SEAL

SUBJECT : CHEMISTRY	DAY – 2
SESSION : AFTERNOON	TIME : 02.30 P.M. TO 03.50 P.M.

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					A - 1	807425

DOs :

1. Check whether the CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This Question Booklet is issued to you by the invigilator after the **2nd Bell i.e., after 02.30 p.m.**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'TS :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The **3rd Bell rings at 02.40 p.m., till then;**
   - Do not remove the paper seals present on all the 3 sides of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 60 questions and each question will have one statement and four distracters. (Four different options / choices.)
2. After the **3rd Bell is rung at 02.40 p.m.,** remove the paper seals of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 70 minutes:
   - Read each question carefully.
   - Choose the correct answer from out of the four available distracters (options / choices) given under each question / statement.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :

4. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
5. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
6. After the **last bell is rung at 03.50 p.m.,** stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
7. Hand over the **OMR ANSWER SHEET** to the room invigilator as it is.
8. After separating the top sheet (Our Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
9. Preserve the replica of the OMR answer sheet for a minimum period of ONE year.

SEAL

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1. The mass of a non-volatile solute of molar mass 40 g mol^{-1} that should be dissolved in 114 g of octane to lower its vapour pressure by 20% is ·

(1) 10 g (2) 11.4 g

(3) 9.8 g (4) 12.8 g

2. During the adsorption of a gas on the surface of a solid, which of the following is TRUE ?

(1) $\Delta G < O, \Delta H > O, \Delta S < O$

(2) $\Delta G > O, \Delta H < O, \Delta S < O$

(3) $\Delta G < O, \Delta H < O, \Delta S < O$

(4) $\Delta G < O, \Delta H < O, \Delta S > O$

3. The approximate time duration in hours to electroplate 30g of calcium from molten calcium chloride using a current of 5 amp is

[At. mass of Ca = 40]

(1) 8 (2) 80

(3) 10 (4) 16

4. The pH of the solution obtained by mixing 100 ml of a solution of pH = 3 with 400 ml of a solution of pH = 4 is

(1) 3 – log 2.8 (2) 7 – log 2.8

(3) 4 – log 2.8 (4) 5 – log 2.8

Space For Rough Work

5. The equilibrium constant of the reaction :

$$A_{(s)} + 2B^{+}_{(aq)} \rightleftharpoons A^{2+}_{(aq)} + 2B_{(s)};\ E^{\circ}_{cell} = 0.0295\ V \text{ is}$$

$$\left[\frac{2.303\ RT}{F} = 0.059\right]$$

(1) 10 (2) 2×10^2

(3) 3×10^2 (4) 2×10^5

6. An oxygen containing organic compound was found to contain 52% carbon and 13% of hydrogen. Its vapour density is 23. The compound reacts with sodium metal to liberate hydrogen. A functional isomer of this compound is

(1) Ethanol (2) Ethanal

(3) Methoxy Methane (4) Methoxy Ethane

7. Which one of the following is NOT true regarding electromeric effect ?

(1) It results in the appearance of partial charges on the carbon atoms.

(2) It is a temporary effect.

(3) It operates on multiple bonds.

(4) It requires an attacking reagent.

8. Which one of the following is NOT formed when a mixture of methyl bromide and bromobenzene is heated with sodium metal in the presence of dry Ether ?

(1) Ethane (2) Diphenyl

(3) Propane (4) Toluene

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9. Power alcohol is a mixture of

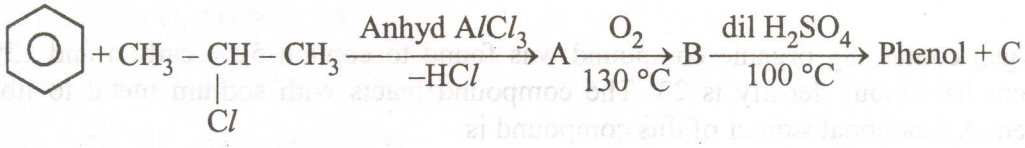
(1) 80% Petrol + 20% Benzene + Small quantity of Ethanol

(2) 80% Petrol + 20% Ethanol + Small quantity of Benzene

(3) 80% Ethanol + 20% Benzene + Small quantity of Petrol

(4) 50% Petrol + 50% Ethanol + Small quantity of Benzene

10. Identify 'C' in the following :



(1) Water (2) Ethanol

(3) Propanone (4) Cumene hydroperoxide

11. 20 ml of methane is completely burnt using 50 ml of oxygen. The volume of the gas left after cooling to room temperature is

(1) 80 ml (2) 40 ml

(3) 60 ml (4) 30 ml

12. 100 ml of 0.1 M acetic acid is completely neutralized using a standard solution of NaOH. The volume of Ethane obtained at STP after the complete electrolysis of the resulting solution is

(1) 112 ml (2) 56 ml

(3) 224 ml (4) 560 ml

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13. Saccharin, an artificial sweetner, is manufactured from

(1) Cellulose (2) Toluene

(3) Cyclohexane (4) Starch

14. Which of the following is NOT TRUE for S_N1 reaction ?

(1) Favoured by polar solvents.

(2) 3° – alkyl halides generally react through S_N1 reaction.

(3) The rate of the reaction does not depend upon the molar concentration of the nucleophile.

(4) 1° – alkyl halides generally react through S_N1 reaction.

15. Oil of winter green is

(1) an ester (2) a carboxylic acid

(3) an alcohol (4) a ketone

16. An organic compound 'A' burns with a sooty flame. It is negative towards Tollen's reagent test and positive for Borsche's reagent test. The compound 'A' is

(1) Benzaldehyde (2) Acetophenone

(3) Acetone (4) Salicylic acid

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17. For a reaction : A + B → Products, the rate of the reaction at various concentrations are given below :

Expt No	[A]	[B]	rate (mol dm^{-3} s^{-1})
1	0.2	0.2	2
2	0.2	0.4	4
3	0.6	0.4	36

The rate law for the above reaction is

(1) $r = K[A]^2 [B]$ (2) $r = K[A] [B]^2$

(3) $r = K[A]^3 [B]$ (4) $r = K[A]^2 [B]^2$

18. Which one of the following has NO unpaired electrons ?

(1) O_2 (2) O_2^-

(3) O_2^+ (4) O_2^{--}

19. The atomic number of cobalt is 27. The EAN of cobalt in $Na_3[Co(NO_2)_4Cl_2]$ is

(1) 35 (2) 24

(3) 36 (4) 34

20. The "spin only" magnetic moment of Ni^{2+} in aqueous solution would be [At No. of Ni = 28]

(1) $\sqrt{6}$ BM (2) $\sqrt{15}$ BM

(3) $\sqrt{2}$ BM (4) $\sqrt{8}$ BM

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21. Impossible orbital among the following is

(1) 2s (2) 3f

(3) 2p (4) 4d

22. The total number of electrons in 18 ml of water (density = 1 g ml^{-1}) is

(1) 6.02×10^{23} (2) 6.02×10^{25}

(3) 6.02×10^{24} (4) $6.02 \times 18 \times 10^{23}$

23. The number of moles of hydrogen that can be added to 1 mole of an oil is the highest in

(1) Linseed oil (2) Groundnut oil

(3) Sunflower seed oil (4) Mustard oil

24. The reaction between sodium and water can be made less vigorous by

(1) lowering the temperature (2) adding a little alcohol

(3) amalgamating sodium (4) adding a little acetic acid

25. All colloidal dispersions have

(1) very high osmotic pressure (2) low osmotic pressure

(3) no osmotic pressure (4) high osmotic pressure

26. Silver iodide is used for producing artificial rain because AgI

(1) is easy to spray at high altitude

(2) is easy to synthesize

(3) has crystal structure similar to ice

(4) is insoluble in water

Space For Rough Work

27. The equilibrium constant of a reaction is 0.008 at 298 K. The standard free energy change of the reaction at the same temperature is

(1) +11.96 kJ (2) –11.96 kJ

(3) –5.43 kJ (4) –8.46 kJ

28. The function of potassium ethyl xanthate in froth floatation process is to make the ore

(1) attracted towards water (2) water repellant

(3) lighter (4) heavier

29. The correct order of electronegativities of N, O, F & P is

(1) F > N > P > O (2) F > O > P > N

(3) F > O > N > P (4) N > O > F > P

30. The s-block element used as a catalyst in the manufacture of Buna-S rubber is

(1) Mg (2) Ca

(3) Ba (4) Na

31. Which of the following is NOT a characteristic of a covalent compound ?

(1) Low melting point

(2) No definite geometry

(3) Insoluble in polar solvent

(4) Small difference in electronegativity between the combining atoms.

Space For Rough Work

32. The volume of 0.1 M oxalic acid that can be completely oxidized by 20 ml of 0.025 M $KMnO_4$ solution is

(1) 125 ml (2) 25 ml

(3) 12.5 ml (4) 37.5 ml

33. A ligand is

(1) Lewis acid

(2) Bronsted acid

(3) either a Lewis acid or a Lewis base

(4) Lewis base

34. The vapour pressures of two liquids A and B in their pure states are in the ratio of 1 : 2. A binary solution of A and B contains A and B in the mole proportion of 1 : 2. The mole fraction of A in the vapour phase of the solution will be

(1) 0.33 (2) 0.2

(3) 0.25 (4) 0.52

35. Which of the following statements is TRUE ?

(1) The total entropy of the universe remains constant.

(2) The total entropy of the universe is continuously decreasing.

(3) The total energy of the universe is continuously decreasing.

(4) The total energy of the universe remains constant.

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36. 5 ml of 0.4 N NaOH is mixed with 20 ml of 0.1 N HCl. The pH of the resulting solution will be

(1) 6 (2) 7

(3) 8 (4) 5

37. On adding which of the following, the pH of 20 ml of 0.1 N HCl will not alter ?

(1) 1 ml of 1 N HCl (2) 20 ml of distilled water

(3) 1 ml of 0.1 N NaOH (4) 500 ml of HCl of pH = 1

38. Which one of the following has a potential more than zero ?

(1) $Pt, \frac{1}{2}H_2$ (1 atm) | HCl (1 M)

(2) $Pt, \frac{1}{2}H_2$ (1 atm) | HCl (2 M)

(3) $Pt, \frac{1}{2}H_2$ (1 atm) | HCl (0.1 M)

(4) $Pt, \frac{1}{2}H_2$ (1 atm) | HCl (0.5 M)

39. HCHO was treated with a reagent X. The product formed upon hydrolysis in the presence of an acid gave C_2H_5OH. The reagent X is

(1) aqueous KOH (2) alcoholic KOH

(3) alcoholic KCN (4) CH_3MgI

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40. Benzylamine is a stronger base than aniline because

(1) The lone pair of electrons on the nitrogen atom in benzylamine is delocalised.

(2) The lone pair of electrons on the nitrogen atom in aniline is delocalised.

(3) The lone pair of electrons on the nitrogen atom in aniline is not involved in resonance.

(4) Benzylamine has a higher molecular mass than aniline.

41. The relative acidic strengths of benzoic acid, o-toluic acid and p-toluic acid is of the decreasing order :

(1) p-toluic acid > o-toluic acid > benzoic acid

(2) o-toluic acid > p-toluic acid > benzoic acid

(3) p-toluic acid > benzoic acid > o-toluic acid

(4) o-toluic acid > benzoic acid > p-toluic acid

42. The C-H bond and C-C bond in ethane are formed by which of the following types of overlap ?

(1) $sp^3 - s$ and $sp^3 - sp^3$ (2) $sp^2 - s$ and $sp^2 - sp^2$

(3) $sp - s$ and $sp - sp$ (4) $p - s$ and $p - p$

43. The IUPAC name of

is

(1) 4-Hydroxy-2-pentanone (2) 2-Hydroxy-4-pentanone

(3) 2-Oxo-4-pentanol (4) 4-Keto-2-pentanol

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44. A first order reaction is 60% complete in 20 minutes. How long will the reaction take to be 84% complete ?

(1) 54 mins (2) 68 mins

(3) 40 mins (4) 76 mins

45. A given sample of milk turns sour at room temperature (27 °C) in 5 hours. In a refrigerator at –3 °C, it can be stored 10 times longer. The energy of activation for the souring of milk is

(1) $2.303 \times 10\ R\ kJ \cdot mol^{-1}$ (2) $2.303 \times 5\ R\ kJ \cdot mol^{-1}$

(3) $2.303 \times 3\ R\ kJ \cdot mol^{-1}$ (4) $2.303 \times 2.7\ R\ kJ \cdot mol^{-1}$

46. At 300 K, a gaseous reaction :

$A \rightarrow B + C$

was found to follow first order kinetics. Starting with pure A, the total pressure at the end of 20 minutes was 100 mm of Hg. The total pressure after the completion of the reaction is 180 mm of Hg. The partial pressure of A (in mm of Hg) is

(1) 100 (2) 90

(3) 180 (4) 80

47. From the Ellingham graphs on carbon, which of the following statements is FALSE ?

(1) CO_2 is more stable than CO at less than 983 K

(2) CO reduces Fe_2O_3 to Fe at less than 983 K

(3) CO is less stable than CO_2 at more than 983 K

(4) CO reduces Fe_2O_3 to Fe in the reduction zone of Blast furnace

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48. Which of the following is a negatively charged bidentate ligand ?

(1) Dimethyl glyoximato (2) Cyano

(3) Ethylene diamine (4) Acetato

49. The secondary valency of platinum in tetra ammine dichloroplatinum (IV) chloride is

(1) +4 (2) +2

(3) 3 (4) 6

50. Which one of the following has a magnetic moment of 1.75 BM ?

(1) Ti^{3+} (2) V^{3+}

(3) Cr^{3+} (4) Fe^{3+}

51. The correct order of ionisation energy of C, N, O & F is

(1) F < N < C < O (2) C < N < O < F

(3) C < O < N < F (4) F < O < N < C

52. The correct set of four quantum numbers for the outermost electron of sodium (Z = 11) is

(1) $3, 1, 0, \frac{1}{2}$ (2) $3, 1, 1, \frac{1}{2}$

(3) $3, 2, 1, \frac{1}{2}$ (4) $3, 0, 0, \frac{1}{2}$

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53. The ore that is concentrated by the Froth Floatation process is

(1) Chalcopyrites (2) Cryolite

(3) Cuprite (4) Calamine

54. The equivalent mass of a certain bivalent metal is 20. The molecular mass of its anhydrous chloride is

(1) 91 (2) 111

(3) 55.5 (4) 75.5

55. 2 moles of $N_2O_{4(g)}$ is kept in a closed container at 298 K and under 1 atm pressure. It is heated to 596 K when 20% by mass of $N_2O_{4(g)}$ decomposes to NO_2. The resulting pressure is

(1) 2.4 atm (2) 1.2 atm

(3) 4.8 atm (4) 2.8 atm

56. Sucrose is NOT a reducing sugar since

(1) it is chemically stable

(2) it contains no free aldehyde or keto group adjacent to a $\diagdown$CHOH$\diagup$ group

(3) it is built up of a fructose unit

(4) it is optically active

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57. Which one of the following contains ionic, covalent and co-ordinate bonds ?

(1) NaOH (2) NaCl

(3) NaCN (4) NaNC

58. Dialysis can be used to separate

(1) glucose & fructose (2) protein & starch

(3) glucose & protein (4) glucose & NaCl

59. The percentage of p-character of the hybrid orbitals in graphite and diamond are respectively :

(1) 33 and 25 (2) 50 and 75

(3) 67 and 75 (4) 33 and 75

60. A gas expands from a volume of 1 m^3 to a volume of 2 m^3 against an external pressure of 10^5 Nm^{-2}. The work done by the gas will be

(1) 10^5 kJ (2) 10^2 kJ

(3) 10^2 J (4) 10^3 J

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SEAL

A-1

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