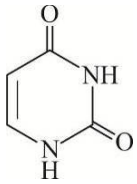
Daily Tutorial Sheet 4	JEE Main (Archive)

46.(D) RNA contain Uracil, whose structure is :

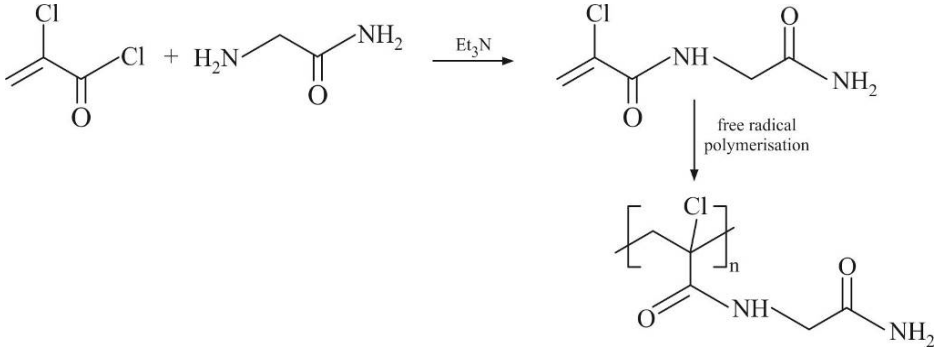


47.(B) Lysine and Histidine contains basic side chain at neutral pH which contain nitrogen and resemble ammonia. In lysine lone pair of nitrogen is free while in Histidine it is participating in resonance.

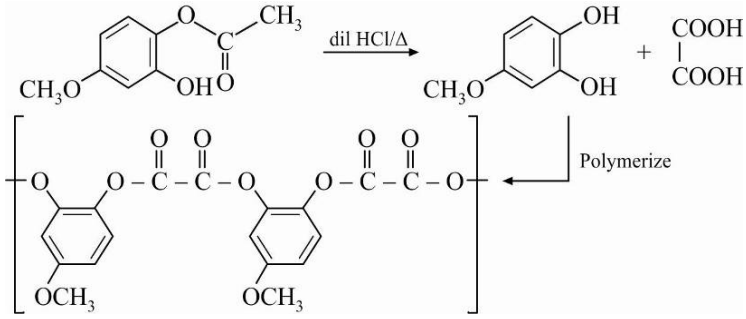
48.(A) Histidine exist as dipositive cationic species given in (A) in strongly acidic solution (pH = 2)

49.(A) Ester test is given by aspartic acid carbylamines test is given by lysine. Phthalein dye test is given by tryptophan.

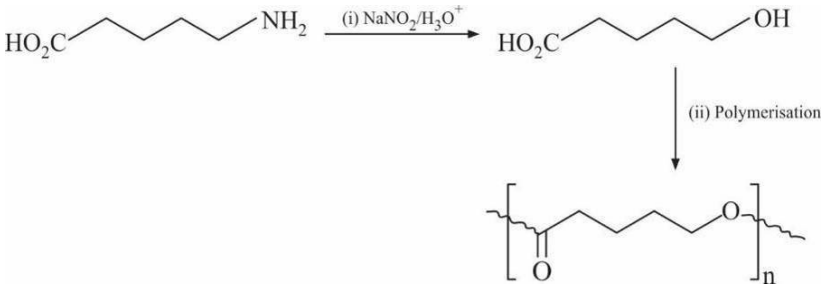
50.(D)



51.(B)



52.(C)



53.(C) $CH_3-\underset{\text{(3-Hydroxybutanoic acid)}}{\underset{|}{\overset{OH}{CH}}}-CH_2-COOH + CH_3-CH_2-\underset{\text{3-Hydroxypentanoic acid}}{\underset{|}{\overset{OH}{CH}}}-CH_2COOH \rightarrow \left(O-\underset{|}{\overset{CH_3}{CH}}-CH_2-\overset{||}{\underset{O}{C}}-O-\underset{|}{\overset{C_2H_5}{CH}}-CH_2-\overset{||}{\underset{O}{C}}\right)_n$ (PHBV)

54.(C) Fact

55.(D) The homopolymer formed by 4-hydroxy-butanoic acid is $\left[C-(CH_2)_3-O\right]_n$

56.(A) Nylon-6 is derived from $NH_2-(CH_2)_5-\overset{O}{\overset{||}{C}}-OH$

57.(C) As alkylation of nitrogen increases, Basicity of amines increase due to (+I) effect of Alkyl groups which results in more electron cloud density over nitrogen atom (available toward donation).

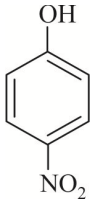
Hence correct order is $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3$ [Gaseous phase]

58.(A) pKa value is directly proportional to the –I effect.

59.(D) $CH(CN)_3$ is the strongest acid since the $-CN$ group will stabilize the conjugate base ($\bar{C}(CN)_3$) the most

$\underset{\text{Electron withdrawing effect}}{-CN > -Cl > -Br > -I}$

60.(D) More the acidic strength, lesser will be the value of pK_a



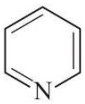
is most acidic as it's conjugate base is resonance stabilized by NO_2 group

Overall order of acidic strength

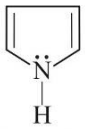
61.(A) $\underset{\text{–I effect increases}}{-NO > -CN > F^- > -Cl}$

Greater is the –I, effect, greater is the stability of the conjugate base and hence more is the acid strength.

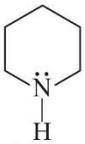
62.(D)



lp on sp^2 hybridised N atom



lp is delocalised and is a part of the aromatic e^- cloud



lp on sp^3 hybridised atom

63.(C) For $Ph-\underset{|}{\overset{CH_3}{N}}-H$, lone pair of N is involved in resonance, so it is least basic.

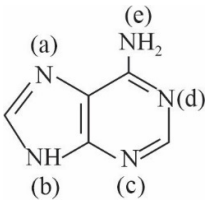
$CH_3CH_2NH_2$ $\quad pK_b = 3.29$

$CH_3CH_2-\underset{\displaystyle CH_2CH_3}{\overset{\displaystyle |}{N}}H \quad pK_b = 3.00$

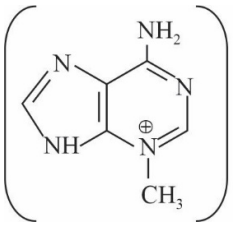
$H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{N}}-CH_3 \quad pK_b = 4.22$

64.(A) Nitrogen at (b), (c) and (d) sites are more basic because their electron pairs are not delocalized.

65.(B)

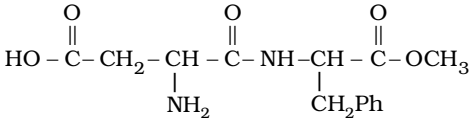


Ione pair on "N" marked as "C" is most nucleophilic and form

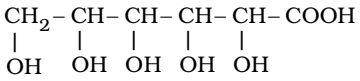


I^- with CH_3I

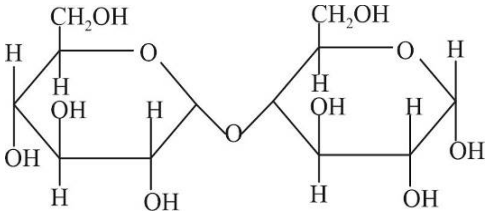
66.(9)



67.(A) Gluconic acid is obtained by partial oxidation of glucose by Br_2 / H_2O.

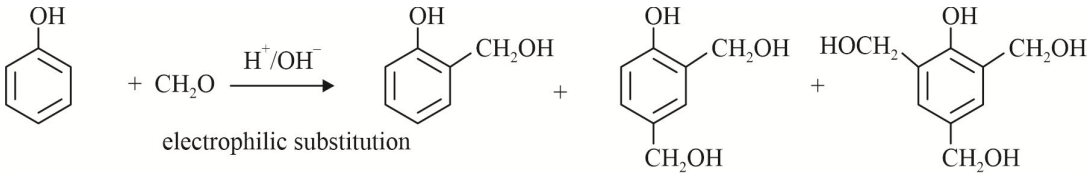


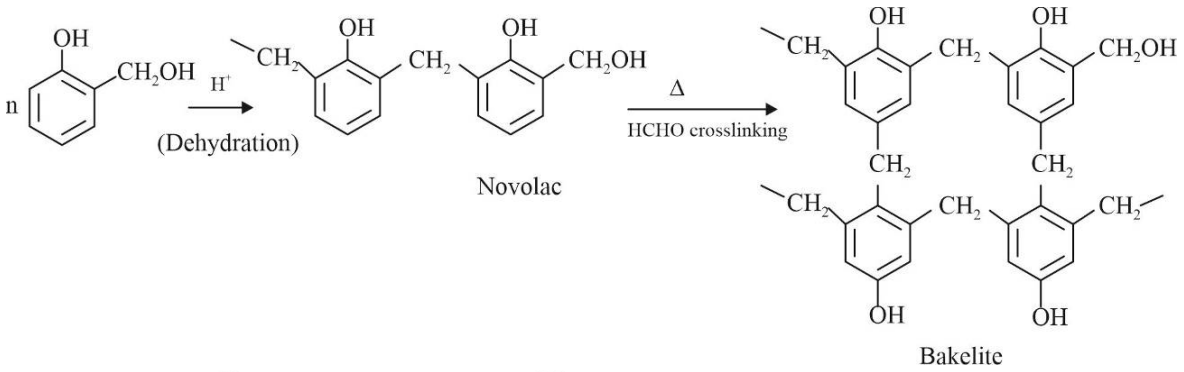
68.(B)



Maltose is a disaccharide of two $\alpha - D$ glucose monomers.

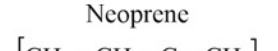
69.(A)



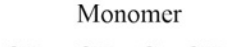


70.(C)

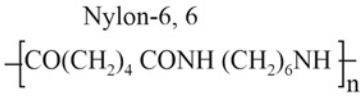
Neoprene



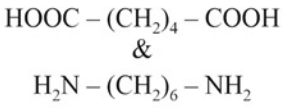
Monomer



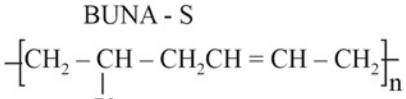
Nylon-6, 6



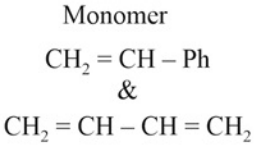
Monomer



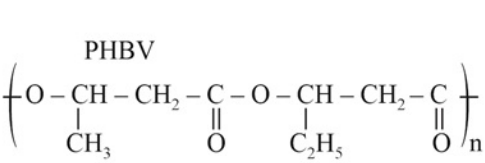
BUNA - S



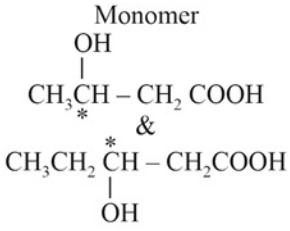
Monomer



PHBV



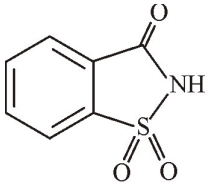
Monomer



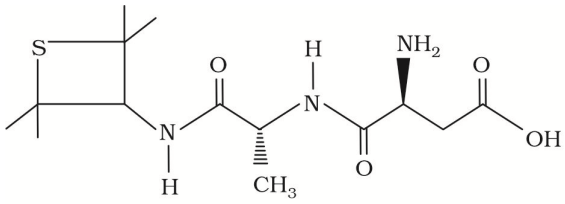
71.(D) All carbohydrates – Monosaccharides, disaccharides, and polysaccharides should give a positive reaction.

Barfoed's test detects monosaccharides. It is based on reduction of copper (II) acetate to copper (I) oxide which forms brick red precipitate.

Biuret test detects presence of peptide bonds. Copper (II) ion forms purple colored complexes in an alkaline solution

72.(C)  → +ve sodium nitroprusside test

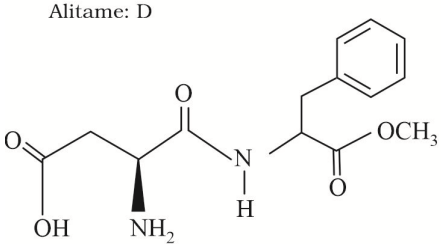
Saccharin: B



→ +ve sodium nitroprusside test

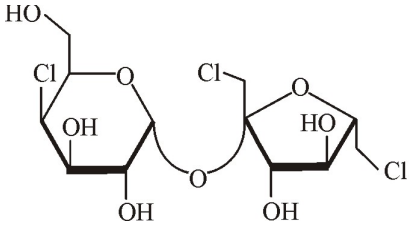
→ forms blue-violet colour with ninhydrin

Alitame: D



→ forms blue-violet colour with ninhydrin

Aspartame: A

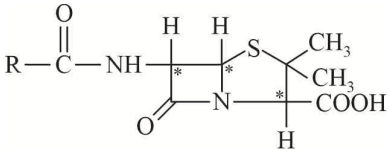


→ gives positive $AgNO_3$ test with it's Lassaigne's extract

→ doesn't give $Fe_4[Fe(CN)_6]_3$ test

Sucralose: C

73.(3.00)



(Structure of penicillin)

74.(B) → Glucose exists in two crystalline forms α and β

→ Glucose does not give the schiff's test for aldehyde

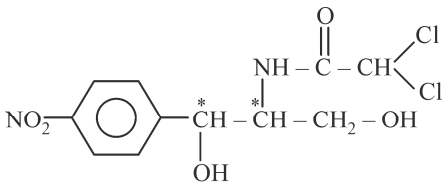
→ Glucose penta-acetate does not react with hydroxylamine

→ Glucose combines with hydroxylamine to form a monoxime.

75.(B)

Vitamins	Deficiency
Vitamin B_2 - (Riboflavin)	Cheilosis
Vitamin B_1 - (Thiamine)	Beriberi
Vitamin B_6 - (Pyridoxine)	Convulsions
Vitamin C - (Ascorbic acid)	scurvy

76.(2)



(Two Chiral Centre)

77.(A) Basic strength depends upon availability of lone pairs. Greater the resonance of lone pairs lesser is the basic strength.

78.(A) (v) $\overset{\ominus}{\underset{\cdot\cdot}{C}}N \rightarrow$ least basic [negative charge on sp-hybridised C-atom bonded to an electronegative N-atom.]

(iii) $HC \equiv \overset{\ominus}{C} \rightarrow$ More basic than $\overset{\ominus}{C}N$ but less basic than the others as negative charge is present on sp-hybridised C-atom.

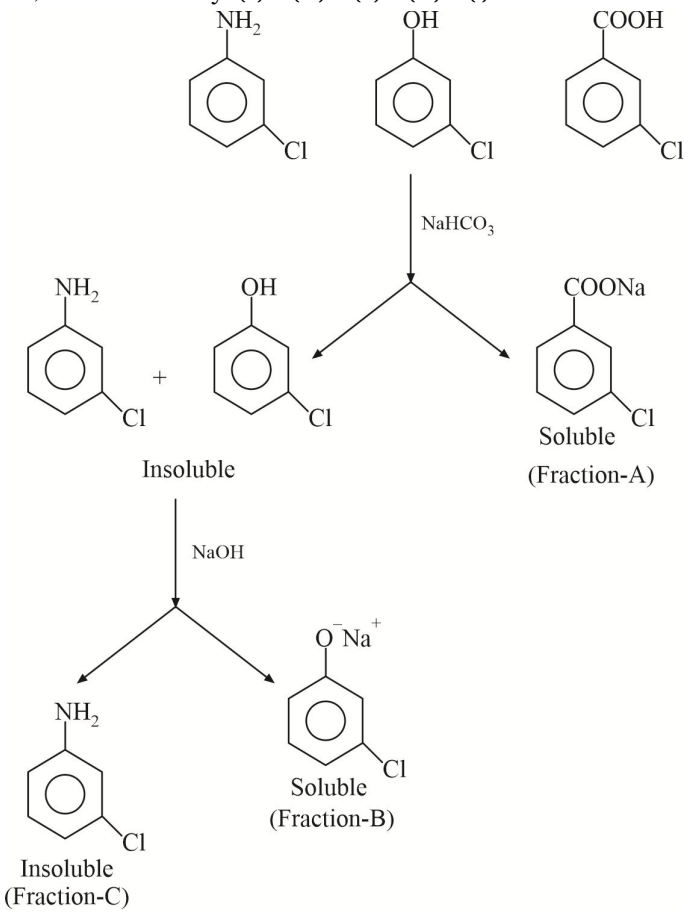
(ii) $CH_2 = CH - \overset{\ominus}{\underset{\cdot\cdot}{C}}H_2 \rightarrow$ negative present on allylic C-atom, therefore, can be delocalized by mesomeric effect

(iv) $\overset{\ominus}{\underset{\cdot\cdot}{C}}H_3$ (i) $H_3C - \underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}} : \overset{\ominus}{}$

(i) is more basic than (iv) due to + I-effect of three Methyl groups in (i) and these two are more basic than the others due to no stabilizing factor for –ve charge.

So, order of basicity: (v) < (iii) < (ii) < (iv) < (i)

79.(A)



80.(D) B → Guanidine type strongest organic base (conjugate acid is stabilised by equivalent resonance) (three resonating structure)

A → $NH_2 - CH = NH$ (also guanidine type but two equivalent resonating structure of conjugate acid) (so less basic than (B)

C → CH_3NHCH_3 (aliphatic amine)

Order of basic nature $B > A > C$

Order of pK_b $B < A < C$