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प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | | |

प्रश्नपुस्तिका सीरीज
Question Booklet Series
B

B.Sc. (First Semester) Examination, February/March-2022

B190101T

Industrial Chemistry

(Fundamentals of Industrial Chemistry)

Time : 1:30 Hours **Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

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Rough Work / रफ कार्य

1. If the electronic-Configuration of oxygen atom in ground state is written as $\perp s^2, 2s^2$

   ↑↓ ↑↓

   It would violate-

   (A) Hund's Rule

   (B) Pauli's exclusion principle

   (C) Both (A) & (B)

   (D) None of these

2. Which ion has the higher polarizing power?

   (A) Mg^{++}

   (B) Al^{+++}

   (C) Ca^{++}

   (D) Na^{+}

3. A metal which does not liberate H_2 (g) from acids?

   (A) Cu

   (B) Fe

   (C) Mn

   (D) Zn

4. Paramagnetism is not shown by-

   (A) O_2^-

   (B) H_2^+

   (C) O_2

   (D) O_2^{2-}

5. Which of the following exist as dimer?

(A) $AlCl_3$

(B) $CaCl_2$

(C) NCl_3

(D) BF_3

6. Liquid Ammonia and Liquour Ammonia are-

(A) Same

(B) Different

(C) Allotropes

(D) None of these

7. In Benzene, C atom exhibits the hybridization-

(A) SP

(B) SP^2

(C) SP^3

(D) SP^3d

8. The outermost electronic configuration of copper (29) is-

(A) $3d^5, 4s^1$

(B) $3d^5, 4s^1$

(C) $3d^9, 4s^1$

(D) $3d^{10}, 4s^1$

9. The shape of a molecule which has three bond pairs and one lone pair is-

(A) Octahedral

(B) Triangular planner

(C) Pyramidal

(D) Tetrahedral

10. The strongest base is-

(A) AsH_3

(B) NH_3

(C) PH_3

(D) SbH_3

11. Which is not present in clear hard water?

(A) $MgCO_3$

(B) $MgSO_4$

(C) $CaCl_2$

(D) H_2SO_4

12. Which of the following hydrides is most stable?

(A) NH_3

(B) PH_3

(C) AsH_3

(D) SbH_3

13. X_eF_6 is-

(A) Octahedral

(B) Distorted octahedral

(C) Planar

(D) Tetrahedral

14. The element with highest value of first Ionization potential is-

(A) Boron

(B) Carbon

(C) Nitrogen

(D) Oxygen

15. In which molecule are all atoms coplanar?

(A) CH_4

(B) BF_3

(C) PF_3

(D) NH_3

16. Marshall's acid is-

(A) $H_2S_2O_7$

(B) H_2SO_3

(C) $H_2S_2O_8$

(D) H_2SO_5

17. Which one of the following has square planar geometry?

(A) BeF_4^{--}

(B) SiF_4

(C) $SnCl_4$

(D) ICl_4^-

18. The Borax bead is-

(A) B_2O_3

(B) $Na_2B_4O_7$

(C) Na_2BO_3

(D) B_2O_3+$NaBO_2$

19. The most acidic oxide is-

(A) Ti_2O_3

(B) B_2O_3

(C) Ga_2O_3

(D) Al_2O_3

20. Which of the following is known as "king of chemicals"?

(A) H_2O

(B) H_2SO_4

(C) C_6H_6

(D) CH_4

21. Which of the following decreases the rate of reactions ?

(A) Catalytic Promoters

(B) Catalytic Poison

(C) Heterogeneous Catalyst

(D) Homogeneous Catalyst

22. Among N, O, F, Cl, S which have same value of electronegativity on Pauling scale?

(A) N,O

(B) N,S

(C) N, Cl

(D) Cl, S

23. An sp^3hybrid orbital Contains-

(A) ¼ s character

(B) ½ s character

(C) 2/3s character

(D) ¾ s character

24. Second electron affinity of an element-

(A) Is always positive

(B) Is always negative

(C) Can be positive or negative

(D) Is always zero

25. The value of bond order in He_2^+ -

(A) Zero

(B) 2

(C) 1/2

(D) 1

26. Which of the following is obtained at lowest temperature by fractional distillation of petroleum?

(A) Kerosene

(B) Diesel

(C) Gasoline

(D) LPG

27. Normal butane convert into Isobutane by-

(A) Li Al H_4

(B) Al Cl_3

(C) Na BH_4

(D) Zn/HCl

28. Most of the hydrocarbons from petroleum are obtained by-

(A) Fractional Distillation

(B) Vaporization

(C) Polymerization

(D) Fractional-Crystallization

29. LPG is separated during-

(A) Steam Distillation

(B) Fractional Distillation

(C) Azeotrophic Distillation

(D) None of the above

30. Natural gas is a mixture of-

(A) $CO+CO_2$

(B) $CO+N_2$

(C) $CO+H_2+CH_4$

(D) $CH_4+C_2H_6+C_3H_8$

31. At room Temperature solid Paraffin is-

(A) C_3H_8

(B) C_3H_{18}

(C) C_4H_{10}

(D) $C_{20}H_{42}$

32. The electrophile in aromatic- compounds nitration is-

(A) Nitronium Ion

(B) Nitrate Ion

(C) Nitrinium Ion

(D) Nitrate Ion

33. In Friedel - Craft acylation, the electrophile is-

(A) CH_3Co^+

(B) $C_6Co_5^+$

(C) $AlCl_3$

(D) CH_3^+

34. The –CHO group in Benzaldehyde is-

(A) Ortho directing

(B) Meta directing

(C) Para directing

(D) Ortho & Para directing

35. Benzene can undergo-

(A) Substitution

(B) Addition

(C) Elimination

(D) Oxidation

36. Coal Tar is main source of-

(A) Aromatic compounds

(B) Aliphatic compounds

(C) Cycloalkanes

(D) Heterocyclic compounds

37. Nitration of benzene is-

(A) Nucleophilic Substitution

(B) Electrophilic Substitution

(C) Nucleophilic Addition

(D) Free radical substitutions

38. Benzene reacts with CH_3CoCl_3 in the presence of $AlCl_3$ to give-

(A) C_6H_5Cl

(B) C_6H_5CoCl

(C) $C_6H_5CH_3$

(D) $C_6H_5CoCH_3$

39. In H_2SO_4 molecule Sulphur is hybridized as-

(A) sp^3

(B) sp^2

(C) sp

(D) sp^3d

40. The maximum number of Hydrogen bonds a water molecule can form is-

(A) 2

(B) 4

(C) 3

(D) 1

41. The component that contains electron deficient central atom is-

(A) $ZnCl_2$

(B) BCl_3

(C) NCl_3

(D) H_2O

42. In nuclear reactors, graphite is used as-

(A) Fuel

(B) Lubricant

(C) Moderator

(D) Insulator

43. Which of the following elements forms the highest number of compounds?

(A) Oxygen

(B) Hydrogen

(C) Chlorine

(D) Carbon

44. The natural source of hydrocarbon is-

(A) Crude oil

(B) Biomass

(C) Coal

(D) Carbohydrate

45. Baking soda is-

(A) Na_2CO_3

(B) K_2ClO_3

(C) Na_2SO_4

(D) $NaHCO_3$

46. What is the chemical formula of dry Ice?

(A) CO

(B) CO_2

(C) H_2O

(D) H_2O_2

47. Which of the following compound reacts with $NaNO_2$ and HCl?

(A) Phenol

(B) Aniline

(C) Both (A) & (B)

(D) None of these

48. In Laboratory Benzene can be prepaired by-

(A) Benzyl chloride

(B) Chlorobenzene

(C) Sodium Benzoate

(D) None of these

49. Which is most readily Sulphonated?

(A) Benzene

(B) Chlorobenzene

(C) Toluene

(D) Nitrobenzene

50. What type of gas is LPG?

(A) Gasoline

(B) Kerosene

(C) Uncondensed

(D) Heavy oil

51. Which one of the following has the highest value of ionic radius?

(A) Li^{3}

(B) B^{3+}

(C) O^{2-}

(D) F^{-}

52. Which element will have the higher electron affinity?

(A) Al

(B) P

(C) Si

(D) Cl

53. Which has the largest atomic size?

(A) Al

(B) Al^{2+}

(C) Al^{3+}

(D) Al^{+}

54. Which of the following molecular species has unpaired electron(s)?

(A) N_2

(B) F_2

(C) O_2^-

(D) O_2^{2-}

55. An element consist of 15 electrons and 20 neutron its mass number will be-

(A) 35

(B) 19

(C) 20

(D) 48

56. The shape of 'P' orbital is-

(A) Spherically symmetrical

(B) Dumbbell

(C) Double Dumbell

(D) None of these

57. Marsh gas mainly contains-

(A) Methane

(B) Ethane

(C) Propane

(D) Butane

58. The most strained cycloalkane is-

(A) Cyclopropane

(B) Cyclobutane

(C) Cyclopentane

(D) None of these

59. Kerosene is mainly the mixture of-

(A) Alkanes

(B) Alkenes

(C) Alkynes

(D) Arenes

60. What is not true of natural gas?

(A) It is a fuel

(B) It is a mixture of Hydrocarbons

(C) It is the mixture of CO_2& H_2

(D) It is found near petroleum wells

61. Sulphur molecule is-

(A) Diatomic

(B) Tetraatomic

(C) Hexaatomic

(D) Octa atomic

62. The kind of hybridization in SO_2 molecule is-

(A) SP

(B) SP^2

(C) SP^3

(D) dSP^2

63. Which of the following is not planner?

(A) SO_3

(B) SO_3^{2-}

(C) SO_2

(D) CO_3^{2-}

64. Benzene can undergo-

(A) Substitution

(B) Addition

(C) Oxidation

(D) All of these

65. Which is most readly sulphonated?

(A) Benzene

(B) Chlorobenzene

(C) Toluene

(D) Nitrobenzene

66. Which is not a flux?

(A) $CaCo_3$

(B) Lime

(C) SiO_2

(D) CaO

67. Heating of pyrites in air for oxidation of Sulphur is called-

(A) Roasting

(B) Calcination

(C) Smelting

(D) Slagging

68. Main function of roasting is-

(A) To remove volatile substances

(B) Oxidation

(C) Reduction

(D) Slag formation

69. In which state does pulverized coal burns?

(A) Gaseous

(B) Liquid

(C) Solid

(D) Colloidal

70. Which type of firing technique is employed for pulverized coal?

(A) Oxidation firing

(B) Reduction firing

(C) Front wall firing

(D) Raker firing

71. Which is the primary component of crude oil?

(A) Sulphur

(B) Carbon

(C) Hydrogen

(D) Nitrogen

72. How is crude oil separated?

(A) Crystallization

(B) Fractional distillation

(C) Decantation

(D) Sublimation

73. Natural gasoline is produced-

(A) Frame oil wells

(B) In oil refineries

(C) By natural gas stripping

(D) None of these

74. Kerosene is used in -/As-

(A) Ointments

(B) Jet engines

(C) Fuel

(D) Lubricants

75. Bitument is used in-

(A) Electronic-generators

(B) Road surfacing

(C) Coal tar

(D) Natural gas

76. Heating are with carbon in the absence of air is known as-

(A) Reduction

(B) Carbon-reduction

(C) Smelting

(D) Roasting

77. In the extraction of copper from sulphide ore, the metal is formed by reduction of Cu_2O with-

(A) FeS

(B) CO

(C) Cu_2S

(D) SO_2

78. The purest form of Iron is-

(A) Cast iron

(B) Pig iron

(C) Wrought iron

(D) Steel

79. Stainless steel is so called because of its-

(A) High strength

(B) High corrosion resistance

(C) High ductility

(D) Brittleness

80. Final structure of austempered steel-

(A) Pearlite

(B) Ferrite + graphite

(C) Bainite

(D) Martensite

81. Bronze is an alloy of-

(A) Copper and Nickel

(B) Copper and Iron

(C) Copper and Tin

(D) Copper and Aluminium

82. The boiling range of Gasoline is-

(A) 40 – 200℃

(B) 180 – 250℃

(C) 350 – 450℃

(D) 450℃+

83. $C_nH_2n$is the general formula of-

(A) Alkanes

(B) Alkenes

(C) Alkyene

(D) None of these

84. Which of these termed as – 'short-residue'?

(A) Vaccum Residue

(B) Atmospheric Residue

(C) Both (A) & (B)

(D) None of these

85. The pressure is kept ⊥ Bar during-

(A) Vaccum distillation

(B) Atmospheric distillation

(C) Steam distillation

(D) Azeotrophic distillation

86. The temperature is kept 125 – 130℃ during-

(A) Desalting of crude oil

(B) Vaccum distillation

(C) Cracking

(D) None of these

87. Which of the following is not an alloy?

(A) Steel

(B) Copper

(C) Brass

(D) Bronze

88. White cost iron contains carbon in the form of-

(A) Free carbon

(B) Graphite

(C) Cementite

(D) None of these

89. Melting point of Fe is-

(A) 1539℃

(B) 1601℃

(C) 1489℃

(D) 1712℃

90. Rusting of Iron takes place in-

(A) Ordinary water

(B) Distilled water

(C) Both (A) & (B)

(D) None of the above

91. During electrolytic reduction, the metals are deposited at-

(A) Cathode

(B) Anode

(C) Both Cathode & Anode

(D) At the bottom of Electrolytic-cell

92. Stainless steel is very useful material for our life, In stainless steel, iron is mixed with-

(A) Ni & Cr

(B) Cu & Cr

(C) Ni & Cu

(D) Cu & Au

93. The species which does not show paramegnetism is-

(A) O^2

(B) O_2^+

(C) O_2^{2-}

(D) H_2^+

94. Lanthanide Ion which is most likely to be reduced by Cr (+II)is-

(A) Sm

(B) Yu

(C) Yb

(D) All of these

95. Which molecule is T-shaped?

(A) Be F_2

(B) BCl_3

(C) NH_3

(D) ClF_3

96. How many unpaired electrons are present in N_2^+ -

(A) 1

(B) 2

(C) 3

(D) 4

97. Which of the following has zero dipole moment?

(A) CO_2

(B) SO_2

(C) H_2O

(D) NH_3

98. Which has fractional bond order?

(A) O_2^{2+}

(B) O_2^{2-}

(C) F_2^{2-}

(D) H_2^-

99. Which of the following is the weakest-bond?

(A) Hydrogen Bond

(B) Covalent Bond

(C) Metallic Bond

(D) Ionic

100. Electronegativity of Beryllium is approximately equal to that of-

(A) Aluminium

(B) Boron

(C) Mg

(D) Sodium

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