Hall Ticket Number

Q.B.No. 4 6 4 3 2 1

Booklet Code : A

Marks : 100
Time : 120 minutes

3TP1S

Signature of the Candidate **Signature of the Invigilator**

INSTRUCTIONS TO THE CANDIDATE

(Read the Instructions carefully before Answering)

1. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you along with Question Paper Booklet. Please read and follow the instructions on the OMR Answer Sheet for marking the responses and the required data.
2. The candidate should ensure that the Booklet Code printed on OMR Answer Sheet and Booklet Code supplied are same.
3. **Immediately on opening the Question Paper Booklet by tearing off the paper seal, please check for (i) The same booklet code (A/B/C/D) on each page, (ii) Serial Number of the questions (1-100), (iii) The number of pages and (iv) Correct Printing.** In case of any defect, please report to the invigilator and ask for replacement of booklet with same code within five minutes from the commencement of the test.
4. Electronic gadgets like Cell Phone, Calculator, Watches and Mathematical/Log Tables are not permitted into the examination hall.
5. **There will be ¼ negative mark for every wrong answer.** If the response to the question is left blank without answering, there will be no penalty of negative mark for that question.
6. Using Blue/Black ball point pen to darken the appropriate circles of (1), (2), (3) or (4) in the OMR Answer Sheet corresponding to correct or the most appropriate answer to the concerned question number in the sheet. Darkening of more than one circle against any question automatically gets invalidated and will be treated as wrong answer.
7. Change of an answer is NOT allowed.
8. Rough work should be done only in the space provided in the Question Paper Booklet.
9. Return the OMR Answer Sheet and Question Paper Booklet to the invigilator before leaving the examination hall. Failure to return the OMR sheet and Question Paper Booklet is liable for criminal action.

This Booklet consists of 13 Pages for 100 Questions + 2 Pages of Rough Work + 1 Title Page i.e. Total 16 Pages.

SPACE FOR ROUGH WORK

3TP1S **Booklet Code A**

Time : 2 Hours **Marks : 100**

Instructions :

i) Each question carries ***one*** mark and ¼ negative mark for every wrong answer.

ii) Choose the correct or most appropriate answer from the given options to the following questions and darken, with Blue/Black Ball Point Pen, the corresponding digit **1, 2, 3** or **4** in the circle pertaining to the question number concerned in the OMR Answer Sheet, separately supplied to you.

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1. The displacement of particle moving along X-axis with respect to time is $x = at+bt^2–ct^3$, the dimensions of c are
   (1) T^{-3} (2) LT^{-1} (3) LT^{-3} (4) LT^{-2}

2. Which of the following are not the units of self inductance?
   (1) Weber/Ampere (2) Ohm-second
   (3) Joule-Ampere (4) Joule-Ampere^{-2}

3. The dimensions of volume (V), speed (v), force (F) and mass density (ρ) respectively are
   (1) $[V] = [M^0L^3T^0]$, $[v] = [MLT^{-2}]$, $[F] = [ML^{-1}T^{-2}]$, $[\rho] = [ML^{-3}T^0]$
   (2) $[V] = [M^0L^3T^0]$, $[v] = [M^0LT^{-1}]$, $[F] = [M^0LT^{-1}]$, $[\rho] = [ML^{-2}T]$
   (3) $[V] = [M^0L^3T^0]$, $[v] = [M^{-1}LT^{-1}]$, $[F] = [MLT^{-2}]$, $[\rho] = [ML^{-3}T^0]$
   (4) $[V] = [M^0L^3T^0]$, $[v] = [M^0LT^{-1}]$, $[F] = [MLT^{-2}]$, $[\rho] = [ML^{-3}T^0]$

4. The percentage error in the measurement of resistivity, length and radius of a wire is 1%, 2% and 3%, respectively. The percentage error in the measurement of resistance of the wire is
   (1) 9 (2) 6 (3) 8 (4) 10

5. Atmospheric pressure at sea level is
   (1) 1.013×10^3 Pa (2) 1.013 Pa (3) 1.013×10^7 Pa (4) 1.013×10^5 Pa

6. Which of the following is a sub-surface method of improving ground water level:
   (1) Recharge wells (2) Percolation tank
   (3) Flooding (4) Stream augmentation

7. Which of the following is not a primary green house gas in earths atmosphere?
   (1) Carbon monoxide (2) Methane
   (3) Water vapour (4) Ozone

8. Which of the following is false with reference to comets and asteroid :
   (1) Both are celestral bodies orbiting around Sun
   (2) Both have elliptical orbits
   (3) Asteroid consists of metals and rocky material, while comets are made up ice, dust organic compounds etc.
   (4) Asteroid lose material when its gets closer to Sun, while comets are usually solid

9. Choose the sequence containing correct match between left and right panels.

	Left		Right
A)	The Sun, moon and all those objects shining in the night sky	i)	Pole star
B)	Different groups of stars	ii)	Milky way
C)	The North star which indicates north direction	iii)	Asteroids
D)	Numerous tiny bodies move around the Sun	iv)	Celestial bodies
E)	Our solar system is a part of galaxy	v)	Constellations

(1) A-iv, B-v, C-i, D-iii, E-ii
(2) A-iii, B-iv, C-i, D-v, E-ii
(3) A-v, B-iii, C-ii, D-iv, E-i
(4) A-iv, B-iii, C-ii, D-v, E-i

10. An object 10 cm long is placed 20 cm in front of a concave mirror with focal length of 40 cm. What is the height of the image?
(1) 100 cm (2) 20 cm (3) 30 cm (4) 10 cm

11. The terahertz radiation lies between the wavelength range of :
(1) 100 μm to 1 mm (2) 30 μm to 90 μm
(3) 5 μm to 20 μm (4) 10 mm to 10 cm

12. In a Young's double slit experiment the angular width of a fringe formed on a distant screen is 1°. The wavelength of the light used is 6250 Å. What is the distance between the two coherent sources?
(1) 3.58×10^{-5} m (2) 1.3×10^{-5} m
(3) 2.5×10^{-5} m (4) 5.2×10^{-5} m

13. A petrol carrying truck was filled to its capacity of 38,000 liters in a refinery when the temperature was 45 °C. After several days of travel, the petrol was delivered at a destination where the temperature was 20 °C. If the coefficient of volume expansion of petrol and steel are 9.6×10^{-4}/°C and 11×10^{-6}/°C respectively, the amount of petrol delivered is
(1) 38000 Liters (2) 37088 Liters (3) 38912 Liters (4) 37000 Liters

14. Choose the option containing the incorrect statements mentioned below.
A) Water shown unusual expansion when the temperature goes from 0°C to 40°C and it becomes less dense at 4°C.
B) If the density of a solid object is greater than the density of the liquid that it is placed in, the object will sink.
C) Combustion is a reaction in which a substance reacts with hydrogen
D) Calorimeter measures the amount of heat involved in a process
(1) (A), (B) and (C) (2) (C) and (D)
(3) (A) and (C) (4) (A) and (B)

15. Choose the option showing correct match between left and right panels

	Left		Right
A)	Solidification	i)	solid → liquid
B)	Evaporation	ii)	solid → gas
C)	Sublimation	iii)	gas → liquid
D)	Melting	iv)	liquid → gas
E)	Condensation	v)	liquid → solid

(1) A-ii, B-v, C-iv, D-i, E-iii (2) A-i, B-iii, C-v, D-ii, E-iv
(3) A-v, B-iv, C-ii, D-i, E-iii (4) A-v, B-iii, C-i, D-iv, E-ii

16. Consider a situation where in you listen to the background noise in a hall using a tube of length 0.7 m. If this sets up a fundamental standing wave in the tube, what will be the frequency heard by you when your ear closes to other end of the tube and when your ear is far away from the tube? [use speed of sound in air = 343 m/s]
(1) 245 Hz and 122.5 Hz (2) 122.5 Hz and 245 Hz
(3) 163.3 Hz and 490 Hz (4) 122.5 Hz and 122.5 Hz

17. A motor bike moving at 20 m/s with its horn blowing (f = 1000 Hz) is chasing another motor bike going at 10 m/s in the same direction. What is the apparent frequency of the horn as heard by the rider being chased?
[use : speed of sound = 340 m/s]
(1) 917 Hz (2) 1200 Hz (3) 1094 Hz (4) 1031 Hz

18. A sound has an intensity 10×10^{-8} W/m^2. Express this sound level in dB.
(Assume the threshold intensity for hearing is 10^{-12} W/m^2)
(1) 100 dB (2) 10 dB (3) 50 dB (4) 500 dB

19. A canon is shooting the ball vertically down at a speed of 60 ms^{-1} and suddenly strong wind blows in a horizontal direction at a speed of 30 ms^{-1}. What is the resultant direction at which the ball travels with reference to vertical direction.
(1) 30° away (2) 26.5° (3) 35° (4) 45.5°

20. If a ball is dropped to fall from the height of 80 m, then how long it takes to reach the ground
(1) 2 s (2) 3 s (3) 4 s (4) 5 s

21. The principle of momentum conservation in the process of collision between particle can be understood from
(1) Kepler's law of motion (2) Newton's first and second laws
(3) Newton's first and third laws (4) Newton's second and third laws

22. An object is constrained to move along XZ plane. The force $\vec{F} = -2\hat{i} + 3\hat{y} + 4\hat{k}$ N acting on it makes the object to move a vector distance $5\hat{i} + 3\hat{k}$ m, then the work done by the force is
(1) 2 J (2) 1 J (3) 10 J (4) 22 J

23. The gravitational force with which you pull the earth is
(1) equal to the gravitational force with which the earth pulls you
(2) less than the gravitational force with which the earth pulls you
(3) greater than the gravitational force with which the earth pulls you
(4) zero

24. The orbital period of a planet, which orbits the Sun a distance R, given in terms of mass of the Sun M_s and universal gravitational constant G is

(1) $\left(\frac{4\pi}{GM_s}\right)R^2$ (2) $\left(\frac{4\pi^2}{GM_s}\right)R^3$ (3) $\frac{2\pi}{(GM_s)^{1/2}}R^{3/2}$ (4) $\frac{4\pi^2}{GM_s}R^{3/2}$

25. The commonly used material for shielding or screening magnetism is :
(1) Copper (2) Alluminium (3) Soft iron (4) Brass

26. A bar magnet of magnetic moment 2 Am^2 is free to rotate about a vertical axis through its centre. The magnet is released from rest from the east-west position. Find the change in the orientatranal energy of the magnet as it takes the North-South position. The horizontal component of the earth magnetic field is 25 μT.
(1) 70 μJ (2) 50 μJ (3) 9 μJ (4) 40 μJ

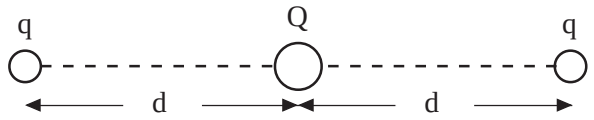
27. Magnetic susceptibility of diamagnetic material is typically :
(1) 10^{-5} (2) -10^{-5} (3) 10^5 (4) -10^{10}

28. The horizontal component of the earth's magnetic field is 3.6×10^{-5}T where the dip is 60°. Find the magnitude of the earth's magnetic field.
(1) 6.2×10^{-5} T (2) 4.5×10^{-5} T (3) 9.8×10^{-5} T (4) 7.2×10^{-5} T

29. The susceptibility of the material, when the Curie constant is 0.3 and the difference in critical temperature and paramagnetic Curie temperature is 0.02, is
(All quanties in SI units)

(1) 1.5 (2) $\frac{1}{15}$ (3) 150 (4) 15

30. Two charges each of magnitude 'q' are located a distance 'd' from a charge 'Q' as shown. For the system to be in equilibrium, the value of charge 'Q' should be



(1) $-\frac{q}{4}$ (2) $\frac{q}{2}$ (3) $\frac{q}{4}$ (4) $-\frac{q}{2}$

31. Eight positive charges of equal magnitude 'q' are placed at the corner of a cube of side length '*a*'. If one charge is removed from the corner, then the magnitude of electric field at the centre of the cube is

(1) $\frac{7q}{4\pi\epsilon_0 a^2}$ (2) $\frac{7q}{\pi\epsilon_0 a^2}$ (3) $\frac{q}{3\pi\epsilon_0 a^2}$ (4) $\frac{q}{12\pi\epsilon_0 a^2}$

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32. Find the energy dissipated in 5 min by an electric bulb with a filament of resistance of 500 Ω connected to a 240 V supply.

(1) 30,600 J (2) 20,560 J (3) 30,500 J (4) 34,560 J

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33. How many 40W bulbs can be safely connected in a parallel circuit which is drawing current through a 5A fuse from a 220V supply?

(1) 17 (2) 24 (3) 27 (4) 30

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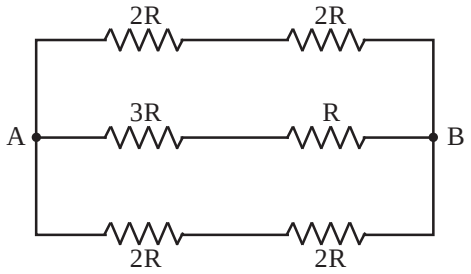
34. Few resistors are connected in series and parallel combination as shown in figure. The effective resistance between the points A and B is

(1) 12 R

(2) 4 R

(3) $\frac{4}{3}$ R

(4) 3 R



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35. If a long straight current carrying wire of radius '*a*' carries uniformly distributed current I, then the magnetic field at a radial distance $r < a$ is

(1) $\frac{\mu_0 I}{2\pi r}$ (2) $\frac{\mu_0 I}{2\pi a}$ (3) $\frac{\mu_0 I\, a}{2\pi r^2}$ (4) $\left(\frac{\mu_0 I}{2\pi a^2}\right) r$

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36. If a particle of charge 'q' moves with velocity $\vec{v}$ relative to an observer, the electric ($\bar{E}$) and magnetic field ($\bar{H}$) produced by the particle at the observer's location is ($\vec{r}$ is the distance vector from the charge to the observer)

(1) $\frac{q}{4\pi\epsilon_0 r^3}\bar{r}$ and $\frac{q}{4\pi r^3}(\vec{v}\times\bar{r})$ (2) $-\frac{q}{4\pi\epsilon_0}\bar{r}$ and $\frac{q}{4\pi}(\vec{v}\times\bar{r})$

(3) $-\frac{q}{4\pi\epsilon_0}\bar{r}$ and $-\frac{q}{4\pi}(\bar{r}+\vec{v})$ (4) $\frac{q}{4\pi\epsilon_0 r^2}\bar{r}$ and $\frac{q}{4\pi r^2}(\vec{v}\times\bar{r})$

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37. A battery of emf ε and internal resistance, *r* is used in a circuit with a variable external resistance R. Find the value of R for which the power consumed in R is maximum.

(1) r^2 (2) $2r^2$ (3) $2r$ (4) r

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38. Rest mass energy of an electron is
(1) 1.02 MeV (2) 0.511 MeV (3) 0.511 keV (4) 1.02 keV

39. What is the wavelength of the radiation emitted when the electron in the hydrogen atom jumps from $n = \infty$ to $n = 3$. ($h = 6.63\times10^{-3}$ J-sec)
(1) 792 nm (2) 822 nm (3) 854 nm (4) 904 nm

40. The kinetic energy of an electron is 13.65 eV. Calculate its approximate de-Broglie wavelength. ($h = 6.63\times10^{-34}$ J-sec)
(1) 6.62×10^{-10} m (2) 3.32×10^{-10} m (3) 4.82×10^{-10} m (4) 2.62×10^{-10} m

41. The half life of a radioactive nuclide is 20 hours. What fraction of original activity will remain after 40 hours?
(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{6}$

42. The half life time of a radioactive element 'X' is same as the mean life of another radioactive element Y. Initially they have same number of atoms then :
(1) Y will decay faster than X
(2) X will decay faster than Y
(3) X and Y will decay at the same rate at all time
(4) X and Y will decay at the same rate initially

43. In the decay scheme
$${}^{A}_{z}P \rightarrow {}^{A}_{z-1}D + x + y$$
the quantities x and y are
(n, ν and p are respectively neutron, photon and proton)
(1) e^+ and n (2) e^- and ν (3) e^- and p (4) e^+ and ν

44. A 1μg sample of a radioactive material contains 6×10^{14} nuclei. After 48 hours, 0.25 μg of the material remains. What is the half life of the material?
(1) 24 hr. (2) 12 hr. (3) 4 hr. (4) 92 hr.

45. Which one among the following is not an active component of an electronic system?
(1) Transistor (2) Tunnel diode (3) Vaccum tube (4) Inductor

46. For the p-type silicon which of the following statement is True.
(1) Holes are minority carriers and trivalent atoms are the dopants
(2) Holes are majority carriers and trivalent atoms are the dopants
(3) Electrons are minority carriers and pentavalent atoms are the dopants
(4) Electrons are majority carriers and pentavalent atoms are the dopants

47. The conductivity of Si at 300 K is 1.6×10^{-3} ohm^{-1} m^{-1} and the mobility of electron and holes are 0.75 m^2/V-sec and 0.25 m^2/V.sec, respectively. Then the carrier density of Si is
(1) 1.16×10^{16} m^{-3} (2) 1×10^{16} m^{-3} (3) 106×10^{16} m^{-3} (4) 10.6×10^{16} m^{-3}

48. Choose the sequence containing the True (T)-False (F) of the following statements.
A) ISP means Internet Service Protocol in E-mail software
B) FTP in file transfer application indicates File Transfer protocol
C) HTML used in web services indicates hypertext markup language
D) WWW indicates World Wide Web
(1) T, T, T, T (2) T, F, T, T (3) F, F, T, T (4) F, T, T, F

49. A signal of 20 kHz and peak voltage of 5V is modulated with a carrier frequency of 2 MHz and peak voltage of 10V. Then the modulation index and sideband produced are
(1) 2 ; 20 kH and 20.2 kHz (2) 0.5 ; 2 MHz and 2.2 MHz
(3) 0.5 ; 1820 kH and 2200 kHz (4) 0.5 ; 1980 kH and 2020 kHz

50. Choose the sequence containing correct match between different layers of atmosphere and their interaction with the propagating EM waves.

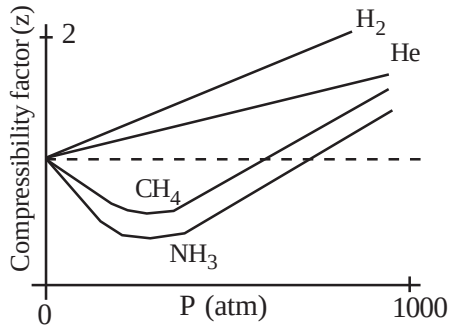
A)	Troposphere	i)	Helps surface waves and reflects HF
B)	Stratosphere	ii)	Efficiently reflects HF waves, particularly at night
C)	Mesosphere	iii)	Allow VHF up to several GHz
D)	Thermosphere	iv)	Partially absorbs HF waves yet allowing them to reach ionospheric layer F_2

(1) A-iv, B-iii, C-ii, D-i (2) A-iii, B-i, C-iv, D-ii
(3) A-ii, B-i, C-iii, D-iv (4) A-iii, B-iv, C-ii, D-i

51. Which of the following statement(s) is/are correct?
A) Chemical properties of a substance do not change with the change of its physical state.
B) Rate of chemical reactions do not depend upon the physical state of a substance.
C) Activation energy involved in a chemical reaction do not depend upon the physical state of a substance.
D) The force acting between two "H" atoms in a H_2 molecule is an example for intermolecular force.
(1) A, B, C (2) A, D, C (3) A (4) A, D

52. The critical pressure (atm) critical molar volume (dm^3) and critical temperature (K) of CO_2 respectively are
(1) 79, 94.6×10^{-2} and 304.2 (2) 73.9, 95.6×10^{-3} and 304.1
(3) 94, 73.6×10^{-3} and 314.2 (4) 72.8, 94.6×10^{-4} and 314.2

53. Order the following substances in the order of their increasing molar volume (Hint : The volume of N_2 at T_c and P_c is 0.09 $dm^3\ mol^{-1}$)
A) CO_2 at > T_c and < P_c
B) H_2O at < T_c and P_c
C) N_2 at T_c and P_c
(1) $CO_2 < N_2 < H_2O$ (2) $N_2 < H_2O < CO_2$
(3) $H_2O < N_2 < CO_2$ (4) $H_2O < CO_2 \simeq N_2$

54. 

Which of the following is wrong for the above representation?

(1) NH_3 and CH_4 at moderate pressure obey Boyle's law.
(2) At extremely low pressures, all the given gases obey Boyle's law.
(3) The compressability factor for He is greater than one at high pressure.
(4) Gases that can be liquefied easily show more deviation from ideal behavior.

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55. Which of the following reactions are possible?

a) $2\,NaFeO_2 + H_2O \longrightarrow 2\,NaOH + Fe_2O_3$

b) $Na_2CO_3 + Ca(OH)_2 \rightleftharpoons CaCO_3 + 2\,NaOH$

c) $2\,Na.Hg + 2\,H_2O \longrightarrow 2\,NaOH + 2\,Hg + H_2\uparrow$

d) $2\,Na + O_2(excess) \xrightarrow{350^\circ C} 2\,NaOH + H_2O$

(1) (a), (b), (c), (d) (2) (b), (c), (d)
(3) (a), (b), (c) (4) (a), (c), (d)

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56. Which of the following indicators would you prefer for the titration of a weak acid and strong base?

(1) Methyl Orange (2) Methyl Red
(3) Phenolpthalein (4) Bromo oresol green

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57. Which is not correct for plaster of paris?

(1) Plaster of paris is calcium sulphate hemihydrate.
(2) The setting process of plaster of paris is endothermic.
(3) Gypsum on heating at 120°C, gives plaster of paris.
(4) When plaster of paris heated at 200°C, forms Dead burnt plaster.

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58. Which of the following are not chemical changes?

i) Souring of milk
ii) Ripening of fruits
iii) Expansion of metal on heating
iv) Liquification of gases to liquids

(1) (i), (ii) (2) (i), (iii) (3) (ii), (iv) (4) (iii), (iv)

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59. Match the following:

List - I		List - II
A) Mixture of sodium ethanoate + soda lime	$\xrightarrow{\text{Heat}}$	i) H_2S
B) Conc.H_2SO_4 + NaCl	$\longrightarrow$	ii) Cl_2
C) Conc.HCl + MnO_2	$\longrightarrow$	iii) CH_4
D) dil.HCl + FeS	$\longrightarrow$	iv) HCl

(1) A-iii B-iv C-ii D-i (2) A-ii B-iii C-i D-iv
(3) A-iii B-iv C-i D-ii (4) A-iv B-iii C-ii D-i

60. The concentration of H^+ ion in a sample of plant extract is 10^{-4} M. What is its pH ?
(1) 4 (2) 3 (3) 2 (4) 12

61. Consider reaction of one mole of Cu with dilute and concentrated HNO_3. The number of moles of $Cu(NO_3)_2$ formed with dilute and concentrated HNO_3 respectively are,
(1) $\frac{1}{3}$ and 1 (2) 1 and $\frac{1}{3}$ (3) 1 and 1 (4) 3 and 3

62. Oxidation state of Fe in the brown colored complex formed during "Brown Ring Test" for nitrates is,
(1) + 3 (2) + 2 (3) + 1 (4) Both +3 and +2

63. Which of the following substances cannot undergo disproportionation reaction?
(1) PbO (2) Pb_3O_4 (3) PbO_2 (4) $Pb(NO_3)_2$

64. 100 mL of 1M solution $K_2Cr_2O_7$ in acidic medium was titrated against 1M solution of Na_2SO_3. What is the volume of Na_2SO_3 required to completely react $K_2Cr_2O_7$?
(1) 33.3 mL (2) 300 mL (3) 100 mL (4) 200 mL

65. Which statement is not true about photoelectric effect?
(1) Photoelectric effect is common in metals of low ionisation energy.
(2) Radiation with threshold frequency can eject electrons.
(3) Increase of the intensity of the radiation of a given frequency increases the number of electrons
(4) The kinetic energy of the emitted electrons decreases with the increase of the magnitude of frequency of the incident radiation.

66. Identify the electromagnetic radiation with longest wavelength.
(1) Radiowaves (2) Visible (3) Infrared (4) Microwave

67. The velocity of an electron is 3.2×10^8 cm s^{-1}. its wavelength is approximately (Electron mass = 9.1×10^{-28} g)
(1) 1.173 Å (2) 2.27 Å (3) 3.0 Å (4) 4.37 Å

68. Which one of the below is not true about Heisenberg uncertainty principle?
(1) Electrons are considered as particles revolving in a definite orbits.
(2) Δx is inversively proportional Δp.
(3) Applicable to microscopic particles
(4) $\Delta x . \Delta p$ is constant

69. Match the following:

List - I		List - II
A)	Principle quantum number (n)	i) Finer lines of spectrum further split up
B)	Angular quantum number (l)	ii) Average distance of electron cloud from nucleus
C)	Magnetic quanton number (m)	iii) Number of sub shells

(1) A-ii B-i C-iii (2) A-i B-ii C-iii
(3) A-iii B-i C-ii (4) A-ii B-iii C-i

70. Which is correct according to Auffbau principle?
(1) 4s will be filled before 3p (2) 3d will be filled before 4p
(3) 6p will be filled before 5d (4) 6d will be filled before 5f

71. According to Hund's rule, the correct electronic configuration of carbon is

		2 s	2 p		
(1)	[He]	↑↓	↑	↑	___
(2)	[He]	↑↓	↑	↓	___
(3)	[He]	↑↓	↑↓	___	___
(4)	[He]	↑↓	___	↑↓	___

72. What are "*n*" and "*l*" values respectively, for an electron in 5p orbital?
(1) 4, 0 (2) 5, 1 (3) 3, 2 (4) 4, 1

73. The filling of 4p sublevel starts for the element with atomic number
(1) 31 (2) 29 (3) 19 (4) 35

74. The correct ground state electronic configuration of Cu is
(1) [Ar] $3d^9\ 4s^2$ (2) [Ar] $4d^{10}\ 5s^1$
(3) [Ar] $3d^{10}\ 4s^0$ (4) [Ar] $3d^{10}\ 4s^1$

75. Which of the following cations has the highest polarizing power?
(1) Na^+ (2) Ca^{2+} (3) Mg^{2+} (4) Al^{3+}

76. The elements which occupy the peaks of atomic volume curve are
(1) Fe, Co, Ni (2) Cl, Br, I (3) Ne, Ar, Kr (4) Na, K, Cs

77. The electronegativity of the following elements increases in the order
(1) C, N, Si, P (2) N, Si, C, P (3) Si, P, C, N (4) P, Si, N, C

78. The first ionization enthalpy of Na, Mg, Al and Si are in the order
(1) Na < Mg > Al < Si (2) Na > Mg > Al > Si
(3) Na < Mg < Al > Si (4) Na > Mg > Al < Si

79. The bromine atom differs from the bromide ion in the
(1) number of protons (2) number of neutrons
(3) number of electrons (4) number of protons and neutrons

80. Which one among the below statements is correct?
(1) Electrons and nuclei repel each other
(2) Nuclei attract each other
(3) In general, the noble gases are chemically active
(4) During the course of chemical combination, atoms try to attain 2 or 8 electrons in their outermost energy level

81. The ion with pseudonoble gas configuration is
(1) Ag^{+} (2) Fe^{+3} (3) Cr^{+2} (4) Ti^{+2}

82. In SiO_2, the electronic configurations of Si and O atoms respectively, are
(1) Chlorine and Sodium (2) Sulphur and Fluorine
(3) Chlorine and Sodium ion (4) Argon and Neon

83. Linear shaped compounds are
(1) CO_2 , SO_2 (2) XeF_2 , NO_2 (3) SO_2 , NO_2 (4) XeF_2 , CO_2

84. Identify the one that exhibits intramolecular hydrogen bonding.
(1) Acetic acid (2) Phenol
(3) ortho-hydroxybenzaldehyde (4) para-hydroxybenzaldehyde

85. Hybridization of $COCl_2$, BCl_3, NH_3 and H_2O, respectively are
(1) sp^2 , sp^2 , sp^3 , sp^3 (2) sp^2 , sp^2 , sp^3 , sp^2
(3) sp , sp^2 , sp^2 , sp^3 (4) sp^2 , sp^2 , sp^2 , sp^2

86. Number of constitutional isomers of alkane with formula C_6H_{14} is
(1) 3 (2) 2 (3) 5 (4) 10

87. According to IUPAC nomenclature, isoprene is same as
(1) 1, 3 - butadiene (2) 2 - methyl but-2-ene
(3) 2 - methyl - 1,3 - butadiene (4) 1, 3 - dimethylbutadiene

88. The nitric acid, in the process of generation of nitronium ion, acts as
(1) a base (2) an acid (3) a catalyst (4) a solvent

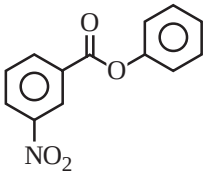
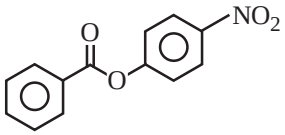
89. The hydrocarbon on heating with acidified $KMnO_4$ gives butanone, CO_2 and water. The hydrocarbon is
(1) butene (2) 2, 3-dimethyl-1-butene
(3) 2-methylpropene (4) 2-methyl-1-butene

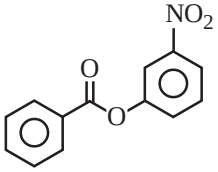
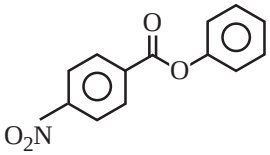
90. The major product formed in the reaction of propene with HBr in the presence of peroxide involves the intermediate

(1) $CH_3 - \underset{\underset{Br}{|}}{CH} - \dot{C}H_2$ (2) $CH_3 - \dot{C}H - CH_3$

(3) $CH_3 - \dot{C}H - CH_2Br$ (4) $CH_3 - CH_2 - \dot{C}H_2$

91. Nitration of phenyl benzoate gives

(1)  (2) 

(3)  (4) 

92. A is treated with H_2SO_4 in the presence of Hg^{2+} to get $B(C_4H_8O)$. When B is treated with NaOH and I_2 gives a yellow precipitate. A and B are respectively

(1) C_2H_2 and $CH_3CH_2CH_2CHO$

(2) $CH_3 - C \equiv CH$ and $C_2H_5 - \underset{\underset{O}{\|}}{C} - CH_3$

(3) $CH_3 - C \equiv C - CH_3$ and $CH_3\,CH_2\,CH_2\,CHO$

(4) $C_2H_5\,C \equiv C - H$ and $C_2H_5 - \underset{\underset{O}{\|}}{C} - CH_3$

93. Cyclo heptatrienyl cation is

(1) benzenoid and aromatic (2) non-benzenoid and aromatic

(3) non-benzenoid and antiaromatic (4) non-benzenoid and non-aromatic

94. The major pyrimidines found in DNA are

(1) Thymine and cytosine (2) Uracil and cytosine

(3) Adenine and cytosine (4) Guanine and cytosine

95. The copolymer derived from glycine and aminocaproic acid is

(1) Nylon - 2, 2 (2) Nylon - 2, 6 (3) Nylon - 6, 6 (4) Nylon - 6

96. From below, which statement is not correct about carbon monoxide (CO)?

(1) CO is very toxic at the levels usually found in the atmosphere.

(2) CO strongly binds to hemoglobin

(3) Treatment of CO poisoning is inhalation of pure oxygen

(4) CO is colorless and tasteless gas

97. Identify the products X and Y of the below reactions relating to acid rains.

Sulphur containing organic compound $\xrightarrow{\text{Anaerobic decomposition}}$ X $\downarrow O_2$ $Y + H_2O$

	X	Y
(1)	RSH	SO_3
(2)	RSH	SO_2
(3)	H_2S	SO_3
(4)	H_2S	SO_2

98. Match the following:

	List - I		List - II
A)	Magnetite	i)	Mg
B)	Argentite	ii)	Zn
C)	Magnesite	iii)	Fe
D)	Calamine	iv)	Ag

(1) A-i, B-ii, C-iv, D-iii (2) A-iii, B-iv, C-i, D-ii
(3) A-iii, B-iv, C-ii, D-i (4) A-iv, B-ii, C-iii, D-i

99. Match the following:

	List - I		List - II
A)	$Al_2O_3 \cdot 2H_2O \xrightarrow{\text{Heat}}$	i)	Smelting
B)	$2ZnS + 3O_2 \xrightarrow{\text{Heat}}$	ii)	Self reduction
C)	$PbO + C \xrightarrow{\text{Heat}} Pb + CO$ $PbO + CO \xrightarrow{\text{Heat}} Pb + CO_2$	iii)	Roasting
D)	$2PbS + 3O_2 \longrightarrow 2PbO + 2SO_2$ $2PbO + PbS \longrightarrow 3Pb + SO_2$	iv)	Calcination

(1) A-iii, B-i, C-iv, D-ii (2) A-ii, B-iii, C-iv, D-i
(3) A-i, B-ii, C-iii, D-iv (4) A-iv, B-iii, C-i, D-ii

100. Which one among the below generates refined pure metal via the formation its Tetrahedral carbonyl complex?

(1) Electrolytic refining (2) Poling
(3) Mond's process (4) Van Arkel process

SPACE FOR ROUGH WORK