ORGANIC CHEMISTRY- BIOMOLECULES, POLYMERS

Single answer type questions:

POLYMERES

1. In a polymer sample, 30% molecules have a molecular mass of 20,000, 40% have 30,000 and rest have 60000. The number average $(\bar{M}n)$ and weight average $(\bar{M}w)$ molecular weights are respectively

   (A) 1, 10, 000 and 10, 538 (B) 36,000 and 43,333
   (C) 1,40,000 and 1,56,000 (D) 228,000 and 56,000

2. Which of the following is not a natural polymer?
   (A) Wool (B) Silk
   (C) Cotton (D) Teflon

3. The product of addition polymerization reaction is
   (A) PVC (B) nylon
   (C) terylene (D) polyamid

4. Polymer consists of large molecules
   (A) Called macromolecules which are made by linking together repeated units of small molecules, called monomer
   (B) Called capolymer
   (C) Called ε- caprolactum
   (D) all of the above

5. On the basis of intermolecular forces, polymers are classified as
   (a) rubbers (b) fibres
   (c) elastomers, fibres, thermoplastics and thermosetting
   (d) amino acids

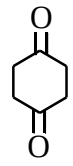
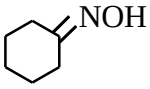
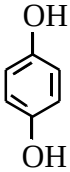
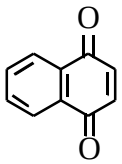
6. Which of the following is not a natural polymer?
   (a) Wool (b) Silk
   (c) Cotton (d) Teflon

7. Isoprene on polymerization, produce
   (a) synthetic rubber (b) gutta – percha
   (c) nepprene (d) cis – poly (2-methyl – 1,3 – butadiene)

8. Natural rubber is obtained from latex, which is a
   (a) mixture of wood, plants and gums
   (b) colloidal dispersion of rubber in water
   (c) mixture of chloroprene and carbohydrates
   (d) none of these
9. Natural silk is
   (a) Polyester (b) Polyamide
   (c) Epoxide (d) Polyurethane
10. Natural rubber is polymer, derived from
   a) 1, 3 – butadiene b) isoprene
   c) Protein d) DNA
11. Step – growth polymers are formed by
   a) The reactions of a single monomer that possesses two different functional groups A and B
   b) The reaction of two different bifunctional monomers and concentrated HNO_3
   c) The intermolecular reaction of bifunctional molecules
   d) All of these
12. A polyurethane is the product of
   a) toluene – 2, 6 – diisocyanate and ethylene glycol in presence of a blowing agent
   b) $\in$- caprolactum and ethylene glycol
   c) terephthalic acid and ethylene glycol
   d) an isocyanate and an alcohol
13. Which of the following is not a copolymer?
   a) Cross copolymer b) block copolymer
   c) Random copolymer d) Graft copolymer
14. Polymeric molecules are held by
   a) interatomic forces b) coulombic forces
   c) intermolecular forces d) gravitational forces
15. The polymers such as polyethylene are
   a) held together by Vander Waals forces
   b) held together with the forces which operate at long distance
   c) closely packed with coluombic forces
   d) none of these

16. Example of thermosetting plastic is/are
    a) Bakelite b)PVC
    C) polyurethane d) Mylar
17. Terylene is a condensation polymer of ethylene glycol and
    a) benzoic acid b) acetic acid
    c) terephthalic acid d) salicylic acid
18. The fibre obtained by the condensation of hexamethylene diamine and adipic acid is
    a) Dacron b) nylon 6,6
    c) Rayon d) Teflon

19. A raw material used in making nylon is
    a) adipic acid b) 1,3 – butadiene
    c) ethyne d) cyclohexanone
20. $\in$–caprolactum is the starting material for the manufacture of nylon 6 and is obtained by Beckmann rearrangement of

    a) 
    b) 
    c) 
    d) 

21. The repeating units of PCTFE is
    a) $CF_2 = CF_2$ b) $CH_2 = CH_2$
    c) $CF_3 – CF_3$ d) $FClC = CF_2$
22. The repeating units of PTEF are
    a) $CH \equiv CH$ b) $CF_3 – CF_3$
    c) $CH_2 = CHCN$ d) $CF_2 = CF_2$
23. Glyptal is the polymer of ethylene glycol and
    a) terephthalic acid b) adipic acid
    c) benzoic acid d) picric acid
24. A polymer which is used for making ropes and carpet fibres is
    a) polyacetylene b) polypropylene
    c) polyacrylonitrile d) PVC
25. Hard plastic covers of telephone are made of polymer of
    a) metyl methacrylate b) venyl acetate
    c) neoprene d) phenol and formaldehyde

26. The polymer which contains nitrogen is
a) PVC b) Teflon
c) butyl rubber d) nylon

27. The product of addition polymerization reaction is
a) PVC b) nylon
c) terylene d) polyamide

28. Cellulose is a condensation polymer of
a) maltose b) β-glucose
c) α–glucose d) β–fructose

29. Which of the following is a "polyamide"?
a) Rayon b) Terylene
c) nylon d) Orlon

30. Teflon, polystyrene and neoprene are all
a) copolymers b) condensation polymer
c) homopolymers d) monomers

31. Teflon
a) $(- CF_2 - CF_2 -)_n$ b) $- (CCl_2 - CCl_2)_n$
c) $- (CBr_2 - CBr_2)_n$ d) CF_2Cl_2

32. The product of addition polymerization reaction is
a) PVC b) nylon
c) Terylene d) polyamide

33. Isoprene is used in making
a) petrol b) nylon
c) rubber d) liquid fuel

34. Which of the following is an inert polymer used in coating, particulary in nonstick cookware?
a) Teflong b) Cellulose
c) Bakelite d) Orlon

35. Cellulose trinitrate, also called "gun cotton" is used in
a) Cellophane paper b) dyes
c) explosives d) making rayon

36. Cellulose contains glucose units joinind by β-1, 4-glycosidic linkages. These molecules are held by
a) ionic bond b) intramolecular hydrogen bonds
c) weak vander Waals forces d) all of these

37. Which of the following cannot serve as a food source for human?
a) Proteins b) Starch
c) Enzymes d) Cellulose

38. Natural rubber is a cis-1, 4-polyisoprene. During vulcanization, natural rubber is heated with sulphur. As result, a reaction takes place
a) that produces cross-links between the cis-polyisoprene chains
b) and makes the rubber much harder
c) and sulphur reacts both at the double bonds and at allylic hydrogen atoms
d) all of these

39. Nylon-6,9 is so named because it is a polyamide, formed from a
a) six – carbon dibase and a six-carbon diamine
b) six – carbon diacid and a sis-carbon diamine
c) six – carbon $\in$-caprolactum and a six-carbon diamine

40. Rubber is a
a) conducting polymer b) oriented polymer
c) elastomer d) strong commercially available fabric

POC

41. Sulphur present in an organic compound is detected by treating the 'sodium extract' with
a) potassium ferricyanide b) postassium ferrocyanide
c) sodium nitroprusside d) ammonium thiocyanate

42. Which of the following nitrogenous compounds does not give blue colour in the usual Lassaigne's test for the detection of nitrogen?
a) Glycine b) Urea
c) Aniline d) Hydrazine

43. For the detection of sulphur in an organic compound, sodium nitroprusside is added to the sodium extract of the compound. If sulphur is present, an intense pink to purple colour is obtained due to the formation of
a) $Fe(CN)_2$ b) $K_3[Fe(CN)_5NS]$
c) $Na_4[Fe(CN)_5NO.S]$ d) $Na_4[Fe(CN)_6]$

44. Lassaigne's test is performed to detect the presence of the elements N,S,X & P in an organic compound. In this test the organic substance is at first fused with
a) NaCl b) metallic sodium
c) metallic copper d) NaOH

45. In Lassaigne's test, the sulphur present in the organic compound, on fusion with sodium, is converted into
a) Na_2S b) C_4H_4S
c) $Na_2S_2O_3$ d) CH_3SH

46. Halogens present in organic compounds may be detected by heating the compound on a copper foil in a Bunsen nonluminous flame whereby it imparts green colour to the flame. This test is known as
a) Marsh's test b) Lassaigne's test
c) Gutzeit test d) Beilstein test

47. The sodium extract prepared from sulphanilic acid, contains SCN^-. It gives blood-red colouration with
a) $FeCl_3$ b) Na_2CS_3
c) $FeSO_4$ d) a mixture of Na_2S and CS_2

48. An organic compound contains C, H, N, S and Cl. For detection of chlorine in the compound, the sodium extract of the compound is at first heated with a few drops of concentrated HNO_3 and then silver nitrate solution is added to get a precipitate of AgCl. This digestion with HNO_3, prior to addition of $AgNO_3$, is required
a) to prevenet the formation NO_2
b) to convert the CN^- and S^{2-} ions to volatile HCN and H_2S, otherwise, they will interfere with the test by forming AgCN and Ag_2S.
c) to prevent the hydrolysis of NaCN and Na_2S
d) to form S_4N_4 which prevent formation of AgCl with $AgNO_3$

49. In Lassaigne's test, when 'sodium extract' of an organic compound containing both N and S is heated with sodium nitroprusside solution, a blood-red colouration is developed. This is due to the formation of
a) sodium nitroprusside b) sodium thiosulphate
c) ferric sulphocyanide d) thiourea

50. When a nitrogenous organic compound is fused with sodium, the nitrogen present in the compound is converted into
a) sodium nitrate b) sodium nitrite
c) sodamide d) sodium cyanide

51. To detect iodine in presence of bromine, the sodium fussion filtrate is treated with $NaNO_2$+ glacial acetic acid + CCl_4. Iodine is detected by the appearance of
a) purple colour in the organic layer of CCl_4
b) brown colour in the organic layer of CCl_4
c) deep blue colour in CCl_4 layer
d) yellow colour in CCl_4 layer

52. A mixture of acetone and carbon tetrachloride can be separated by
a) fractional crystallization b) fractional distillation
c) steam distillation d) vacuum distillation

53. Benzoic acid can be separated from a mixture of phenol and benzoic acid by treatment with
a) $NaHCO_3$ solution b) NaOH solution
c) $Na_2S_2O_3$ solution d) $FeCl_3$ solution

54. Orthonitrophenol can be separated from paranitrophenol by
a) chromatography b) solvent extraction
c) steam distillation d) sublimation

55. Anthracene can be purified by
a) sublimation b) crystallization
c) distillation d) filtration

56. Rectified spirit contains
a) 95.6% ethanol and 4.4% water b) 100% ethanol
c) 95.6% ethanol and 4.4% water c) 95.6% ethanol and 4.4% benzene

57. A liquid organic compound decomposes at its boiling point. It can be purified by
a) simple distillation
b) sublimation
c) distillation under reduced pressure
d) all of these

58. Aniline can be separated from phenol using
a) $NaHCO_3$ b) dilute HCl
c) NaCl d) conc. HNO_3

59. KOH can be used as drying agent for
a) amines b) acids
c) phenols d) esters

60. Which of the following compounds are purified by steam distillation?
a) Nitrobenzene b) Chlorobenzene
c)Orthonitrophenol d) All of these

61. Quick time can only be used for drying
a) ethanol b) phenols
c) esters d) carboxylic acid

62. Silver salt method is used for the determination of molecular weight of
a) organic bases b) organic acids
c) aliphatic amines d) esters

63. The molecular weight of aniline is determined by
a) converting it into its chloroplatinate salt and then estimating platinum obtained by ignition of the salt.
b) converting it into its acetate
c) making aniline into its tribromo derivative
d) all of these

64. Which of the following methods is used for the estimation of nitrogen in organic compounds?
a) Hypobromite method b) Rast method
c) Dumas' method d) Carius method

65. Which of the following methods is used for the estimation of sulphur in organic compounds?
a) Carius method b) Victor Meyer's method
c) Kjeldahl method d) Dumas' method

66. An organic compound has carbon and hydrogen percentages in the ratio 6 : 1 and carbon and oxygen percentages in the ratio 3 : 4. The compound has the empirical formula
a) CH_2O b) CH_4O
c) C_2H_6O d) CHO_2

67. 0.0833 mole of a carbohydrate of empirical formula CH_2O contains 1.00g of hydrogen. The molecular formula of the carbohydrate is
a) $C_5H_{10}O_5$ b) $C_3H_4O_3$
c) $C_{12}H_{22}O_{11}$ d) $C_6H_{12}O_6$

68. Which of the following aliphatic aldehydes on heating with concentrated NaOH solution gives an yellow resinous precipitate?
a) CH_3CHO b) $CCl_3.CHO.H_2O/CCl_3CH(OH)_2$
c) HCHO d) All of these

69. Which fot he following compounds will give chloroform on warming with NaOH solution?
a) $CCl_3CH(OH)_2$ b) H.CHO
c) CH_3CONH_2 d) $C_6H_5NHCOCH_3$

70. Which of the following organic compounds will not yield CO_2 when treated with Na_2CO_3 solution?
a) Benzoic acid b) Phenol
c) Sulphanilic acid d) Orthonitrophenol

71. Phenol and carboxylic acid can be distinguished from each other using
a) NaOH solution b) NaCl solution
c) $NaHCO_3$ solution d) None of these

72. HCHO and CH_3CHO can be distinguished from each other by the use of
a) Fehling's solution b) ammoniacal silver nitrate solution
c) evaporation by heating d) alkaline $KMnO_4$ solution

73. Acetaldehyde on treatment with alkaline solution of sodium nitroprusside will produce
a) black colouration b) yellow colouration
c) blue colouration d) red colouration

74. Acetaldehyde and acetone can be distinguished by
a) iodoform test b) nigroprusside test
c) Fehling's solution test d) $NaHSO_3$ test

75. Which of the following compounds will not give iodoform test?
a) CH_3COCH_3 b) $CH_3CO.C_6H_5$
c) $CH_3CH_2COCH_2CH_3$ d) CH_3CH_2OH

76. Methanol and ethanol can be distinguished by
a) iodoform reaction b) esterification
c) oxidation with acidified $K_2Cr_2O_7$ solution
d) acrolein test

77. Which of the following observations is correct and is useful in identifying carboxylic acids?
a) Carboxylic acids liberate CO_2 gas from $NaHCO_3$ solution.
b) They produce fruity smell of esters when heated with alcohol in presence of concentrated H_2SO_4.

c) Acids liberate I_2 from a mixture of $KIO_3$and KI.
d) All of these

78. Which of the following carboxylic acids will give "silver-mirror test"?
a) CH_3CO_2H b) $H.CO_2H$
c) $(COOH)_2$ d) $CH_3CO.CO_2H$

79. Which of the following compounds will give orange-yellow precipitate with 2,4-dinitrophenylhydrazine reagent?
a) $CH_3CH_2.CO_2.H$ b) $CH_3COOC_2H_5$
c) CH_3COCH_3 d) C_6H_5OH

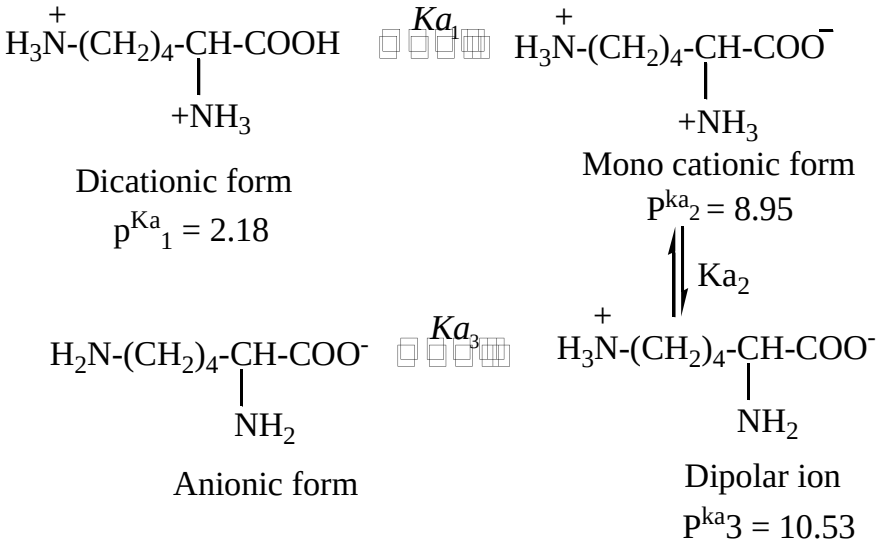
80. Which of the following organic compounds will give foul odour of isocyanide on heating with chloroform and alcoholic KOH?
a) para-toluidine b) Glycine
c) Anthranilic acid d) Sulphanilic acid

81. An organic compound is treated with $NaNO_2$ and dilute HCl at 0^oC and then the resulting solution is added to an alkaline solution of β-naphthol whereby a brilliant red dye is produced. This observation indicates that the compound processes
a) $-NO_2$ group b) $-CONH_2$ group
c) aromatic $-NH_2$ group d) aliphatic $-NH_2$group

82. Which of the following aromatic amines will undergo Liebermann's reaction?
a) $C_6H_5NHCH_3$ b) $C_6H_5N(cH_3)_2$
c) $(C_2H_5)_3N$ d) C_5H_5N

83. Nitrobenzene on heating with a mixture of conc. HNO_3 and conc. H_2SO_4 at 100^0C produces
a) p-dinitrobenzene b) m-dinitrobenzene
c) o-diritrobenzene d) benzene sulphonic acid

84. Lysine exists as a Zwitter ion



Then isoelectric point (P^I) of Lysine is
a) 5.56 b) 9.74 c) 6.25 d) 0

85. Choose correct answer

I) Sucrose on hydrolysis gives $\alpha-D-glucose$

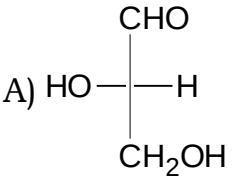
II) Sucrose on hydrolysis gives $\beta-D-glucose$

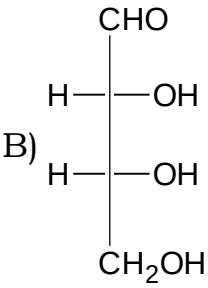
III) Sucrose on hydrolysis gives $\alpha-D-fructose$

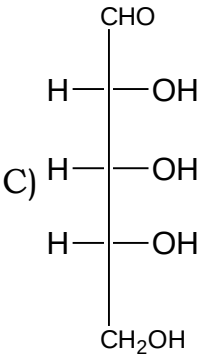
IV) Sucrose on hydrolysis gives $\beta-D-fructose$

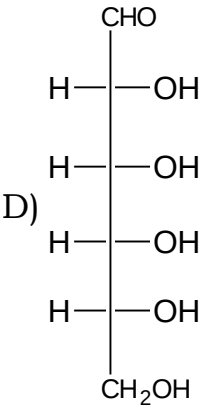
A) I, II, IV only B) I, IV only C) I, II & III only D) I, II, III & IV

86. Which of the following will not show fermentation?

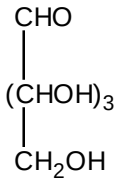
A) 

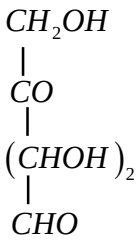
B) 

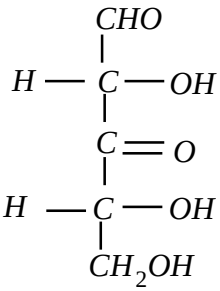
C) 

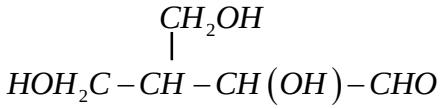
D) 

87. Compound (A), $C_5H_{10}O_4$ is oxidized by Br_2-H_2O to the acid, $C_5H_{10}O_5$ which readily forms a lactone. (A) forms a triacetate with Ac_2O and a hydrazone with $PhNHNH_2$. 'A' is oxidized by HIO_4, only one molecule of which is consumed. The structure of 'A' is

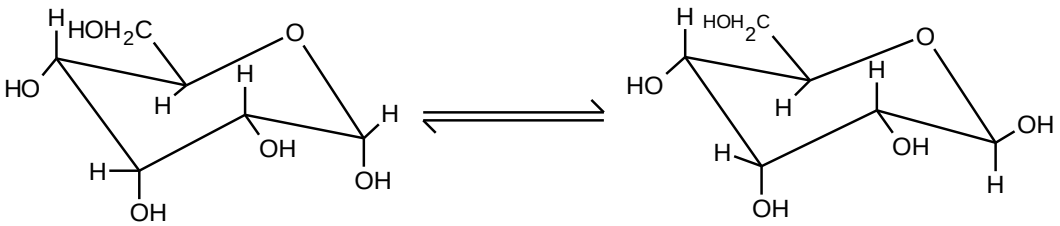
A) 

B) 

C) 

D) 

88. Which one of the following statements concerning the given equilibrium is true?



A) The two structures are enantiomers of each other and their inter conversion is mutarotation.

B) The two structures are diastereomers of each other and their interconversion is mutarotation

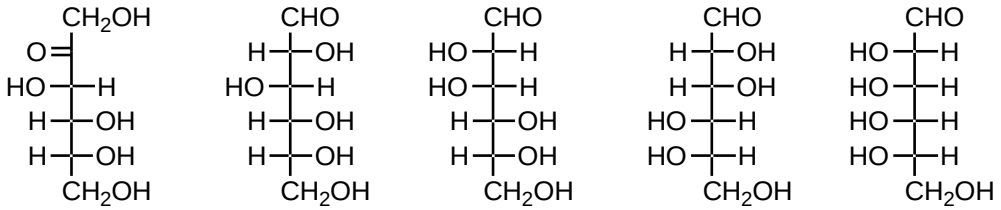
C) The two structures are diastereomers of each other one is furanose form and the other is pyranose form

D) The two structures are enantiomers of each other one is furanose form and the other is pyranose form.

89. Which one of the following is not an aldohexose ?

(A) Mannose (B) Galactose (C) Talose (D) Tagatose

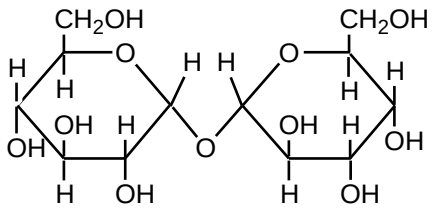
90. Epimers are represented by:



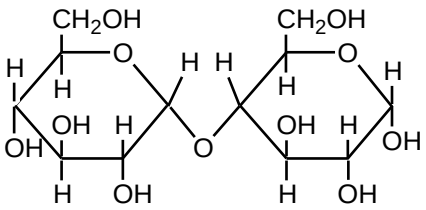
I II III IV V

a) I, II, and III b) II and III c) III and IV d) I, II, and V

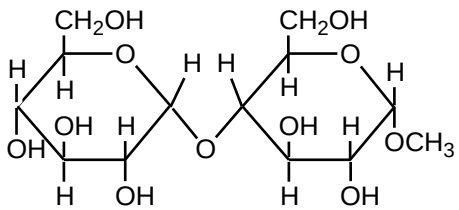
91. Which of these compounds, I, II, III, IV, is a reducing disaccharide?



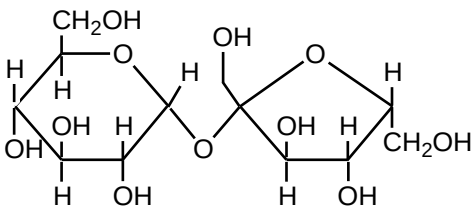
I



II



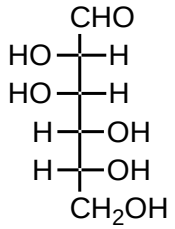
III



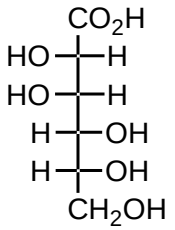
IV

a) I alone b) II alone c) III alone d) IV alone

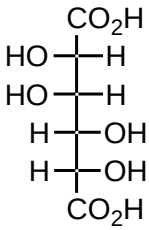
92. Reaction of the following substance with nitric acid would yield:



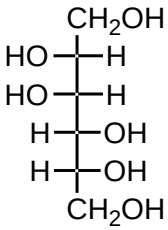
$\xrightarrow{HNO_3}$?



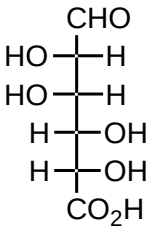
I



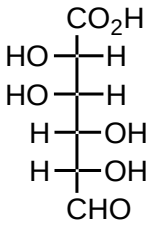
II



III



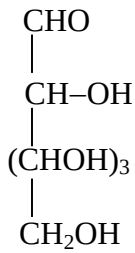
IV



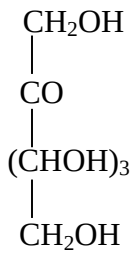
V

a) III b) IV & V c) II d) I

93. Predict the nature of the products Z and Z′ in the following series of reactions



$\xrightarrow{NaCN/HCN}$ [X] $\xrightarrow{H_3O^+}$ [Y] $\xrightarrow{HI/P}$ [Z]



$\xrightarrow{NaCN/HCN}$ [X′] $\xrightarrow{H_3O^+}$ [Y′] $\xrightarrow{HI/P}$ [Z′]

(A) both are n–heptane

(B) both are n–heptanoic acid

(C) both are 7–iodoheptanoic acid

(D) Z is n–heptanoic acid and Z′ is a substituted hexanoic acid

94. Ring structure of glucose is due to formation of hemiacetal and ring formation between

(A) C_1 and C_5 (B) C_1 and C_4

(C) C_1 and C_3 (D) C_3 and C_4

95. In the given reaction:

Glucose + $3C_6H_5NH - NH_2 \xrightarrow{H^+/\Delta}$ Osazone + A + B

(A) and (B) are

(A) $C_6H_5NH_2$ and NH_3 (B) $C_6H_5NH_2$ and NH_2OH

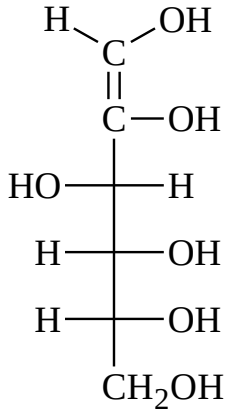
(C) $C_6H_5NH - NHOH$ and NH_3 (D) NH_2OH and HOH

96. The reaction, sucrose $\xrightarrow{H^+}$ glucose +fructose, takes place at certain temperature while volume of solution is maintained at 1 lt. At time zero, the initial rotation of the mixture is 34^0. After 30 minutes the total rotation of solution is 19^0 and after a very long time, the total rotation is -11^0C. Find the time when the solution would be optically inactive?

(A) 135 min (B) 103.7min

(C) 38.7 min (D) 45min

97.



The Fischer projection formula shown above is the enolic form of

(A) D-fructose (B) D-mannose

(C) D-glucose (D) All

98. Give the correct order of initials T or F for following statements. Use T if statement is true and F if it is false. X (molecular formula, $C_7H_6O_2$) is and aromatic white solid which liberates colourless, odourless gas on rescting with $NaHCO_3$.

S1 : Only three of th3e five functional isomers of X (including 'X' itself) will give positive 2, 4-DNP test.

S2 : The liberated colourles, odourless gas will contaning radioactive ^{14}C.

S3 : Except 'X', no other functional isomer will liberate colourless odourless gas with NaHCO3.

S4 : The DU of higher homolog of 'X' will be four.

(A) TTTF (B) FTTF (C) FTTT (D) TTFF

99. Which one of the following will not give white precipitate with ammonical silver nitrate solution

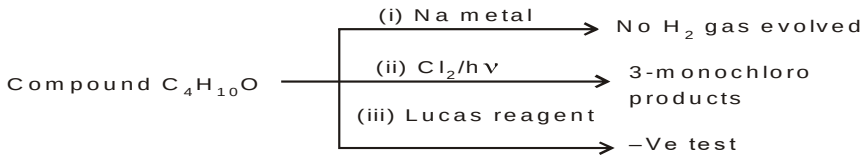
(A) $CH_3 - C \equiv C - CH_3$

(B) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - C \equiv C - CH_3$

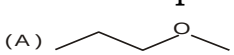
(C) $CH_3 - CH_2 - CH = CH_2$

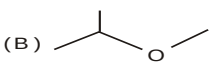
(D) All of these

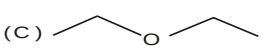
100.

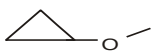


Compound is

(A) 

(B) 

(C) 

(D) 

KEY SHEET
BIOMOLECULES, POLYMERS, POC

Single Answers :

1	B	2	D	3	A	4	A	5	C	6	D
7	D	B	B	9	B	10	B	11	A	12	A
13	A	14	C	15	A	16	A	17	C	18	B
19	A	20	B	21	D	22	D	23	A	24	B
25	D	26	D	27	A	28	B	29	C	30	C
31	A	32	A	33	C	34	A	35	C	36	B
37	D	38	D	39	B	40	C	41	C	42	D
43	C	44	B	45	A	46	D	47	A	48	B
49	C	50	D	51	A	52	B	53	A	54	C
55	A	56	C	57	C	58	B	59	A	60	D
61	A	62	B	63	A	64	C	65	A	66	A
67	D	68	A	69	A	70	B	71	C	72	C
73	D	74	C	75	C	76	A	77	D	78	B
79	C	80	A	81	C	82	A	83	B	84	B
85	D	86	C	87	D	88	B	89	D	90	B
91	B	92	C	93	D	94	A	95	A	96	B
97	D	98	B	99	D	100	B				

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