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# 68th BPSC Mains

**Previous Year Paper  
(Chemistry Optional) 18  
May, 2023**



1. Which biodegradable polymer can be produced from glycine and aminocaproic acid?

- (A) Nylon-2-nylon-6
- (B) PHBV
- (C) Buna-N
- (D) Nylon-6,6

2. The commercial name of polyacrylonitrile is

- (A) Dacron
- (B) Orlon
- (C) PVC
- (D) Bakelite

3. Which of the following compounds are used for the treatment of depression and hypertension?

- (A) Analgesics
- (B) Tranquilizers
- (C) Antibiotics
- (D) Pheromones

4. Which of the following enhances leathering property of soap?

- (A) Sodium carbonate
- (B) Sodium rosinate
- (C) Sodium stearate
- (D) Trisodium phosphate

5. Which of the following can be used as germicide also?

- (A) A cationic detergent
- (B) An anionic detergent
- (C) A non-ionic detergent
- (D) None of the above

6. Polyethylene glycols are used in the preparation of which type of detergents?

- (A) Cationic detergents
- (B) Anionic detergents
- (C) Non-ionic detergents
- (D) Soaps

7. Which of the following is a polymer?

- (A) Carnauba wax
- (B) Carbowax
- (C) Beeswax
- (D) Paraffin wax

8. The most appropriate source of vitamin C is

- (A) yeast
- (B) milk
- (C) lemon
- (D) cereal



9. The deficiency of which of the following vitamins causes rickets and osteomalacia?

(A) ~~Ergocalciferol~~

(B) Biotin

(C) Riboflavin

(D) Thiamine



10. What happens when a lead storage battery is discharged?

(A) ~~SO<sub>2</sub> is evolved~~

(B) Lead sulphate is consumed

(C) Lead is formed

(D) Sulphuric acid is consumed

H<sub>2</sub>SO<sub>4</sub>

11. Vinegar is

(A) ~~acetic acid~~

(B) salicylic acid

(C) stearic acid

(D) carbonic acid

12. Carboxylic acid used in acne creams is

(A) citric acid

(B) acetic acid

(C) oxalic acid

(D) ~~salicylic acid~~

13. Which of the following is used as a flavouring agent?

(A) Ethanol

(B) Acetone

(C) Formaldehyde

(D) ~~Benzaldehyde~~

14. Carbolic acid is

(A) ~~phenol~~

(B) salol

(C) phenyl benzoate

(D) phenyl acetate

15. Which one of the following is responsible for the permanent hardness of water?

(A) Calcium bicarbonate

(B) Sodium chloride

(C) Magnesium bicarbonate

(D) ~~Calcium sulphate~~

16. Baking powder contains

(A) NaHCO<sub>3</sub>, Ca(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> and starch

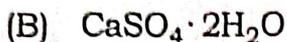
(B) NaHCO<sub>3</sub> and Ca(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub>

(C) NaHCO<sub>3</sub> and starch

(D) ~~NaHCO<sub>3</sub>~~



17. Plaster of Paris is



18. Which one of the following has magnesium?

(A) Vitamin  $\text{B}_{12}$

(B) Chlorophyll

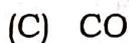
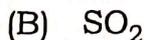
(C) Haemocyanin  $\times$

(D) Carbonic anhydrase  $\times$

19. Which is the main constituent of eggshell?



20. Which gas is used in aerated water?



(D) Water vapour

21. Petrochemicals can be used to prepare which of the following?

(A) Synthetic fibres

(B) Pesticides

(C) Plastics

(D) All of the above

22. Which of the following hormones plays a role in release of milk from mammary glands?

(A) Adrenaline

(B) Thyroxine

(C) Oxytocin

(D) Progesterone



23. Laughing gas is

(A) nitrous oxide

(B) nitric oxide

(C) carbon dioxide

(D) sulphur dioxide

24. Which one of the following acids is present in tomato?

(A) Lactic acid  $\times$

(B) Oxalic acid

(C) Citric acid  $\times$

(D) Tartaric acid



25. Which of the following hormones is/are responsible for the regulation of blood sugar level?

- (A) Insulin only
- (B) Insulin and glucagon
- (C) Insulin and vasopressin
- (D) Glucagon and vasopressin

26. Which of the following pairs is correctly matched?

- (A) Tocopherol—Antisterility
- (B) Ascorbic acid—Antiscorbutic
- (C) Thiamine—Antineuritic
- (D) Calciferol—Antihæmorrhagic



27. Which of the following is a natural polymer?

- (A) Nucleic acid
- (B) Rubber
- (C) Polyvinyl chloride
- (D) Cotton cloth

28. Which of the following is correctly matched?

- (A) Isotropic process—Pressure constant
- (B) Isochoric process—Volume constant
- (C) Isothermal process—Temperature constant
- (D) Adiabatic process—Heat constant

29. Isotopes have the same

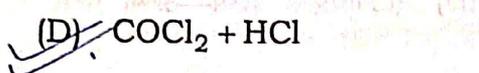
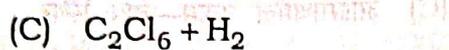
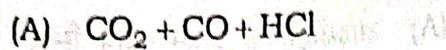
- (A) atomic number
- (B) mass number and atomic number
- (C) Avogadro number
- (D) mass number

30. Which of the following is the strongest acid?

- (A)  $\text{CH}_3\text{COOH}$
- (B)  $\text{ClCH}_2\text{CH}_2\text{CH}_2\text{COOH}$
- (C)  $\text{CH}_3\text{CH}_2\text{CHClCOOH}$
- (D)  $\text{CH}_3\text{CHClCH}_2\text{COOH}$



31. When chloroform is exposed to light and air, it forms



32. Teflon is a polymer of which of the following monomers?

(A) Tetrafluoroethylene

(B) Vinyl chloride

(C) Chloroprene

(D) Acetylene dichloride

33. Which of the following vitamins is known as ergocalciferol?

(A) Vitamin  $\text{D}_2$

(B) Vitamin  $\text{D}_3$

(C) Vitamin  $\text{B}_{12}$

(D) Vitamin  $\text{B}_6$

34. Which of the following is a natural polymer?

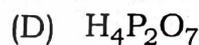
(A) PVC

(B) Nylon

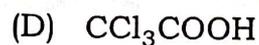
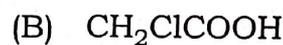
(C) RNA

(D) Neoprene

35. Which one of the following is called glacial phosphoric acid?



36. The weakest acid among the following is



37. Soap removes grease by

(A) coagulation

(B) adsorption

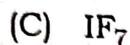
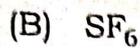
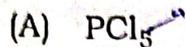
(C) emulsification

(D) None of the above





45. Which among the following is Lewis acid?



(D) All of the above

46. The complexes of which of the following metals can be used in the treatment of rheumatoid arthritis?

(A) Gold

(B) Ruthenium

(C) Iron

(D) Copper

47. Salicylic acid reacts with acetic anhydride to form

(A) oil of wintergreen

(B) aspirin

(C) mustard oil

(D) salol

48. Ullmann reaction is used for the preparation of

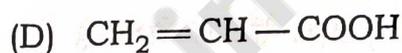
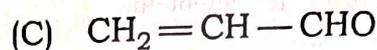
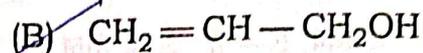
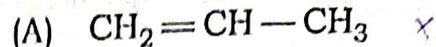
(A) iodobenzene

(B) diphenyl

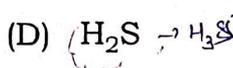
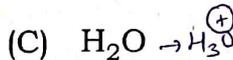
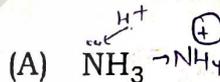
(C) toluene

(D) benzene

49. When glycerol is heated with  $\text{KHSO}_4$ , it gives



50. Which of the following has the highest proton affinity?



51. Smog is essentially caused by the presence of

(A)  $\text{O}_2$  and  $\text{O}_3$

(B)  $\text{O}_3$  and  $\text{N}_2$

(C)  $\text{O}_2$  and  $\text{N}_2$

(D)  $\text{NO}_x$  and  $\text{SO}_x$

52. Which of the following is the most important greenhouse gas?

(A)  $N_2O$

(B)  $O_3$

(C)  $CO_2$

(D)  $CH_4$

53. The Deficiency of vitamin  $B_{12}$  causes

(A) colour blindness

(B) anaemia

(C) rickets

(D) scurvy

54. Which of the following displays paramagnetism?

(A)  $La^{3+}$   $[Xe] 4f^0$

(B)  $Lu^{3+}$   $[Xe] 4f^14$

(C)  $Ce^{4+}$   $[Xe] 4f^0$

(D)  $Sm^{3+}$   $[Xe] 4f^5$

55. Among the following oxides, which is most basic?

(A)  $ZnO$  (2)

(B)  $MgO$  (2)

(C)  $Al_2O_3$  (3)

(D)  $N_2O_5$  (5)  
 $2x+10$

56. Washing soda has the formula

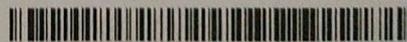
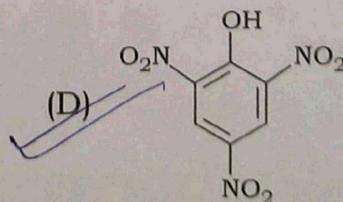
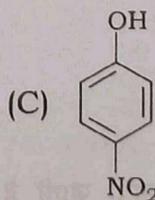
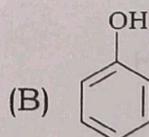
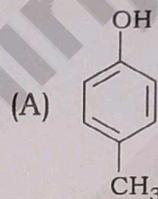
(A)  $Na_2CO_3 \cdot 7H_2O$

(B)  $Na_2CO_3 \cdot 10H_2O$

(C)  $Na_2CO_3 \cdot 3H_2O$

(D)  $Na_2CO_3$

57. Which one is the most acidic compound?



58. Formalin is an aqueous solution of

- (A) fluorescein   
(B) formic acid  
 (C) formaldehyde  
(D) furfuraldehyde

59. Haemoglobin is

- (A) an enzyme  
 (B) a protein  
(C) a vitamin  
(D) a carbohydrate

60. Which of the following cannot act both as a Brønsted acid and as a Brønsted base?

- (A)  $\text{HCO}_3^-$   
(B)  $\text{NH}_3$   
 (C)  $\text{HCl}$   
(D)  $\text{HSO}_4^-$

61. Identify the wrongly matched pair.

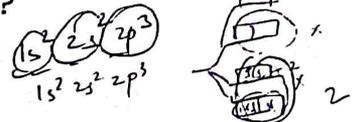
Molecule	Shape
<input checked="" type="checkbox"/> (A) $\text{PCl}_5$	Trigonal planar
(B) $\text{SF}_6$	Octahedral
<input checked="" type="checkbox"/> (C) $\text{BeCl}_2$	Linear
(D) $\text{NH}_3$	Trigonal pyramidal

62. Which of the following compounds shows both Frenkel as well as Schottky defects?

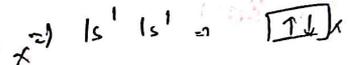
- (A)  $\text{AgBr}$   
(B)  $\text{AgI}$   
(C)  $\text{NaCl}$   
(D)  $\text{ZnS}$

63. Which of the following is paramagnetic?

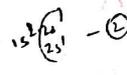
(A)  $\text{N}_2$



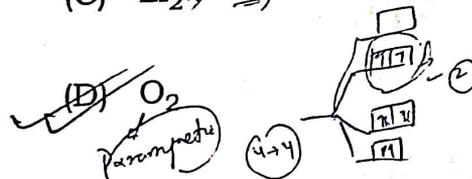
(B)  $\text{H}_2$



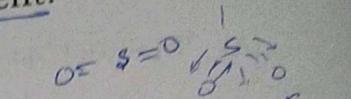
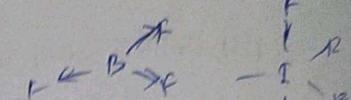
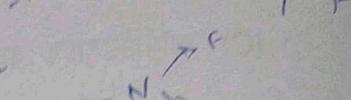
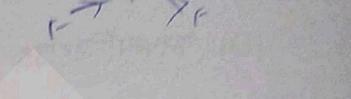
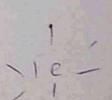
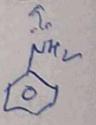
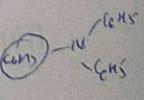
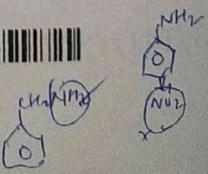
(C)  $\text{Li}_2$

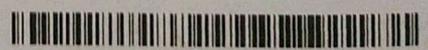


(D)  $\text{O}_2$



64. Natural rubber is a polymer of
- (A) butadiene  
(B) ethyne  
(C) styrene  
(D) ~~isoprene~~
65. The reaction between benzaldehyde and acetophenone in the presence of dilute NaOH is known as
- (A) Cannizzaro reaction ×  
(B) cross Cannizzaro reaction  
(C) ~~cross aldol condensation~~  
(D) aldol condensation
66. The vitamin which is effective in blood clotting is
- (A) vitamin A  
(B) vitamin B  
(C) vitamin D  
(D) ~~vitamin K~~
67. The numbers of sigma and pi bonds in benzene are
- (A) 3, 3  
(B) 3, 6  
(C) ~~12, 3~~  
(D) ~~12, 6~~

68. Which of the following has dipole moment? no
- (A) ~~SO<sub>2</sub>~~   
(B) ~~BF<sub>3</sub>~~   
(C) ~~IF<sub>5</sub>~~   
(D) ~~NF<sub>3</sub>~~ 
69. Which of the following pairs has the same size?
- (A) Fe<sup>2+</sup>, Ni<sup>2+</sup>  
(B) Zr<sup>4+</sup>, Ti<sup>4+</sup>  
(C) Zr<sup>4+</sup>, Hf<sup>4+</sup>  
(D) ~~Zr<sup>2+</sup>, Hf<sup>4+</sup>~~
70. Iron carbonyl, Fe(CO)<sub>5</sub>, is
- (A) trinuclear  
(B) ~~mononuclear~~   
(C) tetranuclear  
(D) dinuclear
71. Which of the following is more basic than aniline?
- (A) Diphenylamine   
(B) Triphenylamine   
(C) *p*-Nitroaniline   
(D) ~~Benzylamine~~ 



72. The most stable carbocation among the following is

- (A)  $(\text{CH}_3)_3\text{C}-\overset{\oplus}{\text{C}}\text{H}-\text{CH}_3$   
 (B)  $\text{CH}_3-\text{CH}_2-\overset{\oplus}{\text{C}}\text{H}-\text{CH}_2-\text{CH}_3$   
 (C)  $\text{CH}_3-\overset{\oplus}{\text{C}}\text{H}-\text{CH}_2-\text{CH}_2-\text{CH}_3$   
 (D)  $\text{CH}_3-\text{CH}_2-\overset{\oplus}{\text{C}}\text{H}_2$

73. Which of the following is an amphoteric hydroxide?

- (A)  $\text{Ca}(\text{OH})_2$   
 (B)  $\text{Mg}(\text{OH})_2$   
 (C)  $\text{Be}(\text{OH})_2$   
 (D)  $\text{Sr}(\text{OH})_2$

74. The number of unpaired electrons in the complex ion  $[\text{CoF}_6]^{3-}$  is (At. No. of Co is 27)

- (A) 3  
 (B) 2  
 (C) 4  
 (D) 0

75. In which of the following, bond angle is maximum?

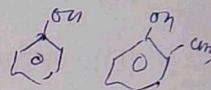
- (A)  $\text{NH}_3$  →  $107^\circ$   
 (B)  $\text{NH}_4^+$  → X  
 (C)  $\text{PCl}_3$   
 (D)  $\text{SCl}_2$  → 4 tetrahedron

76. The electronic configuration of gadolinium (At. No. = 64) is

- (A)  $[\text{Xe}] 4f^8, 5d^9, 6s^2$   
 (B)  $[\text{Xe}] 4f^7, 5d^1, 6s^2$   
 (C)  $[\text{Xe}] 4f^6, 5d^2, 6s^2$   
 (D)  $[\text{Xe}] 4f^3, 5d^5, 6s^2$

77. Which of the following is least acidic?

(A) Phenol



(B) o-Cresol



(C) p-Nitrophenol

(D) p-Chlorophenol

78. Which one is **not** prepared by Wurtz reaction?

(A)  $\text{C}_2\text{H}_6$

(B)  $n\text{-C}_4\text{H}_{10}$

(C)  $\text{CH}_4$

(D)  $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_3$



79. Which of the following has the highest boiling point?

- (A) ~~n-Hexane~~  
 (B) n-Pentane  
 (C) 2-Methylbutane  
 (D) 2,2-Dimethylpropane

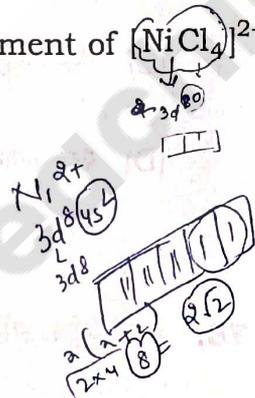
80. Which of the following is most acidic?

- (A) Benzyl alcohol  
 (B) Cyclohexanol  
 (C) Phenol  
 (D) ~~m-Chlorophenol~~



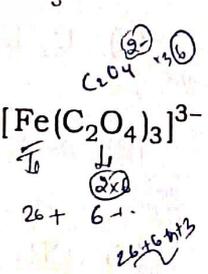
81. The magnetic moment of  $[\text{NiCl}_4]^{2-}$  is

- (A) 1.82 BM  
 (B) 5.46 BM  
 (C) ~~2.83 BM~~  
 (D) 1.41 BM



82. The EAN of Fe in  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$  is

- (A) 27  
 (B) 24  
 (C) ~~35~~  
 (D) 29



83. Which of the following does not follow EAN rule?

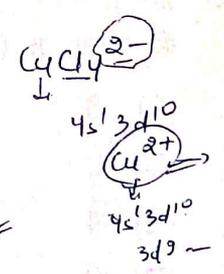
- (A)  ~~$\text{V}(\text{CO})_6$~~   
 (B)  $\text{Cr}(\text{CO})_6$   
 (C)  $\text{Ni}(\text{CO})_4$   
 (D)  $\text{W}(\text{CO})_6$

84. Which of the following is an ester?

- (A) Coconut oil ×  
 (B) Kerosene oil ×  
 (C) ~~Soap~~ sod. stearate  
 (D) Glycerine

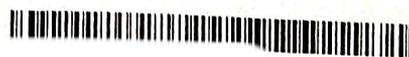
85. Which of the following compounds is not coloured?

- (A)  $\text{Na}_2[\text{CuCl}_4]$   
 (B)  $\text{Na}_2[\text{CdCl}_4]$   
 (C)  $\text{FeSO}_4$   $\text{Fe}^{2+}$   
 (D)  ~~$\text{Bi}_2\text{O}_3$~~

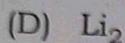
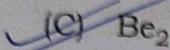
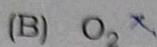
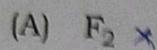


86. Perlon is

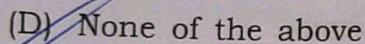
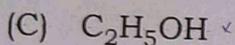
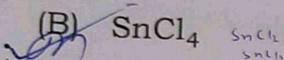
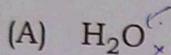
- (A) Terylene  
 (B) rubber ×  
 (C) ~~Nylon-6~~  
 (D) Polyester



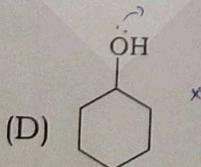
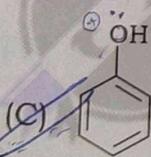
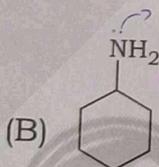
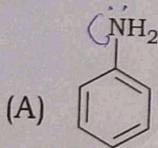
87. The bond order of which among the following molecules is zero?



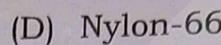
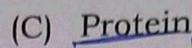
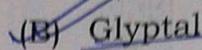
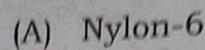
88. Which of the following is a Lewis acid?



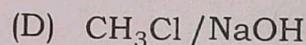
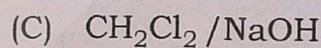
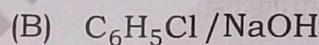
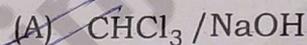
89. Which of the following compounds is the weakest Brønsted base?



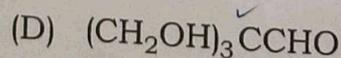
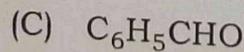
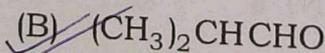
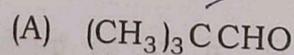
90. Which of the following is polyamide?



91. The reagents used in Reimer-Tiemann reaction are



92. Which of the following does not give Cannizzaro reaction?



93. The reagent used in Clemmensen reduction is

- (A) conc.  $H_2SO_4$
- (B)  $Zn-Hg/conc. HCl$
- (C) aq.  $KOH$
- (D) alc.  $KOH$

94. The acid present in red ant is

- (A)  $CH_3COOH$
- (B)  $HCOOH$
- (C)  $HCN$
- (D)  $H_3PO_4$

95. Which of the following is used in cosmetic surgery?

- (A) Silica
- (B) Silicate
- (C) Silicone
- (D) Zeolite

96. Phosgene is the common name for which of the following?

- (A) Phosphoryl chloride
- (B) Thionyl chloride
- (C) Carbon dioxide and phosphine
- (D) Carbonyl chloride

97. Inorganic graphite is

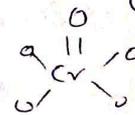
- (A)  $BN$
- (B)  $SiC$
- (C)  $B_3N_3H_6$
- (D) None of the above

98. Which of the following has the highest boiling point?

- (A)  $He$
- (B)  $Ne$
- (C)  $Xe$
- (D)  $CH_4$

99. The oxidation state of Cr in  $CrO_5$  is

- (A) -6
- (B) +12
- (C) +6
- (D) +4



100. The antiseptic present in Dettol is

- (A) quinoline
- (B) chloroxylenol
- (C) bithional
- (D) None of the above

