistivity of the combination is _____.

(A) $\frac{\rho_1+\rho_2}{2}$

(B) $(\rho_1+\rho_2)$

(C) $\frac{\rho_1\rho_2}{\rho_1+\rho_2}$

(D) $\sqrt{\rho_1\rho_2}$

(Space for Rough Work)

$R + R$.

$\rho_1\frac{l}{A} + \rho_2\frac{l}{A}$

12) Match the following two columns.

	Column I		Column II
a)	Electrical resistance	p)	$ML^2T^{-3}A^{-2}$
b)	Electrical potential	q)	$ML^2T^{-1}A^{-2}$
c)	Specific resistance	r)	$ML^2T^{-3}A^{-1}$
d)	Specific conductance	s)	None of these

(A) $a-q, b-r, c-p, d-s$

(B) $a-q, b-s, c-r, d-p$

(C) $a-p, b-q, c-s, d-r$

(D) $a-p, b-r, c-q, d-s$

13) Angle of minimum deviation for a prism of refractive index 1.5 is equal to the angle of prism of given prism. Then the angle of prism is _____ ($\sin 48°36' = 0.75$)

(A) 80°

(B) 41°24'

(C) 60°

(D) 82°48'

14) A ray of light passes from a medium A having refractive index 1.6 to the medium B having refractive index 1.5. The value of critical angle of medium A is _____.

(A) $\sin^{-1}\sqrt{\frac{16}{15}}$

(B) $\sin^{-1}\left(\frac{16}{15}\right)$

(C) $\sin^{-1}\left(\frac{1}{2}\right)$

(D) $\sin^{-1}\left(\frac{15}{16}\right)$

(Space for Rough Work)

15) The power of plane mirror is _____.

(A) 0 (B) ∞

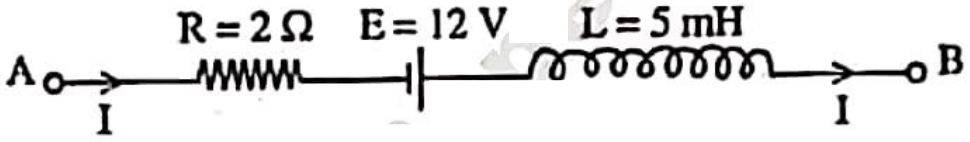
(C) 2D (D) 4D

16) Light waves travel from optically rarer medium to optically denser medium. Its velocity decreases because of change in _____

(A) wavelength (B) frequency

(C) amplitude (D) phase

17) The Network shown in Figure is a part of the circuit. (The battery has negligible resistance)



At a certain instant the current I = 2 A and it is decreasing at the rate of 10^2 As^{-1}. What is the potential difference between the points B and A?

(A) 8.5 V (B) 8.0 V

(C) 10 V (D) 15 V

18) A rod of 10 cm length is moving perpendicular to uniform magnetic field of intensity 5×10^{-4} Wb/m^2. If the acceleration of the rod is 5 m/s^2, then the rate of increase of induced emf is _____.

(A) 25×10^{-4} Vs (B) 2.5×10^{-4} Vs^{-1}

(C) 20×10^{-4} Vs (D) 20×10^{-4} Vs^{-1}

(Space for Rough Work)

$F = \frac{m}{a}$.

$B = 5 \times 10^{-4}$.

$\mathcal{E} =$ $l = 10\ cm = 0.1\ m$.

$a = \frac{m}{F}$

19) A current of $\frac{25}{\pi}$ Hz frequency is passing through an A.C. circuit having series combination of $R = 100\ \Omega$ and $L = 2$ H, the phase difference between voltage and current is _____

(A) 60° (B) 90°

(C) 30° (D) 45°

20) In A.C. circuit having only capacitor, the current _____.

(A) leads the voltage by $\frac{\pi}{2}$ in phase

(B) lags behind the voltage by $\frac{\pi}{2}$ in phase

(C) leads the voltage by π in phase

(D) lags behind the voltage by π in phase

21) An alternating voltage given as $V = 100\sqrt{2}\sin 100t$ volt is applied to a capacitor of 1 μF. The current reading of the ammeter will be equal to _____ mA.

(A) 20 (B) 10

(C) 40 (D) 80

22) The distance of the closest approach of an alpha particle fired at a nucleus with kinetic energy K is r_0. The distance of the closest approach when the α particle is fired at the same nucleus with kinetic energy 2K will be

(A) $4r_0$ (B) $\frac{r_0}{2}$

(C) $\frac{r_0}{4}$ (D) $2r_0$

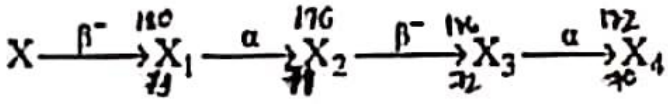
(Space for Rough Work)

23) Number of spectral line in hydrogen atom is

(A) 8 (B) 6

(C) 15 (D) α

24) A radioactive element X disintegrates successively as under



If atomic number and atomic mass number of X are respectively 72 and 180, what are the corresponding values for X_4?

(A) 69, 172 (B) 69, 176

(C) 71, 176 (D) 70, 172

25) The energy released by the fission of one uranium atom is 200 MeV. The number of fission per second required to produce 6.4 W power is _____.

(A) 2×10^{11} (B) 10^{11}

(C) 10^{10} (D) 2×10^{10}

26) If by successive disintegration of ${}_{92}U^{238}$, the final product obtained is ${}_{82}Pb^{206}$, then how many number of α and β particles are emitted?

(A) 6 and 8 (B) 8 and 6

(C) 12 and 6 (D) 8 and 12

(Space for Rough Work)

27) A change of 0.04 V takes place between the base and the emitter when an input signal is connected to the CE transistor amplifier. As a result, 20 μA change take place in the base current and a change of 2 mA takes place in the collector current. Find the input resistance and A.C. current gain.

(A) 1kΩ, 100
(B) 2kΩ, 100
(C) 2kΩ, 200
(D) 1kΩ, 200

28) A plane polarized light is incident normally on a tourmaline plate. Its E vectors make an angle of 60° with the optic axis of the plate. Find the percentage difference between initial and final intensities.

(A) 50%
(B) 25%
(C) 75%
(D) 90%

29) Light of wave length λ is incident on slit of width d. The resulting diffraction pattern is observed on a screen placed at distance D. The linear width of central maximum is equal to width of the slit, then D = _____

(A) $\frac{2\lambda^2}{d}$
(B) $\frac{d^2}{2\lambda}$
(C) $\frac{d}{\lambda}$
(D) $\frac{2\lambda}{d}$

(Space for Rough Work)

30) In a N–P–N transistor about 10^{10} electrons enter the emitter in 2μs, when it is connected to a battery. Then I_E = _____ μA.

(A) 400

(B) 200

(C) 800

(D) 1600

0.314

31) The effective length of a magnet is 31.4 cm and its pole strength is 0.8 Am. The magnetic moment, if it is bent in the form of a semicircle is _____ Am^2.

(A) 1.2

(B) 1.6

(C) 0.16

(D) 0.12

32) Equal currents are passing through two very long and straight parallel wires in the same direction. They will _____.

(A) attract each other

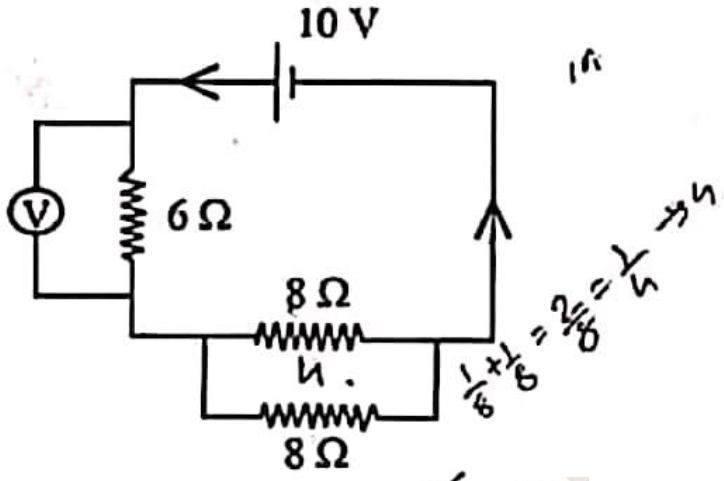
(B) repel each other

(C) lean towards each other

(D) neither attract nor repel each other

(Space for Rough Work)

33) A voltmeter of a very high resistance is joined in the circuit as shown in figure. The voltage shown by this voltmeter will be _____.



(A) 5 V
(B) 6 V
(C) 2.5 V
(D) 3 V

34) A galvanometer of resistance 50 Ω is connected to a battery of 8 V along with a resistance of 3950 Ω in series. A full scale deflection of 30 div is obtained in the galvanometer. In order to reduce this deflection to 15 division, the resistance in series should be _____ Ω

(A) 1950
(B) 7900
(C) 2000
(D) 7950

35) At a place on Earth, the vertical component of Earth's magnetic field is $\sqrt{3}$ times its horizontal component. The angle of dip at this place is _____

(A) 60°
(B) 30°
(C) 45°
(D) 0°

(Space for Rough Work)

36) Which gate can be obtained by shorting both the input terminals of a NOR gate.

(A) NOT (B) OR

(C) AND (D) NAND

37) An optical fiber can offer a band width of _____.

(A) 100 GHz (B) 100 MHz

(C) 750 MHz (D) 250 MHz

38) To transmit a signal of 3 KHz frequency, the minimum length of antenna is _____km $\frac{3\times10^8}{3\times10^3} = 10^5$

(A) 25 (B) 20

(C) 50 (D) 75

39) 27 identical drops of mercury are charged simultaneously with the same potential of 10 Volt. Assuming the drop to be spherical, if all the charged drops are made to combine to form one large drop, then its potential will be _____ Volt.

(A) 40 (B) 90

(C) 160 (D) 10

40) When 10^{19} electrons are removed from a neutral metal plate through some process, the charge on it becomes _____.

(A) +1.6 C (B) –1.6 C

(C) 10^{19} C (D) 10^{-19} C

(Space for Rough Work)

CHEMISTRY

41) Which method is used to get very pure germanium used in semiconductor?

(A) vapour - phase refining

(B) electrolysis

(C) liquation

(D) zone - refining

42) Which product will be obtained in the following reaction?

Reaction : $P_{4(s)} + 3NaOH_{(aq)} + 3H_2O_{(l)} \rightarrow$

(A) $PH_{3(g)} + 3NaH_2PO_{2(aq)}$

(B) $PH_{3(g)} + 3Na_2HPO_{2(aq)}$

(C) $2PH_{3(g)} + 3Na_2HPO_{2(aq)}$

(D) $2PH_{3(g)} + 3NaH_2PO_{2(aq)}$

43) The molecular formulae for phosgene and tear gas are _____ and _____ respectively.

(A) $COCl_2$ and CCl_2NO_2

(B) $SOCl_2$ and CCl_2NO_2

(C) $COCl_2$ and CCl_3NO_2

(D) $SOCl_2$ and CCl_3NO_2

44) Which of the following mixture is called Aquaregia?

(A) Three parts of dil. HCl and 1 part of conc. HNO_3

(B) Two parts of conc. HCl and two parts of conc. HNO_3

(C) Three parts of conc. HCl and 1 part of dil. HNO_3

(D) Three parts of conc. HCl and 1 part of conc. HNO_3

(Space for Rough Work)

45) Which of the following is allylic halide?

(A) (1 - bromo ethyl) benzene

(B) Benzyl chloride

(C) 1 - bromo benzene

(D) 3 - chloro cyclo hex-1-ene

46) 50% of the reagent is used for dehydrohalogenation of 6.45 gm CH_3CH_2Cl. What will be the weight of the main product obtained?

[At. mass of H, C and Cl are 1, 12 & 35.5 gm/mole^{-1} respectively]

(A) 1.4 gm (B) 0.7 gm

(C) 2.8 gm (D) 5.6 gm

47) Name the following reaction $CH_3CH_2Cl + NaI \xrightarrow{\text{acetone}} CH_3CH_2I + NaCl$

(A) Frinkel-stein reaction

(B) Swartz reaction

(C) Wurtz reaction

(D) Hell-Volhard Zelinsky reaction

48) Which reagent is used for bromination of methyl phenyl ether?

(A) Br_2 / CH_3COOH

(B) Br_2 / Red P

(C) Br_2 / $FeBr_3$

(D) HBr / Δ

(Space for Rough Work)

49) Which of the following acid does not have –COOH group?

(A) Picric acid
(B) Ethanoic acid
(C) Benzoic acid
(D) Salicylic acid

50) Which of the following statement is not correct?

(A) Phenol is neutralised by sodium carbonate
(B) Phenol is used to prepare analgesic drugs
(C) Solubility of phenol in water is more than that of chlorobenzene
(D) Boiling point of o-nitrophenol is lower than that of p-nitrophenol

51) Total order of reaction $X + Y \rightarrow XY$ is 3. The order of reaction with respect to X is 2. State the differential rate equation for the reaction.

(A) $-\frac{d[X]}{dt}=K[X]^{1}[Y]^{1}$
(B) $-\frac{d[X]}{dt}=K[X]^{1}[Y]^{0}$
(C) $-\frac{d[X]}{dt}=K[X]^{2}[Y]$
(D) $-\frac{d[X]}{dt}=K[X][Y]^{2}$

52) $X \xrightarrow{\text{Step-I}} Y \xrightarrow[\text{slow}]{\text{Step-II}} Z$ is a complex reaction. Total order of reaction is 2 and Step - II is slow step. What is molecularity of Step-II?

(A) 2
(B) 1
(C) 3
(D) 4

(Space for Rough Work)

53) Reaction $3ClO^- \rightarrow ClO_3^- + 2Cl^-$ occurs in following two steps.

(i) $ClO^- + ClO^- \xrightarrow{K_1} ClO_2^- + Cl^-$ (Slow step)

(ii) $ClO_2^- + ClO^- \xrightarrow{K_2} ClO_3^- + Cl^-$ (Fast step)

then the rate of given reaction = _____.

(A) $K_1[ClO^-]$ (B) $K_1[ClO^-]^2$

(C) $K_2[ClO_2^-][ClO^-]$ (D) $K_2[ClO^-]^3$

54) At given temperature and pressure adsorption of which gas of the following will take place the most?

(A) Di oxygen O_2 (B) Di hydrogen H_2

(C) Ammonia NH_3 (D) Di nitrogen N_2

55) Which type of colloid is the dissolution of sulphur (S_8)?

(A) Micelle (B) Associated colloid

(C) Multimolecular colloid (D) Macromolecular colloid

56) For Adsorption phenomenon,

(A) $\Delta H = -ve, \Delta S = +ve$ (B) $\Delta H = +ve, \Delta S = -ve$

(C) $\Delta H = -ve, \Delta S = -ve$ (D) $\Delta H = +ve, \Delta S = +ve$

(Space for Rough Work)

57) Which of the following statement is incorrect for $KMnO_4$?

(A) It is used as antiseptic.

(B) It is an oxidising agent.

(C) It is used as bleaching agent in textile industries.

(D) It is dark purple coloured amorphous substance.

58) Which of the following ion has the maximum theoretical magnetic moment?

(A) Cr^{3+} (B) Fe^{3+}

(C) Ti^{3+} (D) Co^{3+}

59) Which of the following oxide has the maximum basicity?

(A) Pr_2O_3 (B) La_2O_3

(C) Sm_2O_3 (D) Gd_2O_3

60) Which of the following spectrochemical series is true?

(A) $SCN^- < F^- < NH_3 < en < CO$

(B) $SCN^- < NH_3 < F^- < en < CO$

(C) $SCN^- < F^- < en < NH_3 < CO$

(D) $SCN^- < F^- < en < CO < NH_3$

(Space for Rough Work)

61) Which of the following complex is paramagnetic?

(A) $[Co(NH_3)_6]^{3+}$ (B) $[Ni(CO)_4]$

(C) $[Ni(CN)_4]^{2-}$ (D) $[NiCl_4]^{2-}$

62) Both $[Ni(CO)_4]$ and $[Ni(CN)_4]^{2-}$ are diamagnetic. The types of hybridisation of Ni in these complexes are _____ & _____ respectively.

(A) sp^3, dsp^2 (B) sp^3, sp^3

(C) dsp^2, sp^3 (D) dsp^2, dsp^2

63) Which of the following order of acidic strength is not correct?

(A) $CH_3 \cdot CH_2 \cdot \underset{\displaystyle Cl}{\underset{|}{CH}} \cdot COOH > CH_3 \cdot \underset{\displaystyle Cl}{\underset{|}{CH}} \cdot CH_2 \cdot COOH > CH_2 \cdot CH_2 \cdot \underset{\displaystyle Cl}{\underset{|}{CH_2}} \cdot COOH$

(B) $Cl_3 \cdot C \cdot COOH > Cl_2 \cdot CH \cdot COOH > Cl \cdot CH_2 \cdot COOH$

(C) $H \cdot COOH > CH_3COOH > C_6H_5COOH$

(D) $CH_3COOH > CH_3 \cdot CH_2 \cdot COOH > (CH_3)_2 \cdot CH \cdot COOH$

64) What is the formula of Acrolein?

(A) $CH_2 = CH - CN$

(B) $CH_2 = CH - CHO$

(C) $CH_2 = CH - COOH$

(D) $CH_2 = CH - CONH_2$

(Space for Rough Work)

65) What is IUPAC name for isophthalic acid?

(A) Benzene - 1, 2 dicarboxylic acid

(B) Benzene - 1, 3 dicarboxylic acid

(C) Benzene - 1, 4 dicarboxylic acid

(D) Benzene - 1, 5 dicarboxylic acid

66) What is the name for red azo dye?

(A) β - napthyl azo benzene

(B) p –hydroxy azo benzene

(C) p - amino azo benzene

(D) p - N, N dimethyl amino azo benzene

67) Which of the following is not formed by Sandmayer reaction?

(A) C_6H_5I (B) C_6H_5Cl

(C) C_6H_5Br (D) C_6H_5CN

68) For which vitamin liver is not the source?

(A) Vitamin - B_2 (B) Vitamin - B_1

(C) Vitamin - B_{12} (D) Vitamin - H

(Space for Rough Work)

69) In which of the following compound, all the monosaccharide units are not joined by $C_1 - O - C_4$ chain.

(A) Lactose
(B) Maltose
(C) Cellulose
(D) Amylopectin

70) Which of the following polymer is formed by cationic addition polymerisation reaction?

(A) Poly styrene
(B) Butyl rubber
(C) Teflon
(D) PVC

71) Which of the following polymer is used in pigment?

(A) Neoprene
(B) Buna - S
(C) Teflon
(D) Orlon

72) To prevent food from spoilage by microorganism, which substance is used?

(A) Arneto
(B) Aspartame
(C) Salt of sorbic acid
(D) Tetrazine

(Space for Rough Work)

73) Which of the following defect is seen in FeO?

(A) Metal deficiency defect

(B) Metal excess defect

(C) Displacement defect

(D) Impurity defect

74) Which of the following substance possess antiferromagnetic property?

(A) CrO_2 (B) Fe_3O_4

(C) H_2O (D) MnO

75) The boiling points for aqueous solutions of sucrose and urea are same at constant temperature. If 3 gm of urea is dissolved in its 1 litre solution, what is the weight of sucrose dissolved in its 1 litre solution?
[Urea - 60 gm/mole, sucrose = 342 gm/mole]

(A) 17.1 gram (B) 3.0 gram

(C) 6.0 gram (D) 34.2 gram

76) Which option is inconsistant for Raoult's law?

(A) The change in heat of dilution for solution = 0

(B) Volume of liquid solvent + volume of liquid solute = volume of solution.

(C) Solute does not undergo association in solution

(D) Solute undergoes dissociation in solution

(Space for Rough Work)

77) Which colligative property is more useful to determine the molecular weight of the substances like proteins and polymers?

(A) Elevation in boiling point

(B) Lowering of vapour pressure

(C) Depression of freezing point

(D) Osmotic pressure

78) The resulting solution obtained at the end of electrolysis of concentrated aqueous solution of NaCl _____.

(A) turns blue litmus into red

(B) turns red litmus into blue

(C) remains colourless with phenolphthalein

(D) the colour of red or blue litmus does not change

79) The value of E°_{red} for metal A, B and C are 0.34 Volt, –0.80 Volt and –0.46 Volt respectively. State the correct order for their ability to act as reducing agent.

(A) A > B > C

(B) C > B > A

(C) B > C > A

(D) C > A > B

80) Two electrolytic cells containing molten solutions of Nickel chloride & Aluminium chloride are connected in series. If same amount of electric current is passed through them, what will be the weight of Nickel obtained when 18 gm of Aluminium is obtained? (Al - 27 gm/mole, Ni - 58.5 gm/mole $^{-1}$)

(A) 117 gm

(B) 58.5 gm

(C) 29.25 gm

(D) 5.85 gm

(Space for Rough Work)