31/03/2022

RM_CODE-A

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Phone : 011-47623456

MM : 720

REVISION TEST SERIES

Time : 3.00 Hrs.

(*for* NEET-2022)

Test - 3

TELEGRAM - CLICK HERE

Answers

1.	(2)	41.	(4)	81.	(4)	121.	(2)	161.	(1)
2.	(3)	42.	(2)	82.	(4)	122.	(1)	162.	(4)
3.	(4)	43.	(1)	83.	(2)	123.	(3)	163.	(3)
4.	(1)	44.	(1)	84.	(1)	124.	(3)	164.	(2)
5.	(3)	45.	(2)	85.	(3)	125.	(4)	165.	(1)
6.	(4)	46.	(2)	86.	(4)	126.	(4)	166.	(3)
7.	(2)	47.	(3)	87.	(4)	127.	(4)	167.	(2)
8.	(4)	48.	(3)	88.	(3)	128.	(4)	168.	(3)
9.	(1)	49.	(1)	89.	(1)	129.	(3)	169.	(4)
10.	(2)	50.	(4)	90.	(3)	130.	(1)	170.	(2)
11.	(2)	51.	(1)	91.	(3)	131.	(2)	171.	(4)
12.	(3)	52.	(2)	92.	(2)	132.	(2)	172.	(1)
13.	(2)	53.	(1)	93.	(2)	133.	(4)	173.	(3)
14.	(2)	54.	(3)	94.	(2)	134.	(2)	174.	(3)
15.	(1)	55.	(4)	95.	(4)	135.	(2)	175.	(4)
16.	(4)	56.	(1)	96.	(2)	136.	(2)	176.	(1)
17.	(2)	57.	(2)	97.	(4)	137.	(1)	177.	(1)
18.	(2)	58.	(3)	98.	(2)	138.	(3)	178.	(2)
19.	(4)	59.	(1)	99.	(3)	139.	(2)	179.	(2)
20.	(3)	60.	(2)	100.	(4)	140.	(3)	180.	(4)
21.	(3)	61.	(3)	101.	(2)	141.	(3)	181.	(3)
22.	(2)	62.	(3)	102.	(1)	142.	(4)	182.	(1)
23.	(3)	63.	(4)	103.	(2)	143.	(3)	183.	(1)
24.	(1)	64.	(1)	104.	(4)	144.	(2)	184.	(3)
25.	(4)	65.	(3)	105.	(2)	145.	(4)	185.	(2)
26.	(1)	66.	(2)	106.	(2)	146.	(2)	186.	(3)
27.	(1)	67.	(3)	107.	(4)	147.	(1)	187.	(3)
28.	(1)	68.	(4)	108.	(1)	148.	(2)	188.	(4)
29.	(3)	69.	(2)	109.	(3)	149.	(1)	189.	(2)
30.	(2)	70.	(2)	110.	(2)	150.	(1)	190.	(3)
31.	(2)	71.	(3)	111.	(1)	151.	(2)	191.	(4)
32.	(1)	72.	(4)	112.	(4)	152.	(1)	192.	(3)
33.	(1)	73.	(3)	113.	(2)	153.	(1)	193.	(2)
34.	(2)	74.	(1)	114.	(1)	154.	(3)	194.	(2)
35.	(2)	75.	(3)	115.	(2)	155.	(4)	195.	(1)
36.	(4)	76.	(1)	116.	(2)	156.	(4)	196.	(2)
37.	(3)	77.	(2)	117.	(1)	157.	(1)	197.	(4)
38.	(3)	78.	(4)	118.	(3)	158.	(1)	198.	(1)
39.	(4)	79.	(2)	119.	(2)	159.	(2)	199.	(1)
40.	(3)	80.	(3)	120.	(3)	160.	(1)	200.	(4)

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Aakash BYJU'S

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Phone : 011-47623456

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REVISION TEST SERIES

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Test - 3

Answers & Solutions

PHYSICS

SECTION-A

1. Answer (2)

$\vec{F}_m \perp^r \vec{B}$ therefore $\vec{a} \perp^r \vec{B}$

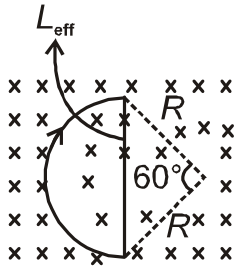
$\vec{a} \cdot \vec{B} = 0$

$\Rightarrow \left(\hat{i} + 2\hat{j} - 3\hat{k}\right) \cdot \left(2\hat{i} + b\hat{j} + 3\hat{k}\right) = 0$

$\Rightarrow$ 2 + 2*b* – 3 = 0

$\boxed{b = \frac{1}{2}}$

2. Answer (3)



$L_{eff} = R$

$F_m = IRB = 2 \times \frac{1}{2} \times 2 = 2$ N

3. Answer (4)

$F_m = I\, l_{eff}\, B \sin\theta$

$F_m = I \times 0 \times B \sin\theta$

$F_m = 0$

$\vec{\tau} = \vec{M} \times \vec{B}$

$\Rightarrow$ $\tau = MB \sin\theta = Il^2 B \sin\theta = 0$

Both (1) and (2) are incorrect

4. Answer (1)

$\vec{B}_{arc} = \frac{\mu_0 I}{2R} \times \frac{\phi}{2\pi} \otimes$

$\Rightarrow \vec{B}_{arc} = \frac{\mu_0 I}{2R} \times \frac{\pi}{2 \times 2\pi}$

$\Rightarrow \vec{B}_{arc} = \frac{\mu_0 I}{8R} \otimes$

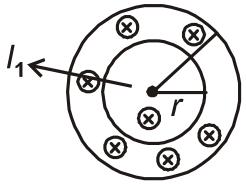
$\Rightarrow \vec{B}_{straight\ wire} = \frac{\mu_0 I}{4\pi R}(\sin\alpha + \sin\beta)$

$= \frac{\mu_0 I}{4\pi R}(\sin 90° + \sin 0°) \otimes = \frac{\mu_0 I}{4\pi R} \otimes$

$\vec{B}_{net} = \vec{B}_{arc} + \vec{B}_{straight\ wire} = \left(\frac{\mu_0 I}{8R} + \frac{\mu_0 I}{4\pi R}\right) \otimes$

$\vec{B}_{net} = \frac{\mu_0 I}{4\pi R}\left(\frac{\pi}{2} + 1\right)$

5. Answer (3)



$B = \frac{\mu_0 I r}{2\pi R^2}$ when $r \le R$

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for $r > R$

$$B = \frac{\mu_0 I}{2\pi r}$$

$$B \propto \frac{1}{r}$$

6. Answer (4)

$$\vec{M} = NI\vec{A}$$

Magnetic dipole moment depends on

(1) Number of turn of the loop

(2) Current in the loop

(3) Area of the loop

7. Answer (2)

$$B_{axis} = \frac{1}{27} B_{centre}$$

$$\frac{\mu_0 I R^2}{2\left(R^2 + X^2\right)^{\frac{3}{2}}} = \frac{1}{27}\frac{\mu_0 I}{2R}$$

$$\frac{1}{2\left(R^2 + X^2\right)^{\frac{3}{2}}} = \frac{1}{2R^3 \times 27}$$

$$\sqrt{R^2 + X^2} = 3R$$

$R^2 + X^2 = 9R^2$

$X^2 = 8R^2$

$$\boxed{X = 2\sqrt{2}R}$$

8. Answer (4)

$$\vec{F}_m = q\left(\vec{v} \times \vec{B}\right) = qvB\left(\hat{i} \times \hat{k}\right) = -qvB\hat{j}$$

$$\vec{F}_e = qE\hat{j}$$

As both magnetic and electric force are in opposite direction, net force on the charge may be zero. Therefore, particle may pass undeflected.

9. Answer (1)

$$\vec{\tau} = MB\sin\theta$$

$M = NIA$

$$I = \frac{q}{t}$$

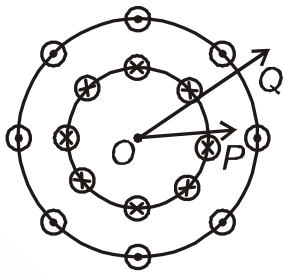
$$\Rightarrow \quad I = \frac{2\pi R\lambda}{\frac{2\pi}{\omega}}$$

$$\Rightarrow \quad I = \frac{2\pi R\lambda\omega}{2\pi}$$

$A = \pi R^2$

Hence, $\tau = \frac{2\pi R\lambda\omega}{2\pi}\pi R^2 \times B = \pi R^3\lambda\omega B$

10. Answer (2)



$$\oint \vec{B} \cdot \vec{dl} = \mu_0 I_{enc}$$

$$\Rightarrow \quad B\,2\pi\frac{3a}{2} = \mu_0 I$$

$$\Rightarrow \quad B_P = \frac{\mu_0 I}{3\pi a}$$

$$\oint \vec{B} \cdot \vec{dl} = \mu_0 I_{enc}$$

$$\Rightarrow \quad B\,2\pi\frac{5a}{2} = \left(\frac{3I}{2} - I\right)\mu_0$$

$$\Rightarrow \quad B_Q = \frac{\mu_0 I}{10\pi a}$$

Hence, $\frac{B_P}{B_Q} = \left(\frac{10}{3}\right)$

11. Answer (2)

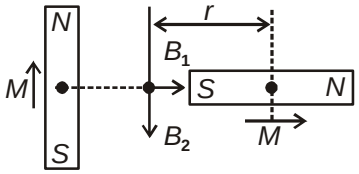
Magnetic field due to current carrying wire

$$B = \frac{\mu_0 I}{4\pi r}\left[\sin\alpha + \sin\beta\right] \quad [\alpha = 90°, \beta = 0°]$$

$$= \frac{\mu_0 I}{4\pi r}(1 - 0)$$

$$B = \frac{\mu_0 I}{4\pi r}$$

12. Answer (3)



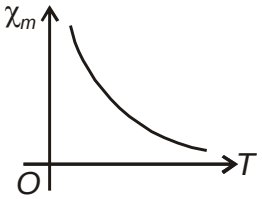
$$B_1 = \frac{\mu_0 2M}{4\pi r^3}$$

$$B_2 = \frac{\mu_0 M}{4\pi r^3}$$

$$B_{net} = \sqrt{B_1^2 + B_2^2} = \frac{\sqrt{5}\mu_0 M}{4\pi r^3}$$

13. Answer (2)

$$\chi_m = \frac{C\mu_0}{T}$$



14. Answer (2)

$$\mu = \frac{B}{H}$$

$$= \frac{0.25}{1000}$$

$= 2.5 \times 10^{-4}$ TmA^{-1}

$$\mu_r = \frac{\mu}{\mu_0}$$

$$\mu_r = \frac{2.5 \times 10^{-4}}{4\pi \times 10^{-7}}$$

$= 0.2 \times 10^3$

$$\mu_r = 2 \times 10^2$$

15. Answer (1)

Work done in rotating a bar magnet

$W = MB[1 - \cos\theta]$

$= MB[1 - \cos 120°]$

$$= \frac{3}{2}MB$$

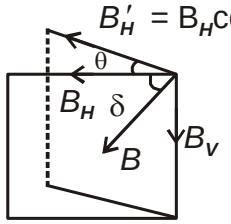
16. Answer (4)

$$\tan\delta' = \frac{B_V}{B_H'}$$

$$\tan\delta' = \frac{B\sin\delta}{B\cos\delta\cos\theta}$$

$$\tan\delta' = \frac{\tan\delta}{\cos\theta}$$

$B_H' = B_H\cos\theta$



$$\tan\delta' = \frac{\tan 60°}{\cos 30°}$$

$$= \frac{\sqrt{3}}{\frac{\sqrt{3}}{2}}$$

$\delta' = \tan^{-1}(2)$

17. Answer (2)

$\tau_H = \tau_V$

$MB_H\sin\alpha = MB_V\sin(90 - \alpha)$

$$\tan\alpha = \frac{B_V}{B_H}$$

$\alpha = \tan^{-1}(3)$

This angle is from horizontal

$\theta = \tan^{-1}\left(\frac{1}{3}\right)$ from vertical

18. Answer (2)

$$\therefore \quad r = \frac{mv}{qB} \text{ if } p = mv = \text{Constant}$$

$r \propto \frac{1}{q}$, lower radius indicates more curved path.

19. Answer (4)

Time period is independent of speed of charge.

20. Answer (3)

Current sensitivity = $\frac{NBA}{k} = \frac{\theta}{i}$

21. Answer (3)

In cyclotron both magnetic and electric field is used to accelerate the charge

22. Answer (2)

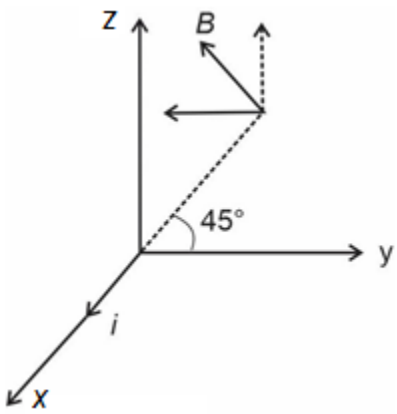
$T = mg$ (Translatory equilibrium)

$TR = \pi R^2 I B_0$ (Rotatory equilibrium)

$\Rightarrow \quad mgR = \pi R^2 I B_0$

$$I = \frac{Mg}{\pi R B_o}$$

23. Answer (3)



$\vec{B} = -\frac{\mu_o i}{2\sqrt{2\pi a}}\hat{j}$

$+\frac{\mu_o i}{2\sqrt{2\pi a}}\hat{k}$

$\hat{B} = \frac{-\hat{j}}{\sqrt{2}} + \frac{\hat{k}}{\sqrt{2}}$

24. Answer (1)

$\vec{E} \times \vec{B} = 0$

Means $\vec{E} \,||\, \vec{B}$

Particle will move in the direction of $\vec{E}$

25. Answer (4)

$\therefore \quad F_{\text{Magnetic}} \le qvB$

26. Answer (1)

$-q\vec{E} = q\vec{v} \times \vec{B}$

$-\vec{E} = vB\hat{j} \times \left(-\hat{i}\right)$

$\vec{E} = -vBk$

27. Answer (1)

$B = \mu_0(ni + I)$

28. Answer (1)

Susceptibility of diamagnetic substance is negative and independent on temperature

29. Answer (3)

$I = \frac{M}{V} = \frac{m.L}{AL} \Rightarrow m = IA$

30. Answer (2)

Speed of proton will not change therefore kinetic energy will be same

31. Answer (2)

$I \propto \tan\phi$

$\frac{I_1}{I_2} = \frac{\tan\phi_1}{\tan\phi_2}$

$\frac{2}{I_2} = \frac{\tan 30°}{\tan 60°}$

$I_2 = 6$ A

32. Answer (1)

$M = \frac{ql}{2m}$

$= \frac{q\frac{2}{3}mR^2\omega}{2m}$

$= \frac{qR^2\omega}{3}$

33. Answer (1)

Magnetic field due to two equal portions of wire will be equal and opposite

34. Answer (2)

$T_1 = 2\pi\sqrt{\frac{I_1 + I_2}{5M}}$

$T_2 = 2\pi\sqrt{\frac{I_1 + I_2}{M}}$

$\frac{T_1}{T_2} = \sqrt{\frac{1}{5}}$

$T_2 = 2\sqrt{5}$ s

35. Answer (2)

$M_{net} = \sqrt{M_1^2 + M_2^2}$

$M_1 = M_2 = \frac{M}{2}$

$M_{net} = \frac{M}{\sqrt{2}}$

SECTION-B

36. Answer (4)

Fact

37. Answer (3)

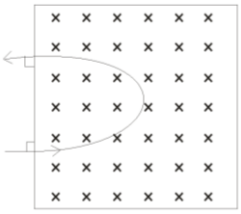
Inside the bar magnet field will be south to north and outside the magnet field will be north to south

38. Answer (3)

$a > r$

$b > 2r$

It means particle will come out from field as shown in figure



Therefore, deviation will be 180°

39. Answer (4)

Force will be zero

Torque may be zero may not be zero

40. Answer (3)

Potential energy of dipole in uniform magnetic field is given by

$U = -\vec{M}.\vec{B}$

41. Answer (4)

$\vec{F} = i\vec{\ell}_{eff} \times \vec{B}$

$F = \sqrt{2}ir \times B\sin 135°$

$= I\,rB$

42. Answer (2)

$M = 2NiA$

$M = \dfrac{L^2}{16}$

$M = \dfrac{IL^2}{16}$

43. Answer (1)

$\dfrac{BH_1}{BH_2} = \dfrac{B\cos 30°}{B\cos 60°}$

$= \sqrt{3} : 1$

44. Answer (1)

The value of H needed to make the residual intensity of magnetization zero is called coercivity

45. Answer (2)

$= \dfrac{2\pi M}{qB}\dfrac{\theta}{2\pi}$

$= \dfrac{2\pi m}{qB} \times \dfrac{5\pi}{3 \times 2\pi}$

$= \dfrac{5\pi m}{3qB}$

46. Answer (2)

$\left|\vec{F}_1\right| = \dfrac{\mu_0}{4\pi}\dfrac{2I_1I_2}{d} = F$ …(I)

$\left|\vec{F}_2\right| = \dfrac{\mu_0}{4\pi}\dfrac{2I_1(3I_2)}{2d} = \dfrac{\mu_0}{4\pi}\dfrac{3I_1I_2}{d}$ …(II)

From I and II

$\dfrac{F_1}{F_2} = \dfrac{2}{3}$

$\Rightarrow \quad F_2 = \dfrac{3}{2}F$

47. Answer (3)

Magnetic susceptibility is negative for diamagnetic materials while for paramagnetic and ferromagnetic materials it is positive.

48. Answer (3)

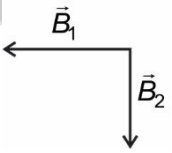
At point 'P'

$\vec{B}_{net} = \vec{B}_1 + \vec{B}_2$

Here $B_1 = B_2 = \dfrac{\mu_0}{4\pi}\dfrac{M}{r^3} = 10^{-7} \times \dfrac{400}{\left(\frac{1}{2}\right)^3}$

$= 3200 \times 10^{-7}$

$= 3.2 \times 10^{-4}$ T



Here, $B_{net} = \sqrt{B_1^2 + B_2^2}$

$= B\sqrt{2}$

$= 4.5 \times 10^{-4}$ T

49. Answer (1)

Radius of path of charged particle

$r = \dfrac{mv}{qB} = \dfrac{P}{qB}$

Here, $\dfrac{r_1}{r_2} = \dfrac{q_2B_2}{q_1B_2} = 1$

So, $r_1 = r_2$

50. Answer (4)

Work done

$X = MB(\cos\theta_1 - \cos\theta_2)$

$= MB(\cos 0° - \cos 53°)$

$= MB\left[1 - \frac{3}{5}\right] = \frac{2MB}{5}$

Torque required $\tau = MB\sin\theta = MB\sin 53°$

$= MB \cdot \frac{4}{5} = 2X$

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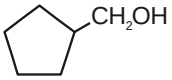
CHEMISTRY

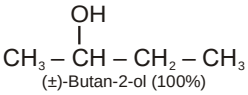
SECTION-A

51. Answer (1)

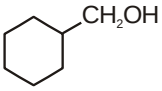
Aromatic aldehyde does not reduce Fehling's solution.

52. Answer (2)

(1) 

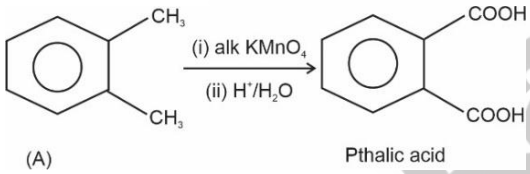
(2) 

(±)-Butan-2-ol (100%)

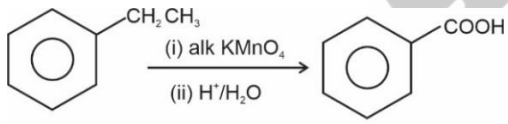
(3) 

(4) CH_3CH_2OH

53. Answer (1)

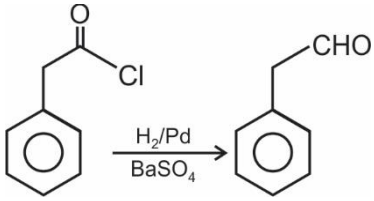


(A) Pthalic acid



(B) Benzoic acid

54. Answer (3)



55. Answer (4)

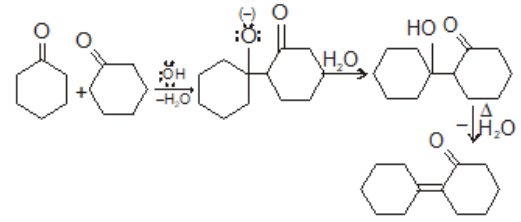
During decarboxylation of β-keto carboxylic acid, intermediate formed is enol and at bridge-head, unsaturation is not possible.

56. Answer (1)

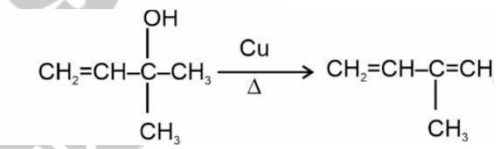
Amide < Ester < Acid anhydride < Acid halide

Reactivity towards nucleophilic acyl substitution

57. Answer (2)



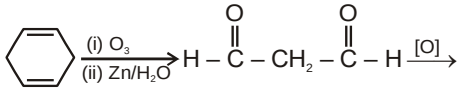
58. Answer (3)

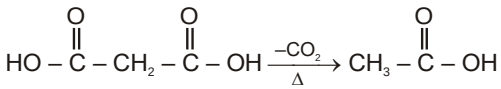
- 3° alcohol does not reduce Tollens' reagent
- 

59. Answer (1)

Electrophilicity of carbonyl carbon is least for ketone. Rate of nucleophilic addition to the carbonyl carbon is governed by electronic as well as steric factors

60. Answer (2)





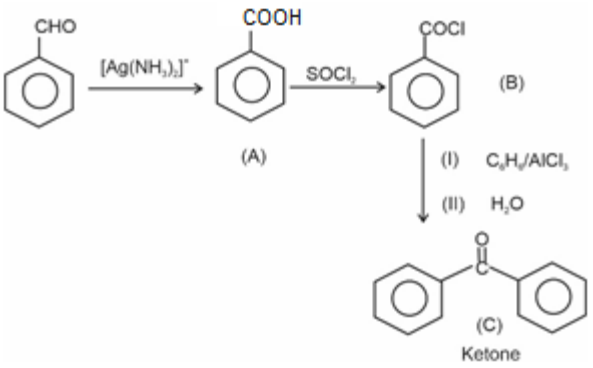
61. Answer (3)

Aldehydes having no α-H-atom undergo Cannizzaro reaction.

62. Answer (3)

Chromyl chloride is used in Etard's reaction

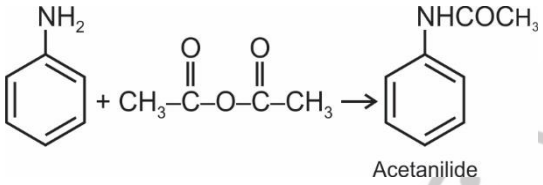
63. Answer (4)



64. Answer (1)

$PdCl_2$ is used as catalyst in Wacker's process.

65. Answer (3)



66. Answer (2)

$2\,(CH_3COO)_2Ca \xrightarrow{\text{dry dist.}} CH_3COCH_3 + CaCO_3$

67. Answer (3)

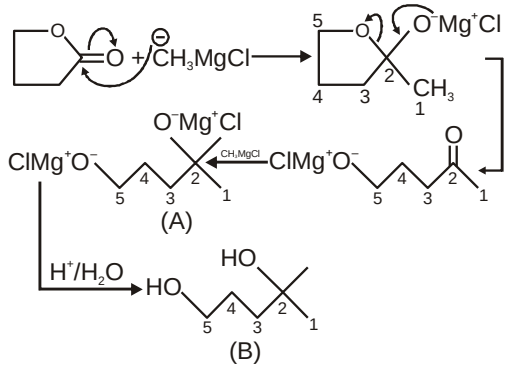
For aldol condensation there must be at least two α hydrogen atoms.

68. Answer (4)

Haloform reaction is shown by the compounds having the $(-\overset{|}{C}-\overset{O}{\overset{\|}{C}}-CH_3)$ linkage.

$CH_3CH_2CH(OH)CH_3$ gets oxidized to $CH_3CH_2COCH_3$ during first step of haloform reaction.

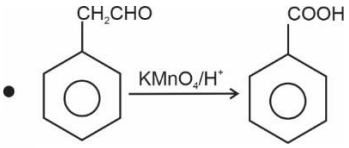
69. Answer (2)



70. Answer (2)

Stronger acid whose acidity is greater than carbonic acid can produce CO_2 gas on reaction with $NaHCO_3$.

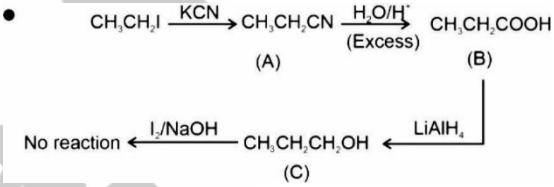
71. Answer (3)

- Aldehydes and ketones give 2,4 DNP test.
- Methyl ketones and acetaldehyde gives iodoform test.
- 

72. Answer (4)

$LiAlH_4$ cannot reduce ether

73. Answer (3)

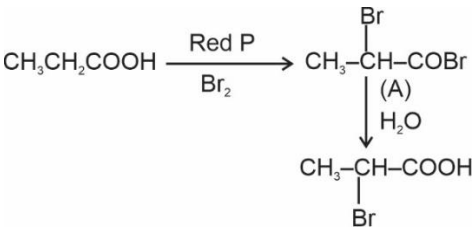
- 

- $CH_3CH_2CN \xrightarrow{LiAlH_4} CH_3CH_2CH_2NH_2$ (1° Amine)
- $CH_3CH_2COOH \xrightarrow{HVZ} CH_3-\underset{*}{\overset{Br}{C}}H-COOH$ (Chiral molecule)

74. Answer (1)

Only aldehydes and ketones form oximes on reaction with NH_2OH.

75. Answer (3)



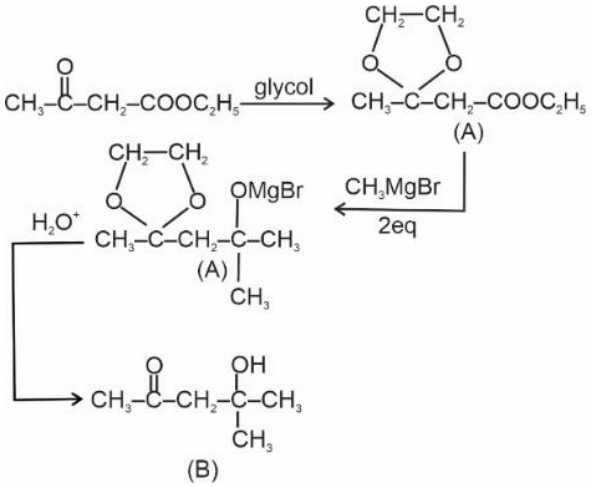
76. Answer (1)

Grignard reagent used in THF solution

77. Answer (2)

Only C = C is reduced at low pressure i.e. 1 atm.

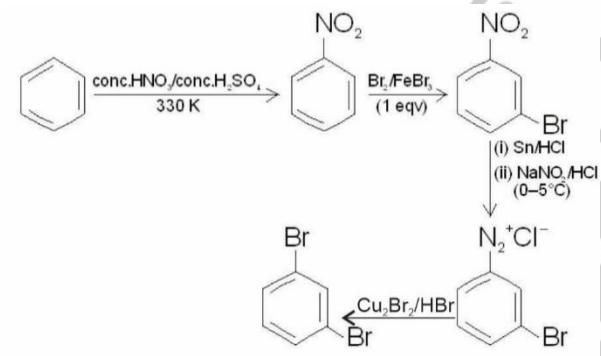
78. Answer (4)



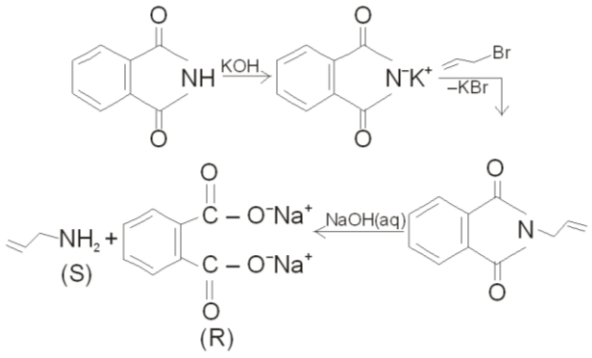
79. Answer (2)

$NH_2–NH–\overset{\overset{O}{\|}}{C}–NH_2$ group is semicarbazide

80. Answer (3)



81. Answer (4)

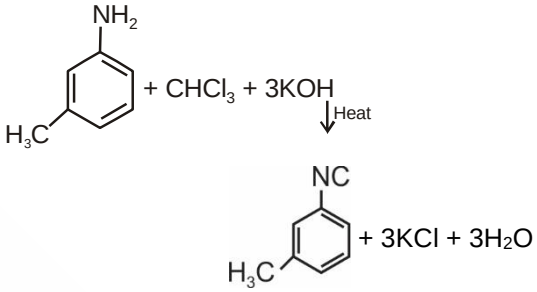


82. Answer (4)

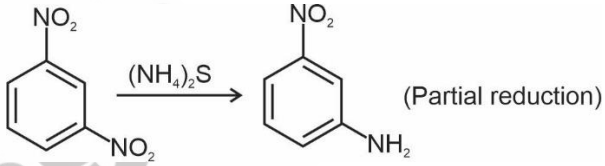
Hydrogen bonding in primary amine is stronger than secondary amine. Hydrogen bonding in tertiary amine is absent.

83. Answer (2)

Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines which are foul smelling substances. Secondary and tertiary amines do no show this reaction. This reaction is known as carbylamine reaction or isocyanide test.



84. Answer (1)



85. Answer (3)

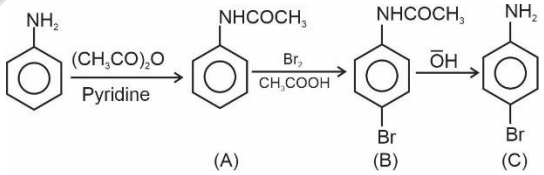
$(CH_3)_2NH + HONO \rightarrow (CH_3)_2N – NO + H_2O$

SECTION-B

86. Answer (4)

$C_2H_5NC \xrightarrow{LiAlH_4} C_2H_5NHCH_3$

87. Answer (4)

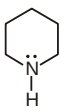


88. Answer (3)

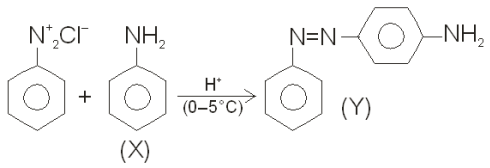
$A \xrightarrow[(ii)\,\Delta]{(i)\,NH_3} B \xrightarrow[\Delta]{Br_2/KOH} C\ (C_6H_7N,)$

so, the compound 'C' is an amine ($– NH_2$) and 'B' must be an amide ($– CONH_2$). Therefore (C) is $C_6H_5NH_2$. Hence 'A' is C_6H_5COOH (Benzoic acid)

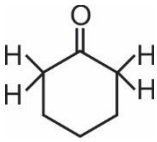
89. Answer (1)

 is most basic as lone pair of electron is most easily available for protonation.

90. Answer (3)



91. Answer (3)

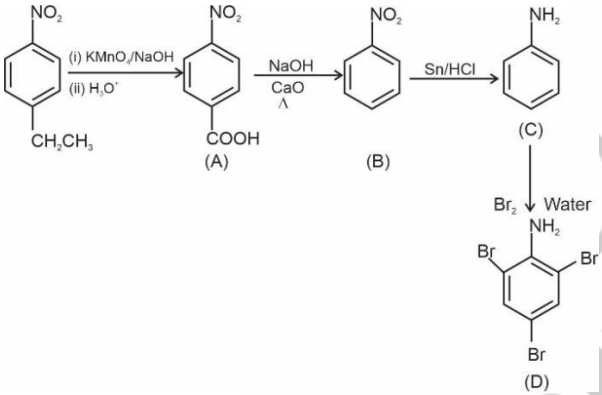


Cyclohexanone contains 4 enolisable hydrogen atoms (α-H atoms)

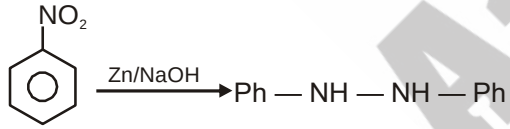
92. Answer (2)

The given reaction is called Sandmeyer reaction

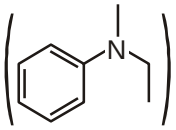
93. Answer (2)



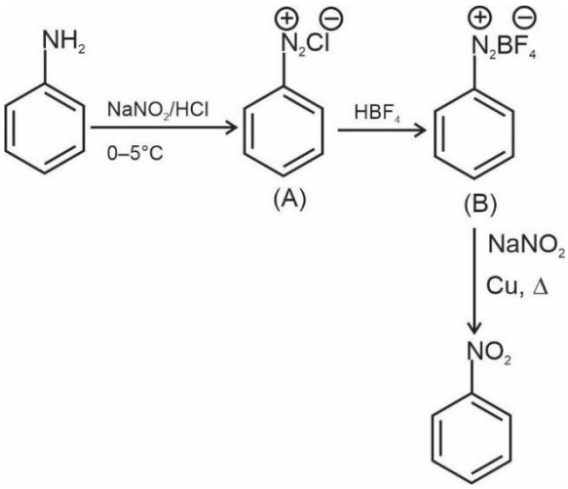
94. Answer (2)



95. Answer (4)

Tertiary amine  will not react with Hinsberg's reagent ($C_6H_5SO_2Cl$)

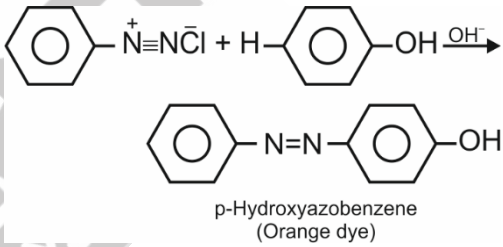
96. Answer (2)



97. Answer (4)

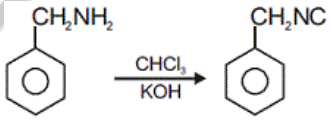
Compounds	Boiling point (K)
n-Butane	273
Methoxyethane	281
Propanal	322
Acetone	329

98. Answer (2)

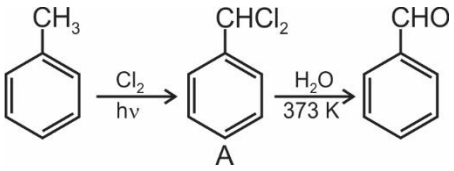


99. Answer (3)

Carbylamine reaction.



100. Answer (4)



BOTANY

SECTION-A

101. Answer (2)

Nitrogenous bases (Adenine, thymine, cytosine and guanine) with pentose sugar (deoxyribose sugar) form nucleoside in DNA. Hence, Thymine + Pentose sugar (deoxyribose sugar) form deoxythymidine as nucleoside in DNA.

102. Answer (1)

A nitrogenous base is linked to a pentose sugar through N-glycosidic linkage.

103. Answer (2)

Chargaff's rule is not applicable for single stranded DNA.

Base ratio $\frac{A+T}{C+G}$ is specific for a species. It is < 1 in prokaryotes and > 1 in eukaryotes.

104. Answer (4)

Nucleosomes have histone octamer, *i.e.,* organised form of H_2A, H_2B, H_3 and H_4 histones. Ribosome is not a part of nucleosome.

105. Answer (2)

Thymine (5-methyl uracil) is found in DNA.

106. Answer (2)

The unequivocal proof that DNA is the genetic material came from the experiment conducted by Hershey and Chase.

107. Answer (4)

A and G are purines (bicyclic N-bases)

A = T = 43%

$\therefore$ C = G = 7%

A + G = 50%

108. Answer (1)

Guanine is a purine.

109. Answer (3)

In Griffith's experiment, mice died when injected with heat–killed S-strain combined with R-strain bacteria.

110. Answer (2)

One of the reasons that DNA is preferred over RNA as genetic material is presence of thymine (5-methyl uracil) confers additional stability to DNA.

111. Answer (1)

In reverse central dogma, DNA is synthesized over RNA template.

112. Answer (4)

In the experiment, heat-killed smooth bacteria had enabled the R-strain to synthesize a smooth polysaccharide coat and R-strain became virulent.

113. Answer (2)

Heterochromatin is darkly stained region and is transcriptionally inactive.

114. Answer (1)

Largest human gene is dystrophin with 2.4 million bases.

115. Answer (2)

Chromosome 1 has 2968 genes.

116. Answer (2)

Peptide bond formation is catalysed by enzyme peptidyl transferase (a type of ribozyme-catalytic RNA *i.e.*, 23S rRNA in bacteria and 28S rRNA in eukaryotes)

117. Answer (1)

Tailing is the addition of adenylate residues about 200-300 at 3′ end in the template–independent manner on newly formed hnRNA with the help of Poly A polymerase.

118. Answer (3)

The terminator is present at 3′ end (downstream) of coding strand and it usually defines the end of process of transcription. In the given transcription unit; A is template strand, B is coding strand.

119. Answer (2)

Deoxyribonucleoside triphophates serves dual purposes. In addition to acting as substrates, they provide energy for polymerisation reaction.

120. Answer (3)

Promoter site of transcription unit is recognised by σ factor.

121. Answer (2)

RNA polymerase itself can start transcription.

122. Answer (1)

After deletion of 15th nucleotide, UGG becomes UGA (Nonsense codon).

Hence, from given sequence 4 amino acids can be coded.

123. Answer (3)

mRNA is synthesized from DNA and has information for protein synthesis. mRNA translates into proteins.

124. Answer (3)

UAA, UAG, UGA are stop codons.

125. Answer (4)

Splicing occurs in nucleus in eukaryotes whereas in prokaryotes, it is usually absent as introns are absent except in Archaebacteria.

126. Answer (4)

Peptidyl transferase is an RNA enzyme rather being proteinaceous. In case of prokaryotes 23S rRNA acts as ribozyme whereas in eukaryotes it is 28S rRNA. It catalyses the peptide bond formation between amino acids.

127. Answer (4)

tRNA is the smallest RNA.

128. Answer (4)

mRNA first binds to smaller subunit of ribosome then initiator tRNA comes to P site of ribosome.

129. Answer (3)

Lactose acts as an inducer. Regulation of *lac* operon by repressor protein is negative regulation.

130. Answer (1)

tRNA and 5S rRNA are synthesized by RNA polymerase III.

131. Answer (2)

Minisatellites are also known as VNTR and surrounded by conserved restriction sites.

132. Answer (2)

The mRNA provides the template to synthesise a protein. The rRNA acts as a catalyst.

133. Answer (4)

The science of collecting and analyzing complex biological data such as genetic codes is called bioinformatics.

134. Answer (2)

Some amino acids are coded by more than one codon, hence the code is degenerate.

135. Answer (2)

Rho factor (ρ) is required for termination of transcription.

SECTION-B

136. Answer (2)

The technique of DNA fingerprinting was developed by Alec Jeffrey.

137. Answer (1)

There are about 1.4 million locations where single base DNA differences occur in humans. This is known as SNPs.

138. Answer (3)

Split genes are usually found in eukaryotes.

139. Answer (2)

The initiator codon is AUG which codes for methionine.

140. Answer (3)

Catalyst, ribozyme and peptidyl transferase are associated with structural RNA in eubacteria (prokaryote).

141. Answer (3)

DNA dependent DNA polymerase catalyses polymerisation only in one direction that is $5' \rightarrow 3'$.

142. Answer (4)

The length of DNA in typical mammalian cell having 6.6×10^9 bp is about 2.2 m.

143. Answer (3)

Hershey and Chase worked with bacteriophage.

144. Answer (2)

About 200 bp of DNA is present in a typical nucleosome and is wrapped around it.

145. Answer (4)

Histones are rich in basic amino acid residues lysine and arginine with charged side chain.

146. Answer (2)

Single stranded DNA is also found in some bacteriophages.

147. Answer (1)

tRNA is the adaptor molecule.

148. Answer (2)

Yeast is eukaryotic and have 3 different types of RNA polymerases to catalyze the synthesis of different RNAs in the nucleus.

149. Answer (1)

Regulator gene (*i*-gene) shows constitutive expression.

150. Answer (1)

G = 14%

Guanine = cytosine $\therefore$ C = 14%

Remaining 72% are A and T.

So, A = 36%, T = 36%

ZOOLOGY

SECTION-A

151. Answer (2)

In the experiment, Miller took molecules similar to early earth's atmosphere and put them into a closed system. The control apparatus comprised similar arrangement except that it was devoid of an energy source.

152. Answer (1)

Hearts in various vertebrates are homologous structures which show similarity in basic plan but have a varied degree of specialization.

153. Answer (1)

Study of external features of organisms is known as morphology. Physiology is the science of body functions and how the body parts work. Biogenesis is formation of organisms from pre-existing organisms.

154. Answer (3)

Life arises from non-living matter according to theory of spontaneous generation.

155. Answer (4)

Origin of species was explained by Charles Darwin and Origin of life by A.I. Oparin. Origin of Universe is explained by the Big-Bang hypothesis.

156. Answer (4)

Theory of germplasm was given by A.Weismann.

157. Answer (1)

Wombat, Bandicoot and Spotted cuscus are Australian marsupials whereas Bobcat is a placental mammal.

158. Answer (1)

The common ancestor of finches was seed eating and other forms arose with altered beaks enabling them to develop different food habits.

159. Answer (2)

During the course of origin of life, events most likely took place in given order.

(1) Synthesis of organic monomers.

(2) Synthesis of organic polymers.

(3) Formation of protobionts

(4) Formation of Eobionts with DNA based genetic systems.

160. Answer (1)

A number of marsupials, each different from the other, evolved from an ancestral stock, but all within Australian island. Divergent evolution represents homology while convergent evolution represents analogy. Saltation refers to single step large mutation leading to variation.

161. Answer (1)

Ontogeny is development of embryo and phylogeny is the ancestral sequence. Biogenetic law states that ontogeny is recapitulation of phylogeny. As per this law, the sequence of embryonic development in different vertebrates shows striking similarities.

162. Answer (4)

Organs which have same origin but different function are called homologous organs. *e.g.*, Forelimbs of human, horse and bat.

163. Answer (3)

Mesozoic era is considered as golden age of reptiles because reptiles were dominant. Jurassic period is considered as golden age of dinosaurs.

164. Answer (2)

Sweet potato is a root modification and potato is a stem modification. They are analogous structures.

165. Answer (1)

Key points of evolution *i.e.*, descent with modifications and natural selection was proposed by Darwin. Darwin stressed on reproductive fitness. Saltation was explained by De Vries and genetic drift by Sewall and Wright.

166. Answer (3)

Plants evolved prior to animals. Sauropsids were ancestors of thecodonts.

167. Answer (2)

According to Lamarck, all acquired characters of a generation are passed on to the next one.

168. Answer (3)

Increased cranial capacity led to natural selection. Erect posture appeared in *Australopithecines*.

169. Answer (4)

Cranial capacities of Cro-Magnon man, *H.erectus, H.habilis* and *H.neanderthalensis* are 1650, 900, 650-800 & 1400 cc respectively.

Neanderthal man buried his dead with flowers and tools.

170. Answer (2)

When gene migration occurs many times there will be gene flow. If the change in allele frequency occurs by chance, it is called genetic drift. Following two effects are ramifications of genetic drift (1) Founder's effect (2) Bottleneck effect.

171. Answer (4)

Jurassic period is considered as golden age of dinosaurs and dinosaurs extinct in cretaceous period.

172. Answer (1)

Evolution is a non-directional, stochastic process based on chance events and chance mutations. Evolution is occurring at a fast pace due to anthropogenic interference.

173. Answer (3)

Non-cellular form of life possible originated around 3 billion years ago.

174. Answer (3)

Mutations are preadaptive.

175. Answer (4)

Epiglottis is not a vestigial organ it prevents entry of food into wind pipe during swallowing.

176. Answer (1)

Seed ferns originated in carboniferous period from progymnosperms

177. Answer (1)

By 10000 years ago, there are evidences of agriculture by early man.

178. Answer (2)

Founder effect is a kind of genetic drift whereby few individuals migrate and colonise a new habitat.

179. Answer (2)

Lamarck's theory, written in a book named ''Philosophie Zoologique''.

180. Answer (4)

Neanderthal man was meat eater with the cranial capacity of 1400 cc.

181. Answer (3)

Non-random mating affects the Hardy-Weinberg equilibrium.

182. Answer (1)

Natural selection selects for reproductive fitness.

183. Answer (1)

The correct sequence is

Ramapithecus $\rightarrow$ *Australopithecines* $\rightarrow$ *Homo habilis* $\rightarrow$ *Homo erectus* $\rightarrow$ *Homo sapiens*.

184. Answer (3)

The therapists (extinct) were the most advanced synapsids that include the ancestor of mammals.

185. Answer (2)

Seed ferns evolved from progymnosperms.

SECTION-B

186. Answer (3)

Java Ape Man - *Pithecanthropus erectus*

or

Homo erectus erectus

187. Answer (3)

Triceratops was a three-horned herbivorous dinosaur.

188. Answer (4)

Tyrannosaurus was giant carnivorous dinosaur.

189. Answer (2)

Earliest autotrophs were chemoautotrophs and anoxygenic photoautotrophs.

190. Answer (3)

Fossils of therapsids are closest and direct ancestors of modern day mammals. Sauropsids were ancestors of modern day reptiles. Pelycosaurs and synapsids also fall on the same lineage as therapsids.

191. Answer (4)

Ozone was not present in primitive atmosphere.

192. Answer (3)

Natural selection of one extreme character is called directional selection.

193. Answer (2)

Genetic drift occurs in small isolated populations as frequency of alleles cannot change suddenly in a large population.

194. Answer (2)

Miller observed formation of simple amino acids by using a mixture of CH_4, NH_3, H_2 and water vapour at 800°C in a large flask.

195. Answer (1)

Both statements are correct. Evolution is stochastic process based on chance events in nature and chance mutation in organisms.

196. Answer (2)

Dicots and monocots are the dominating land plants in the present era. Due to continental drift, South American fauna was overridden by North American fauna.

197. Answer (4)

Frequency of red (recessive flowers) $[q^2]$ = 4%

q = 0.2

p = 0.8

% of dominant allele = 0.8 × 100 = 80%

198. Answer (1)

Homo habilis did not eat meat

199. Answer (1)

Hugo deVries gave the mutation theory. He believed that it is mutation that causes evolution.

200. Answer (4)

Numbat is an Australian marsupial.

❑ ❑ ❑