TARGET : MH-CET 2015

TEST # 04 | DATE : 01 - 03 - 2015

Test Type : MAJOR | Test Pattern : MH-CET

SYLLABUS : FULL SYLLABUS

ANSWER KEY

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

HINT – SHEET

1. (4) Given,

r = 10 cm = 10 x 10^{-2} m

I = 1A

B = 6.284 x 10^{-3} Wb/m^2

n = ?

We know that,

$$B = \frac{\mu_o nI}{2r}$$

$$\therefore\ n = \frac{2Br}{\mu_0 I} = \frac{2\times6.284\times10^{-3}\times10\times10^{-2}}{4\pi\times10^{-7}\times1} = 1000$$

$\therefore$ n = 1000

2. (2) A-s, B-p, C-q, D-r

3. (3) Linear momentum.

4. (3) $a = 3t^2 + 3t + 5 = \frac{dv}{dt}$

$\therefore\ dv = (3t^2 + 3t + 5)\,dt$

$\int dv = \int (3t^2 + 3t + 5)\,dt$

$$\therefore\ v = 3\times\frac{t^3}{3} + 3\frac{t^2}{2} + 5t + \text{constant} \quad ...(I)$$

at t = 0, $v = 3\ \frac{m}{s}$ (Given)

Substituting above values in equation (I) we get, 3 = O + C

$$\therefore\ v = t^3 + 3\frac{t^2}{2} + 5t + 3$$

when t = 2,

v = 8 + 6 + 10 + 3 = 27

$$\therefore\ v = 27\ \frac{m}{s}$$

5. (4) In the first case, power $P = \frac{V^2}{R}$

$$\therefore\ R = \frac{V^2}{P} = \frac{(220)^2}{300} = \frac{484}{3}\Omega$$

When it is connected across 110 V source,

$$P = \frac{V^2}{R} = \frac{(110)^2}{484/3} = 75W$$

Decrease in power = 300 - 75 = 225 W

Percentage decrease in power = $\frac{225}{300} \times 100 = 75\%$

6. (4) The lens must be a convex lens, as it is giving on inverted image of unit magnification (m=1).

Since the image is inverted, it must be a real image.

Since magnification is unity (m = 1),

$$\therefore \frac{\text{Image distance}}{\text{object distance}} = \frac{v}{u} = 1$$

$\therefore$ v = u

This is possible if object is placed at a distance 2f from the lens.

$\therefore$ u = 2f = 2 x 15 = 30 cm

$\therefore$ u = 30 cm

7. (3) $\frac{mg'}{mg} = \frac{GM}{(R+h)^2} \times \frac{R^2}{GM}$

$$\frac{mg'}{mg} = \frac{R^2}{\left(R + \frac{R}{4}\right)^2}$$

$$mg' = \frac{16}{5^2} \times 90$$

mg' = 57.6 N.

8. (3) The normal force is zero.

9. (3) The time taken by the liquid to cool from 60 ^{0}C to 50 ^{0}C is more than10 minutes. Because cooling graph i.e. temperature against time graph is an exponential graph.

10. (4) resolving power of telescope = $\frac{D}{1.22\lambda}$

11. (3) As the sphere is floating, $F_{net} = 0$

So B = Mg

B = upthrust

$$B = \rho_{oil}\frac{V}{2}g + \rho_{Hg} \times \frac{V}{2}g = (\rho_{oil} + \rho_{Hg})\frac{Vg}{2} \quad ...(i)$$

$Mg = \rho_s$ Vg ....(ii)

So ρ_s Vg = $(\rho_{oil} + \rho_{Hg})$ $\frac{Vg}{2}$

$$\Rightarrow \rho_s = \frac{\rho_{oil} + \rho_{Hg}}{2} = \frac{0.8 + 12.6}{2} = \frac{14.4}{2}$$

= 7.2 gm/cm^3

12. (1) Linear momentum = mv = $\frac{me^2}{2 \in_0 nh}$

Angular momentum = $\frac{nh}{2\pi}$

given, linear momentum x angular momentum $\propto n^x$

$$\therefore \frac{me^2}{2 \in_0 nh} \times \frac{nh}{2\pi} \propto n^x$$

$n^0 \propto n^x$

$\therefore$ $x = 0$

13. (3) E = 100 sin (100t) (in V)

$$I = 100 \sin\left(100t + \frac{\pi}{3}\right) \text{ (in mA)}$$

P_{av} = ?

$$E_V = \frac{100}{\sqrt{2}}V, \quad I_v = \frac{100}{\sqrt{2}}, \quad \phi = \frac{\pi}{3}$$

$P_{av} = E_v I_v \cos\phi$

$$P_{av} = \frac{100 \times 100}{\sqrt{2} \times \sqrt{2}} \times 10^{-3} \cos\left(\frac{\pi}{3}\right)$$

$$P_{av} = \frac{10000 \times 10^{-3}}{2} \cos\left(\frac{\pi}{3}\right)$$

$$P_{av} = 5 \cos\left(\frac{\pi}{3}\right) \Rightarrow Pav = 5 \times \frac{1}{2} = 2.5 \text{ W}$$

14. (4) low frequency audio signals on high frequency carrier waves.

15. (3) L = $\frac{n\lambda}{2}$

For first overtone, n = 2

$\therefore$ λ = L

16. (1) V = 2 m/s, m = 1kg

r = 1 m

$$T = \frac{mv^2}{r} = \frac{1 \times 2^2}{1} = 4N$$

17. (4) T/12

$x = A \sin \omega t$

$x = A \sin\left(\frac{2\pi}{T}.t\right)$

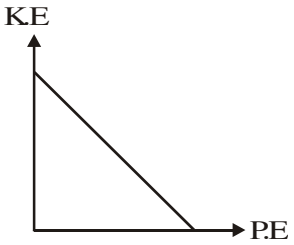
$\frac{A}{2} = A \sin\left(\frac{2\pi}{T}.t\right)$

$\frac{1}{2} = \sin\left(\frac{2\pi}{T}.t\right)$

$\Rightarrow \frac{2\pi}{T}.t = \sin^{-1}\left(\frac{1}{2}\right) \Rightarrow \frac{2\pi}{T}.t = \frac{\pi}{6} \Rightarrow t = \frac{T}{12}$

18. (3) A straight line having intercepts on the E_p and E_k.

K.E. + P.E = constant



19. (4) The P.E. stored in a spring = $\frac{1}{2}kx^2$

K = spring constant

x = Amount of extension or compression

Given $\frac{1}{2}k(2)^2 = U \Rightarrow 2k = U$

So $\frac{1}{2}k(10)^2 = \frac{1}{2} \times k \times 100 = 50k = 25(2k) = 25U$

20. (3) Fundamental frequency, $f = \frac{2}{2l}\sqrt{\frac{T}{\mu}}$

when the lift falls freely, the tension in the string will be zero, so the fundamental frequency will also become zero.

21. (1) The maximum particle velocity = $A\omega$

where A = Amplitude, ω = Angular frequency

wave velocity = $\frac{\omega}{K}$, $K = \frac{2\pi}{\lambda}$

Given $A\omega = 2\left(\frac{\omega}{K}\right)$

$A = \frac{2}{\frac{2\pi}{\lambda}} = \frac{\lambda}{\pi}$

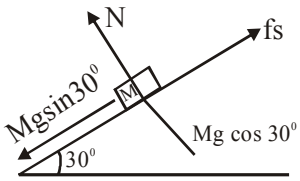
22. (3) Using $\frac{GMm}{R^2} = m\omega^2 R$ as the satellite is revolving very close to the earth, the orbital radius is almost equal to the radius of earth.

$\omega = \sqrt{\frac{GM}{R^3}} = \sqrt{\frac{G \times \rho \times \frac{4\pi}{3}R^3}{R^3}} = \sqrt{\frac{4\pi}{3}G\rho}$

$\omega = \frac{2\pi}{T} = \sqrt{\frac{4\pi}{3}G\rho}$

$\Rightarrow T \propto \frac{1}{\sqrt{\rho}}$

23. (1)



As the block is at rest, the friction is static and equal to the value of

$Mg\sin 30^0 = 2 \times 9.8 \times \frac{1}{2} = 9.8$ N

24. (1) Diatomic gases have $C_V = \frac{5}{2}R$

Linear poly-atomic like CO_2 gas also has $C_V = \frac{5}{2}R$. All mono-atomic gas at low temperature have $C_V = \frac{3}{2}R$.

25. (3) Fringe width $= \left(\frac{\lambda D}{d}\right) = 0.4$ mm. Distance of fourth dark fringe from the central bright fringe $= 7\left(\frac{\lambda D}{2d}\right)$.

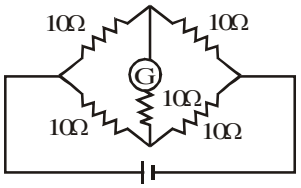
Distance of sixth bright from the central bright fringe $= 6\frac{\lambda D}{d}$

so $6\frac{\lambda D}{d} - \frac{7\lambda D}{2d} = \frac{\lambda D}{d}\left(6 - \frac{7}{2}\right) = \frac{\lambda D}{d} \times \frac{5}{2}$

$= 0.4 \times \frac{5}{2} = 1$mm

26. (2) An isolated spherical conductor has same poteantial everywhere. So the potential at everypoint on the conductor will be equal to 10 volts.

27. (4) As the bridge is balanced, the galvanometer branch will not conduct. so R_{eq} = 10Ω



28. (2) The initial velocity of the stone will be equal to that of the balloon. So the stone will first move up and than later it will start falling downward.

Using $S = ut + \frac{1}{2}gt^2$

$-65 = 12t - 5t^2$

$\Rightarrow 5t^2 - 12t - 65 = 0$

t = 5 sec

29. (1) By using momentum conservation,

$mV = (m+m)v' \Rightarrow v' = \frac{\sqrt{2gL}}{2}$

Initially $T_1 = mg$ ------(1)

Now using $F_{net} = \frac{mv^2}{R} \Rightarrow T_2 - 2mg = \frac{(2m)v'^2}{L}$

$\Rightarrow T_2 = 2mg + \frac{2m}{L} \times \frac{2gL}{4} = 3mg$

$\Rightarrow T_2 - T_1 = 2mg$

30. (4) $\frac{ML^2}{Q^2} = \frac{ML^2}{(IT)^2} = ML^2I^{-2}T^{-2}$

Dimension of inductance = $\frac{B \times A}{I} = \frac{\left(MT^{-2}I^{-1}\right)L^2}{I} = ML^2T^{-2}I^{-2}$. So the dimension of $\frac{ML^2}{Q^2}$ and inductance are equal. The S.I. unit of inductance is Henry.

31. (3) The energy of nth level of H. like species is $\frac{-13.6Z^2}{n^2}$ putting n = 1 and Z = 2,

E_n = -13.6 x 4 = -54.4 eV. So the ionisation energy is 54.4eV for He^+.

32. (2) The time period of oscillation of a spring-mass system is $T = 2\pi\sqrt{\frac{m}{k}}$

So $T_1 = 2\pi\sqrt{\frac{m}{k}}$

When the spring is cut into two equal halves, the spring constant of each half will become 2K.

So $T_2 = 2\pi\sqrt{\frac{m}{2k}}$

$\frac{T_2}{T_1} = \sqrt{\frac{k}{2k}} = \frac{1}{\sqrt{2}}$

33. (2) When the conduction in a semi-conductor is due to the breaking of covalent bonds then it is said to be in the breakdown region. We use this principle in Zener diode.

34. (3) Distance upto which T.V. signals can be received, d = $\sqrt{2hR}$ (R = Radius of earth = 6400 km), d = $\sqrt{2 \times 300 \times 6400 \times 10^3}$ = 62 km

35. (3) Using $F_{net} = m\omega^2 R$ towards the centre,
$T - mg = m\omega^2 L \Rightarrow T = mg + m\omega^2 L$

36. (3) When a person jumps from a certain height his momentum becomes zero after the jump and due to which he experienced a force which can hurt him.
So the maximum speed with which he can jump = $\sqrt{2gH}$

On a different planet, $\sqrt{2gH} = \sqrt{2 \times g' \times H'}$

$H' = \frac{gH}{g'} = \frac{9.8 \times 2}{1.96}$ = 10 m

37. (4) At constant pressure,
$\Delta Q = nC_p\Delta T$
ΔU = change in internal energy
$\Delta U = nC_v \Delta T$
Fraction of heat energy converted into internal energy

$= \frac{\Delta U}{\Delta Q} = \frac{nCv\Delta T}{nC_p\Delta T} = \frac{Cv}{Cp} = \frac{\frac{5}{2}R}{\frac{7}{2}R} = \frac{5}{7}$

38. (4) The velocity of a mechanical wave is dependent on the medium and for one medium one wave has a single speed. So speed will not change.

39. (2) The work done is given by

$W = \int \vec{F}.d\vec{s}$; for constant force $W = \vec{F}.\Delta\vec{s}$

$\Delta\vec{s} = (x_2 - x_1)\hat{i} + (y_2 - y_1)\hat{j} + (z_2 - z_1)\hat{k}$

$= (14-3)\hat{i} + (13-2)\hat{j} + [9-(-6)]\hat{k}$

$= (11\hat{i} + 11\hat{j} + 15\hat{k})$

$W = \vec{F}.\Delta\vec{s} = (4\hat{i} + \hat{j} + 3\hat{k}).(11\hat{i} + 11\hat{j} + 15\hat{k})$

= 44 + 11 + 45 = 100 J

40. (4) $|m| = \left|\frac{v}{u}\right| = 4 \quad \Rightarrow |v| = 4|u|$

As the image is real, u + v = 50 $\Rightarrow$ u + 4u = 50

u = 10cm

Using Lens formula, $\frac{1}{V} - \frac{1}{u} = \frac{1}{f}$

putting v = 4u = 40 cm

u = -10cm

$\frac{1}{40} + \frac{1}{10} = \frac{1}{f} \Rightarrow \frac{5}{40} = \frac{1}{f} \Rightarrow \frac{1}{f} = \frac{1}{8}\ cm^{-1}$

So $P = \frac{1}{f} = \frac{100}{8} m^{-1} = 12.5\,D$

41. (2) The maximum value of Reynold's number for steady flow is 1500.

Using $R = \frac{\rho V D}{\eta} \Rightarrow V = \frac{R \times \eta}{\rho \times D}$

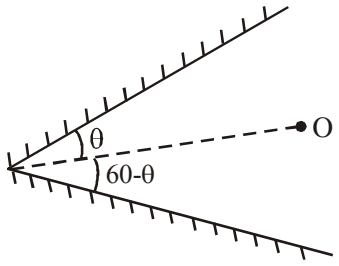
$\Rightarrow V = \frac{1500 \times 80}{10^3 \times 1.5} = 80\ m/s$

42. (2) $KE = \frac{1}{2}mV^2 = \frac{P^2}{2m}$

P = linear momentum

As 'p' is same for both, lighter mass will have more kinetic energy.

43. (3)



If n = No of images formed by both the mirror

θ = Angle between the mirrors then

$n = \left[\left(\frac{360^0}{\theta}\right) - 1\right]$ if $\frac{360^0}{\theta}$ is an even number

In this case, $\frac{360^0}{\theta} = \frac{360^0}{60^0} = 6$

So the answer is 6 - 1 = 5.

The answer can also be calculated by maually finding the positions of image by successive reflections.

44. (2) Angular momentum about the origin 'O' is

$|L| = mvr \sin\theta$

$= mv_x H_{max}$

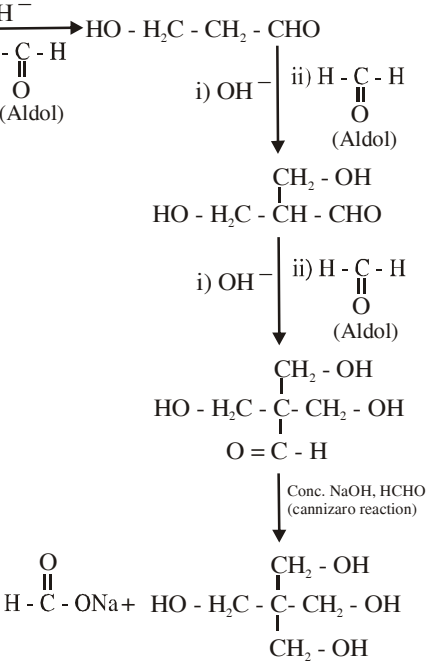
$= m \times \frac{v}{\sqrt{2}} \times H_{max} = m \times \frac{v}{\sqrt{2}} \times \frac{v^2/2}{2g} = \frac{mv^3}{4\sqrt{2}\,g}$

45. (3) Due to induction effect, some negative charge will be developed on the upper side of the conductor and an equal amount of positive charge will be developed on the lowerside. So the field lines are best represented by the option (c).

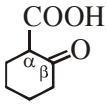
46. $4HNO_3 \longrightarrow 2H_2O + 2NO_2 + 3O_2$

HNO_3 decomposes by giving NO_2, O_2 & H_2O

48.



49. β-ketoacids undergo decarboxylation easily.



(β-ketoacid)

50. Haematite (Fe_2O_3)

$2x + 3(-2) = 0 \Rightarrow x = 3$

magnetite (Fe_3O_4). It is an equimolar mixture of FeO & Fe_2O_3.

FeO : $x + (-2) = 0 \Rightarrow x = 2$

Fe_2O_3 : $x = 3$.

51. Molarity (M) =

$$\frac{\text{Given mass of solute}}{\text{Gram molecular mass}} \times \frac{1000}{\text{Volume of solution (in mL)}}$$

$$\Rightarrow 2 = \frac{x}{63} \times \frac{1000}{250} \Rightarrow x = \frac{63 \times 2 \times 250}{1000} = 31.50\,g$$

100 g concentrated HNO_3 contains 70 g HNO_3

How many grams concentrated HNO_3 contains 31.5g HNO_3

$$= \frac{31.50 \times 100}{70} = 45\,g$$

53. n = 3

$l = 0, 1, 2$

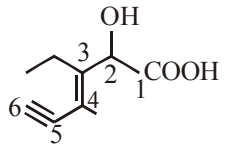
$l = 0, \Rightarrow m = 0$

$l = 1, \Rightarrow m_l = -1, 0, +1$

$l = 2, \Rightarrow m_l = -2, -1, 0, 1, 2$

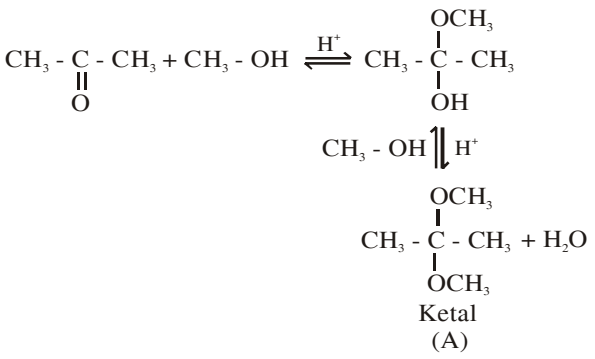
Total '4' electrons can be associated with the quantum numbers n = 3, $l = 1$, $|m_l| = 1$

54.



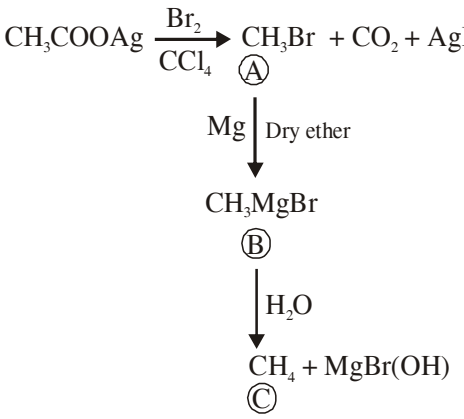
3-Ethyl-2-hydroxy-4-methylhex-3-ene-5-yne-1-oic acid.

55.



In product A, two ether linkages are present.

56.



58. The isomers of pentane are

$H_3C - H_2C - H_2C - H_2C - CH_3$ n-Pentane

$H_3C - H_2C - HC(CH_3) - CH_3$ 2-Methyl butane

$H_3C - C(CH_3)_2 - CH_3$ 2,2-Dimethyl propane

62. Molarity $= \dfrac{\frac{w}{v}\% \times 10}{\text{molar mass}} = \dfrac{6.8 \times 10}{34} = 2$

$\therefore$ [molar mass of H_2O_2 = (2x1) + (2x16)=34 g/mol]

Volume strength of H_2O_2 = Molarity x 11.2

= 2x11.2 = 22.4

64. In XeO_2F_2, the central atom is Xe & it undergoes sp^3d hybridization. Xe has 1 lone pair of electron XeO_2F_2 shape is see-saw.

65. Q = i x t

$Q = 10 \times 10^{-3}\ t$

$2H_2O + 2e^- \rightarrow 2OH^- + H_2$

To liberate 0.01 mole of H_2, 0.02 Faraday charge is required.

Q = 0.02 x 96500 C

$\Rightarrow 0.02 \times 96{,}500 = 10^{-2} \times t$

$\Rightarrow t = 19.30 \times 10^4$ sec

66. $H_2O_{(l)} \longrightarrow H_2O_{(g)}$

(1bar, 373K) (1bar, 373K)

At 100^0C, $H_2O_{(l)}$ has equilibrium with $H_2O_{(g)}$, therefore $\Delta G = 0$

ΔS = +ve because liquid molecules are converting in to gases.

67. $\begin{matrix} H \\ H_3C \end{matrix}\!\!>\!C=C\!<\!\begin{matrix} CH_3 \\ H \end{matrix} \xrightarrow[\text{(Anti addition)}]{Br_2}$ Meso product

68. $PhMgBr + Me_3C\text{-}OH \rightarrow Ph\text{-}H + (CH_3)_3COMgBr$

69. $C_2H_5OH_{(l)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 3H_2O_{(l)}$

Δn = no. of moles of gaseous products - no. of moles of gaseous reactants.

$\Delta n = 2 - 3 = -1$

[$\Delta H = \Delta E + nRT$]

$\Delta H = \Delta E + (-1)\,RT \Rightarrow \Delta H = \Delta E - RT$

70. Na, F show only one non-zero oxidation state.

72. It is para magnetic in gaseous state due to the presence of unpaired electron in its structure.

73. $\dfrac{p^o - p^s}{p^o} = \dfrac{n_B}{n_A}$ $\left[\begin{array}{l} \because p^o \rightarrow \text{vapour pressure of solvent} \\ p^S \rightarrow \text{vapour pressure of solution} \\ n_B \rightarrow \text{no. of moles of solute} \\ n_A \rightarrow \text{no. of moles of solvent} \end{array}\right]$

$$\frac{640-600}{640} = \frac{2.175}{x} \times \frac{78}{39.08} \Rightarrow x = 69.6$$

$\therefore$ The molecular weight of the solid substance (solute) = 69.6 g

74.

	$C_{(s)} + CO_{2(g)} \rightleftharpoons$		$2\,CO_{(g)}$
Initial number of moles	1	1	0
No. of moles at equilibrium	1-x	1-x	2x

As given in the question, 50% of CO_2 reacts at equilibrium.

$1\text{-}x = 0.5 \Rightarrow x = 0.5$

$$K_p = \frac{p_{CO}^2}{p_{CO_2}}$$

[$\because$ $p_i = x_i P$

$$x_i = \frac{n_i}{n}$$

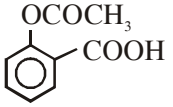
n = Total number of moles at equilibrium

$n = n_{CO_2} + n_{CO} = 1 + 0.5 = 1.5$]

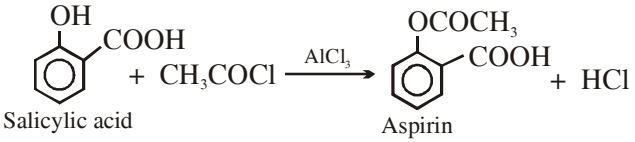
$$K_p = \frac{\left(\frac{n_{CO}}{n} \times P\right)^2}{\left(\frac{n_{CO_2}}{n} \times P\right)} = \frac{n_{CO}^2}{n_{CO_2}} \times \frac{P}{n}$$

$$K_p = \frac{(2 \times 0.5)^2}{0.5} \times \frac{12}{1.5}$$

$\therefore$ $K_p = 16$

75. Aspirin is acetyl salicylic acid 

It is the acetylation product of o-Hydroxy-benzoic acid (Salicylic acid).



Salicylic acid — Aspirin

76. $H_3C\text{-}\overset{1}{C}H(\overset{2}{O}\text{-}CH_2\text{-}CH_2\text{-}CH_3)\text{-}{}_3CH_2\text{-}{}_4CH_2\text{-}{}_5CH_3$

2-propoxy pentane

77. 5.6 lit volume occupied by 16g

22.4 lit volume occupied by how many grams?

$$\frac{22.4 \times 16}{5.6} = 64 \text{ g}$$

1 mole of SO_x mass 64 g

$32 + x(16) = 64 \Rightarrow 16x = 64 - 32$

$\Rightarrow 16x = 32$

$\Rightarrow x = 2$

78. $xA \rightarrow y\,B$

$$-\frac{1}{x}\frac{d[A]}{dt} = \frac{1}{y}\frac{d[B]}{dt} \quad \text{... (i)}$$

Given data in the question

$$\log\left[\frac{-d(A)}{dt}\right] = \log\left[\frac{dB}{dt}\right] + 0.3$$

$$\Rightarrow \log\left[\frac{-d(A)}{dt}\right] = \log\left[\frac{dB}{dt}\right] + \log 2$$

[$\because$ log(ab) = loga + logb]

$$\Rightarrow \log\left[\frac{-d(A)}{dt}\right] = \log\left[2 \times \frac{dB}{dt}\right]$$

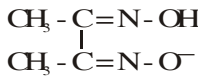
$$\Rightarrow \frac{-d(A)}{dt} = 2 \times \frac{d[B]}{dt}$$

$$\Rightarrow -\frac{1}{2}\frac{d(A)}{dt} = \frac{1}{1}\frac{d[B]}{dt} \quad \text{...(2)}$$

By comparing (1) & (2) equations, $x = 2$, $y = 1$

$x : y = 2 : 1$

79. dmg (dimethylglyoximato) is bidentate negative ligand.

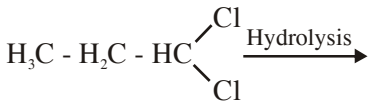


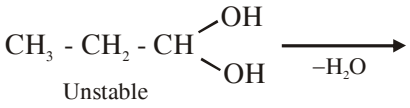
So oxidation number of Ni is $x + 2(-1) = 0$

$\Rightarrow x = +2$

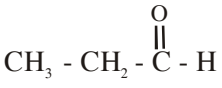
Coordination number of Ni

= 2 x number of bidentate ligands = 2 x 2 = 4

80. 



Unstable



Propanaldehyde

Propanaldehyde can reduce the tollen's reagent due to the presence of -CHO group.

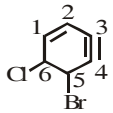
83. $CH_3\text{-}COOH + NaOH \rightarrow CH_3COONa + H_2O$

- Initial number of milli moles of acetic acid = 300 x 0.2 = 60 milli moles.
- Initial number of milli moles of sodium hydroxide = 250 x 0.1 = 25 milli moles.
- Initial number of milli moles of sodium acetate and water are zero.
- Number milli moles of acetic acid and sodium hydroxide reacted are 25, 25.
- Initial number of milli moles of sodium acetate and water produced are 25 and 25.
- Number milli moles of acetic acid unreacted is 35.

$$p^H = p^{Ka} + \log \frac{[salt]}{[Acid]}$$

$$p^H = 4.74 + \log\left(\frac{25}{35}\right) = 4.74 + \log 5 - \log 7$$

$p^H = 4.59$.

86. 

5-Bromo-6-chloro-1-cyclohexen-3-yne

87. C_2H_5OH and CH_3OCH_3 are structural isomers and they have same gram molecular mass

Ideal gas equation PV = nRT

$$\Rightarrow P = \frac{W}{V}\frac{RT}{M} \quad \Rightarrow P = \frac{dRT}{M} \quad \Rightarrow d = \frac{pM}{RT}$$

Gaseous densities at same temperature and pressure are same for both isomers why because 'M' (gram molecularmass) is same.

88. $p_A = x_A P_A^0$ & $p_B = x_B P_B^0$

$p_A = 0.6 \times 150 = 90$

$p_B = 0.4 \times 200 = 80$

$p_A + p_B = 90 + 80 = 170$ mm of Hg

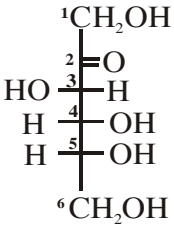
Since $(P_{Total})_{exp} > (P_{Total})_{theo}$, so it is the case of positive deviation from ideal behaviour.

So, $\Delta V_{mixing} > 0$

89. $\Delta H = -20kJ$, $\Delta S = -50$ J/K

$$T = \frac{\Delta H}{\Delta S} = \frac{-20 \times 10^3 J}{-50 J/K} = 400 K$$

Above 400K the process would be nonspontaneous.

90. Fructose Structure. 

1st, 3rd, 4th, 5th and 6th carbons undergo sp^3 hybridization. Second carbon undergoes sp^2 hybridization.

91. Squamata is an order for *Naja* Hence, equivalent category for China rose will be Malvales.

92. Roots of *Pinus* show association with endophytic fungi called mycorrhizae.

93. Saturated fatty acids do not contain double bond between carbon atoms.

94. Carbon dioxide acceptor in C_3 plants is Ribulose 1-5 biphosphate (RuBP) in presence of RUBP *carboxylase* (RuBisCo) to form a 6-carbon unstable compound.

95. Ribosome binding loop is present on clover leaf t-RNA. It carries activated amino acids to ribosomes and helps in elongation of polypeptide chain during the process of translation.

96. Synthesis of m-RNA is called as transcription.

97. Pteridophytes show both heterosporous & homosporous condition. In heterosporous condition, plants produce two different types of spores-small microspores and large megaspores.

98. In mosses, the gametophytic phase of the life cycle includes two stages namely, protonema stage and leafy stage.

99. In eukaryotes, cell division takes place by Amitosis, Mitosis and Meiosis.

100. In onion, all scaly leaves are surrounded by a single tunica.

101. Fabaceae has diadelphous anthers which means two groups of anther are there.

102. Seed attached to fruit by a small stalk is called funicle.

103. In Asparagus, which belongs to liliaceae family has epiphyllous stamens (which means androecium is attached to parianth)

104. Meristem tissue have prominent nucleus, no vacuole and they have low reserve food.

105. In apoplast pathway, movement of water takes place exclusively through cell walls and intercellular spaces.

106. The plants in which flowering is not affected by length of the day, are known as Day Neutral plants. Shoe-flower is a day neutral plant.

107. Ethylene is the only gaseous hormone produced naturally by plants.

Spray of gibberellins brings about increase in size of fruits.

A balanced combination of cytokinin and auxin is useful for inducing organogenesis. These three statements are correct.

108. A test-cross distinguishes between a homozygous dominant and the heterozygous form.

109. The incorrect match is hybrid. It is an heterozygous individual produced from any cross involving pure parents having one contrasting traits.

110. During gamete formation, the factors for each character are separated.

111. Astral rays appear between the centromeres of daughter chromatids are called as inter chromosomal fibres

112. *Helicase* enzyme is used for unwinding of DNA strands.

113. RNA polymerase III is required for t-RNA synthesis.

114. DNA multiplication is called replication.

115. A small DNA sequence which provides binding site for RNA polymerase is called as promoters.

116. Heat denaturation $\rightarrow$ Annealing $\rightarrow$ Polymerisation is the correct sequence of PCR technique.

117. In EcoRI, *Eco* stands for *E.coli.*

118. In *Zea mays* plant, the first transposons were discovered.

119. Hybridisation is the classical method of plant breeding.

120. Biogas is highly expensive which is not an advantage of it.

121. Anthocyanin pigment is absent in chloroplast.

122. CAM plants are mostly succulents i.e. is the plants which grow in dry conditions. In this plants the stomata remain closed during day to check the loss of water due to transpiration.

123. Oxalo-acetic acid (OAA), a four-carbon compound is the first stable product of photosynthesis in maize.

124. Lactic acid fermentation involves steps as hydrolysis, glycolysis and reduction.

125. Respiratory quotient for anaerobic respiration is given by $\frac{2CO_2}{\text{zero } O_2} = \infty$

126. In Sunflower, self-pollination is avoided by protandry.

127. In some plants, anthers and stigma grow and mature at the same time. This phenomenon is called homogamy.

128. Self pollination is the transfer of pollens from anther to the stigma within the same flower.

129. In Gymnosperms, double fertilization does not occur, hence endosperm is haploid.

130. Bird pollination (Ornithophily) requires large amount of sugary nectar, which is used as a drink by birds.

131. Phosphorous is found most in Guano deposits.

132. Secondary productivity is rate of formation of new organic matter by consumers.

133. CO_2, CH_4, CFC, N_2O are the greenhouse gases.

134. The degradation of humus by some microbes release inorganic nutrients and this process is called mineralization.

135. In Castor, the male and female flowers are produced on the same plant.

136. *Dugesia* show high power of regeneration.

137. Visceral mass remain enclosed in thick muscular folds of bodywall known as mantle.

138. Antidon is having its body without well defined head.

139. RUBISCO protein is most aboundent protein in biosphere.

140. *Balanoglossus* is also known as acorn worms.

141. Metabolism is the defining property of living things.

142. Deficiency of B_5 causes dementia, dermatitis and diarrhoea.

143. Sweat gland is having an alternative name as sudoriferous gland.

144. Bone is enclosed in thin layer of white fibrous connective tissue called as periosteum.

145. Osteoblasts are active bone cells whereas osteocytes are inactive.

146. Unstriated muscles are responsible for peristaltic movements which help in passing food in the digestive tract.

147. Spermatheca is the female reproductive part of Cockroach.

148. Cockroach is the common house-hold pest with a very high ability of acclimatization which means it can adopt to different climatic conditions.

149.

1. Vit-C	d. *Aspergillus niger*
2. Vinegar (acetic acid)	f. *Acetobacter aceti*
3. Vit-B_{12}	a. *Pseudomonas denitrificians*
4. *Streptomycin*	e. *Streptomyces griseus*
5. Invertase	c. *Saccharomyces cerevisiae*
6. *Chloromycetin*	b. *Streptomyces venezuelae*

150. (1) Recombinant vaccine for prophylaxis of the human animal viral disease (Hepatitis-B)
(2) Human blood clotting factor VIII to treat haemophilia.
(3) TGF-B promotes new blood vessels and epidermal growth.
(4) HGH producing gene to treat Endocrine disorder of pituitary gland.

151. *Utricularia* and dragon flies are insectivorous while *Gambusia* is larvivorous so all are used to prevent malaria.

152. Oocase contains 14 to 16 eggs and formed by the secretion of collaterial gland in female cockroach.

153. Brunner's gland is mucus secreting gland present in submucosa of duodenum. Auribach's plexus is a part of ENS present in Muscularis externa for the regulation of peristalsis. Lamina propria is formed by the reticular connective tissue.

154. Agglutination $\rightarrow$ Opsonization $\rightarrow$ Precipitation $\rightarrow$ Lysis $\rightarrow$ Neutralization

155. In lungs, maximum gaseous exchange is due to simple diffusion.

156. Bones act as levers during locomotion.

157. Human body consists of about 640 different types of muscles.

158. Antigen binding & Antigen determinant sites are respectively paratope and epitope.

159. Cranial capacity is the measurement of the volume of the interior skull. The cranial capacity of *Neanderthal* man was about 1450 c.c., roughly equal to that of modern man.

160. Haemophilia is also called as bleeder's disease.

161. XXY chromosome compliment is found in Klinefelter's syndrome.

162. Down's syndrome is due to the non-disjunction of 21st chromosome.

163. In DNA fingerprinting technique single stranded radio active DNA probe is used for hybridisation of DNA fragment.

164. DNA fragments generated by the restriction endonucleases in a chemical reaction, can be separated by electrophoresis.

165. Parkinson's disease is associated with basal nuclei.

166. Monocytes are called as scavengers.

167.

1.	Handyman/toolmaker	c. *Homo habialis*
2.	Earliest Hominid fossil	e. *Ramapithecus*
3.	Earliest fossil ape	d. *Dryopithecus*
4.	Homosepiens fossils	b. *Cromagnon man*
5.	Lucy	a. *Australopithecus afarensis.*

168. Neutrophils→Lymphocytes→Monocytes →Acidophils→Basophils.

169. Darwin did not gave the satisfactory explanation for the causes of origin and inheritance.

170. Wine and Beer are prepared by only fermentation while whiskey by both fermentation and distillation.

171. The competition among the individuals of the same species is called as Intra-specific struggle.

172.

Sr. No.	Facts observed in Nature	Deduction
1	a. Over production or prodigality of production	Struggle for existence
	b. Number of survivors remains constant	
2.	a. Struggle for existence	Survival of the
	b. Variations & heredity	fittest or Natural selection
3.	a. Survival of the fittest	Origin of new species
	b. Environmental changes	

173. Diabetes insipidus is caused by deficiency of Vasopressin.

174. ART is Assisted Reproductive Technology.

175. Thymus is the endocrine gland which becomes inactive in old age.

176. Adrenalin hormone is responsible for the emotional state as fear, anger, pain and causes rise of blood pressure and rate of heart beat.

177. Cortisone does not act as a neurotransmitter.

178. In the human penis, urethra passes through corpus spongiosum.

179. Testosterone is secreted by Leydig cells.

180. Interspecific hybridization occur between male and female animals of two different related species.