Enthusiast, Leader & Achiever Course

PHASE : ALL PHASE

TARGET : PRE-MEDICAL 2020

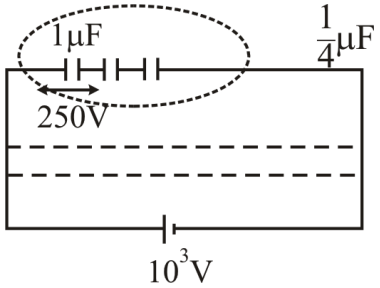
Test Type : **MAJOR** Test Pattern : **NEET (UG)**

TEST DATE : 16-08-2020

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

HINT – SHEET

1. Ans (1)



Potential difference across each capacitor

$$V = \frac{1000}{n}$$

$$\frac{1000}{n} = 300$$

$$\therefore n = \frac{10}{3} \approx 4$$

$$Eq = \frac{c}{n}m$$

$$\frac{1}{n} \times m = 2$$

$$m = n \times 2 = 4 \times 2 = 8$$

$\therefore$ minimum number of capacitors $= 8 \times 4 = 32$

2. Ans (1)

$$R_2 = \frac{v_2}{0.5} = \frac{20 \times 1}{0.5} = 40\Omega$$

$$R_1 = \frac{69 - v_2}{3.5} = \frac{69 - 20}{3.5} = 14\Omega$$

3. Ans (4)

For balanced WSB

$$\frac{10}{30} - \frac{R_1}{9}$$

$$R_1 = 3\Omega$$

4. Ans (3)

Since the current coming out from the positive terminal is equal to the current entering the negative terminal, therefore, current in the respective loop will remain confined in the loop itself.

$\therefore$ Current through 2Ω resistor $= 0$

5. Ans (2)

If f is the degree of freedom of a gas molecule, then

$$\frac{C_p}{C_v} = \left(\frac{f+2}{f}\right)$$

$$\left(\frac{C_p}{C_v}\right)_A = \frac{29}{22} = \left(\frac{f_A+2}{f_A}\right)$$

$\Rightarrow f_A = 6$

$$\left(\frac{C_p}{C_v}\right)_B = \frac{30}{21} = \left(\frac{f_B+2}{f_B}\right)$$

$\Rightarrow f_B = 5$

So *A* has one vibrational degree of freedom and *B* has none

6. Ans (2)

Heat gain by ice = Heat loss by water

$\Rightarrow$ $mL + ms(T_m - 0) = ms(100 - T_m)$

$\Rightarrow$ $50 \times 80 + 50 \times 1 (T_m - 0)$

$= 50 \times 1(100 - T_m)$

$\Rightarrow$ $4000 + 50T_m = 5000 - 50T_m$

$\Rightarrow$ $T_m = 10\ ^\circ C$

7. Ans (2)

$(\Delta Q)_S = (\Delta Q)_P$

$$\frac{KA(T_1 - T_2) \times 12}{2L} = \frac{K(2A)(T_1 - T_2) \times t}{L}$$

$t = 3$ min

8. Ans (1)

$$\lambda_{max} = \frac{b}{T} \Rightarrow \lambda_{max} = \frac{c}{f_{max}} = \frac{b}{T}$$

$$\left\{\because \lambda = \frac{c}{f}\right\}$$

$$\frac{cT}{b} = f_{max} \Rightarrow f_{max} \propto T \quad \text{so}$$

on doubling temperature f_{max} doubles Emitted

$Q = e_r \sigma A T^4 t \quad \Rightarrow \quad Q \propto T^4$

So Q becomes 16 times

9. Ans (2)

$$PV = nRT = \frac{M}{M_w}RT$$

$$\Rightarrow P = \left(\frac{M}{V}\right)_{M_W} RT = \frac{\rho RT}{M_w} \Rightarrow \rho = \frac{M_w}{RT}P$$

slope of $\rho - P$ curve $\propto \frac{1}{T}$

So $T_2 > T_1$

10. Ans (3)

W Battery = V Battery × Q transfered

$= V \times CV = CV^2$

$= (4\mu F)(10\ V)^2$

$= 4 \times 10^{-4} J = 0.4$ mJ

11. Ans (2)

During discharging of a capacitor, the current is given by,

$$I = \frac{E}{R}e^{-\frac{t}{RC}}$$

$$\log I = \log\left(\frac{E}{R}e^{-\frac{t}{RC}}\right)$$

$$\log I = -\frac{t}{RC} + \log\frac{E}{R}$$

Intercept is constant = E & R constant

Magnitude of slope decreases = C is increased

12. Ans (2)

Initial current during the discharge is $\frac{E}{R}$, which is independent of C.

13. Ans (4)

Energy density of wave is given by

$u = 2\pi^2 n^2 \rho a^2$

Or $u \propto a^2$ (as n and ρ are constant)

$$\frac{u_1}{u_2} = \frac{a_1^2}{a_2^2} = \frac{5^2}{2^2} = \frac{25}{4}$$

14. Ans (1)

$$\nu \propto \frac{1}{\sqrt{M}}$$

so $$\frac{\nu'}{\nu} = \sqrt{\frac{M+m}{M}}$$

15. Ans (4)

$U_0 = 20 \quad F = -\frac{dU}{dx} = -2(x-4)$

$M.P = 4 \quad k = 2 \quad k_{max} = 36 - 20 = 16$

$$\frac{1}{2}kA^2 = 16 \Rightarrow A = 4$$

$$KE = \frac{1}{2}k(A^2 - x^2) = 12\ J$$

16. Ans (3)

Total no of prism to enclose the charge

$$N = 2\left(\frac{360}{45}\right) = 16$$

$$\phi_{\text{each prism}} = \frac{1}{16}\left(\frac{q}{\varepsilon_0}\right)$$

17. Ans (1)

$$F = \frac{9\times10^9\times(10^{-6})^2}{1\times10^{-4}} + \frac{9\times10^9\times(10^{-6})^2}{(2)^2\times10^{-4}} + \frac{9\times10^9\times(10^{-6})^2}{(4)^2\times10^{-4}} + \text{- - -}$$

$$= \frac{9\times10^9\times10^{-12}}{10^{-4}}\left(1+\frac{1}{2^2}+\frac{1}{4^2}+\text{- - -}\right)$$

$$= 90\left(\frac{1}{1-\frac{1}{4}}\right) = 90\times\frac{4}{3} = 120\ \text{N}$$

18. Ans (1)

$$\vec{r} = \vec{r}_f - \vec{r}_i$$

$$\vec{r} = \hat{i} + 3\hat{j} + 2\hat{k}$$

$$|\vec{r}| = \sqrt{14}$$

$$\vec{E} = \frac{kq}{|\vec{r}|^3}(\vec{r})$$

$$\frac{k(20)}{(14)^{3/2}}(\hat{i} + 3\hat{j} + 2\hat{k})$$

$$\therefore E_y = \frac{60K}{(14)^{3/2}}$$

19. Ans (4)

In external electric field, net flux through any 3D object is zero, if no charge is enclosed.

20. Ans (2)

Potential decreases in the direction of electric field.

21. Ans (1)

$$\lambda = \frac{v}{n} = \frac{330\ \text{m/s}}{60\times10^3\ \text{Hz}} = 0.0055\ \text{m}$$

$$= 5.5\ \text{mm}$$

22. Ans (1)

Let the frequency of first fork be n; then the frequency of last fork be 3n. As each fork gives 4 beats with previous one, hence frequencies are n, n + 4, n + 2 × 4, ... 3n. It forms as A.P.

So, $3n = a + (n-1)\,d$

$3n = n + (56-1)\,4$

$\therefore \quad n = 110$

23. Ans (2)

$y_1 = a\sin(kx - \omega t)$

$y_2 = a\sin(kx + \omega t)$

According to the principle of superposition, the resultant wave is

$y = y_1 + y_2$

$= a\sin(kx - \omega t) + a\sin(kx + \omega t)$

Using trigonometric identity

$\sin(A+B) + \sin(A-B) = 2\sin A\cos B$

we get

$y = 2a\sin kx\cos\omega t$

24. Ans (3)

$$n' = n\left[\frac{v}{v - v_s}\right]$$

$$n'' = n\left[\frac{v}{v + v_s}\right]$$

when man moves with speed train n will remain same

$$v - v_s = \frac{nv}{n'}$$

$$v + v_s = \frac{nv}{n''}$$

$$2v = nv\left[\frac{1}{n'} + \frac{1}{n''}\right]$$

$$2 = n\left[\frac{n' + n''}{n'n''}\right]$$

$$n = \frac{2n'n''}{n' + n''}$$

25. Ans (1)

Decrease in potential energy of the mass when the pan gets lowered by distance y (due to mass hitting on the pan) = mg(h + y), where h is the heigth through which mass fall on the pan. Increase in elastic potential energy of the spring

$= \frac{1}{2}ky^2$

According to law of conservation of energy,

$$mg(h+y) = \frac{1}{2}ky^2$$

or $ky^2 - 2mgy - 2mgh = 0$

$$\therefore \quad y = \frac{2mg \pm \sqrt{4m^2g^2 + 8mghk}}{2k}$$

$$= \frac{mg}{k} \pm \frac{mg}{k}\sqrt{\left(1 + \frac{2hk}{mg}\right)}$$

$$\text{Amplitude} = y - \frac{mg}{k} = \frac{mg}{k}\sqrt{\left(1 + \frac{2hk}{mg}\right)}$$

26. Ans (2)

Here Keq = 600 + 600 = 1200 Nm^{-1}

$$\frac{1}{2}mv^2 = K_{eq}x^2$$

$$3v^2 = 1200 \times \left(\frac{5}{100}\right)^2$$

$\Rightarrow v = 1 m/s$

27. Ans (1)

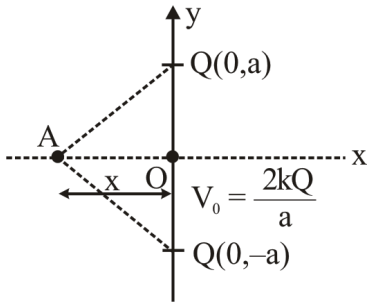
frequency of time period of SHM is dependent on variable forces .it does not depend on constant external force. Constant external force can only change the mean position .for example, in the given question mean position is at natural length of spring in the absence of electric field. where is in the presence of electric field, mean position will be obtained after a compression of x_0 .where x_0 is given by

$K x_0 = QE$

Or $x_0 = QE/K$

Correct answer is (of the same frequency and with shifted mean position)

28. Ans (1)



The potential at the curve is

$$V_0 = \frac{2kQ}{a}$$

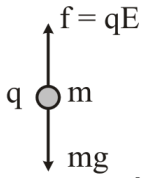
Potential on the x-axis is given by,

$$V_A = \frac{2kQ}{\sqrt{a^2 + x^2}}$$

At $x = \infty$, $V_\infty = 0$

So, The graph will tend to 0 at $x = \pm\infty$ and will be maximum at x = 0

29. Ans (1)



$E = 3 \times 10^8$ v/m

$qE = mg$

$$q = \frac{mg}{E} = 3.3 \times 10^{-18} C$$

30. Ans (2)

$Q = q_1 + q_2 = 1$ mC, $q_1 : q_2 :: 2 : 3$

let $q_1 = 2q$, $q_2 = 3q$, $Q = 2q + 3q = 5q$

$$q = \frac{1}{5}\mu C = 0.2\mu C$$

$$F = \frac{k q_1 q_2}{r^2}$$

$$= \frac{9 \times 10^9 \times (2 \times 0.2 \times 10^{-6})(3 \times 0.2 \times 10^{-6})}{1^2}$$

$F = 0.00216$ N

31. Ans (2)

In case of conductor, effect of inner charge vanishes in the body of conductor and outside the conductor. Only outer charge in case (D) changes charge distribution on spherical surface.

32. Ans (2)

$\overline{KE} = \frac{3}{2}kT$ On doubting the number of molecules and keeping total KE same, average KE becomes half, resulting in half the temperature.

33. Ans (1)

At constant pressure

$\Delta W = P\Delta V = P \times (V_f - V_i)$ ...(i)

For an ideal gas $PV = nRT$

or $PV_f = nRT_f$ and $PV_i = nRT_i$

From (i)

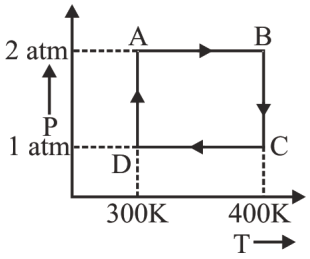
$\therefore \Delta W = nRT(T_f - T_i)$ ...(ii)

For constant temperature, PV = constant

$P_fV_f = P_iV_i$ or $\left(\frac{V_f}{V_i}\right) = \left(\frac{P_i}{P_f}\right)$

$\Delta W = nRT\ \ell n\ \frac{P_i}{P_f}$ ...(ii)

So work done for path AB, BC, CD and DA respectively will be



$\Delta W_{AB} = nR(T_f - T_i) = 2 \times R(400 - 300)$
$= 200\ R$ (Using(ii))

$\Delta W_{BC} = nRT\ln\left(\frac{P_i}{P_f}\right) = 2 \times R \times 400\ln 2$
$= 800R\ln 2$ (Using(iii))

$\Delta W_{CD} = nR(T_f - T_i) = 2 \times R[300 - 400]$
$= -200R$ (Using(ii))

$\Delta W_{DA} = nRT\ln\left(\frac{P_i}{P_f}\right) = 2 \times R \times 300\ \ell n\left(\frac{1}{2}\right)$
$= -600R\ln 2$ (Using(iii))

Hence, the work done in the complete cycle

$\Delta W = W_{AB} + W_{BC} + W_{CD} + W_{DA}$
$= 200R + 800R\ln 2 - 200R - 600R\ln 2$
$= 200R\ln 2$

34. Ans (1)

$\Rightarrow$ Process AB is isobaric expansion so 1, 2, 4 may be correct, option 3 is wrong

$\Rightarrow$ Process BC is isothermal expansion, pressure decrease so option 1, 2, 4 may be correct

$\Rightarrow$ Process CD is isochoric process, pressure is decreasing ($P \propto T$) so only option (1) is correct.

35. Ans (2)

$\eta = 1 - \frac{T_2}{T_1} \Rightarrow \frac{W}{3000\ kcal} = 1 - \frac{300}{900}$

$\Rightarrow W = \frac{2}{3} \times 3000\ kcal = 2000\ kcal$
$= 2 \times 4.2 \times 10^6\ J$
$= 8.4 \times 10^6\ J$

36. Ans (3)

Area of ellipse = πab

Where

a = semi major/minor axis = $\frac{P_2 - P_1}{2}$

b = semi major/major axis = $\frac{v_2 - v_1}{2}$

so work done = $\pi\left(\frac{P_2 - P_1}{2}\right)\left(\frac{v_2 - v_1}{2}\right)$

37. Ans (1)

In case of charging of battery, terminal potential $V = E + Ir = 12 + 16 \times 3 = 60$ volts.

38. Ans (3)

A battery of internal resistance 4Ω

Resistance of network $= 4\ \Omega$

$= \frac{(7R)(12R)}{(19R)} = \frac{84R}{19}$

$\Rightarrow R = \frac{19}{21}\Omega$

39. Ans (3)

$R_s = \frac{R_g \times i_g}{i - i_g} = \frac{100 \times 10}{100 - 10} = \frac{100}{9}$

40. Ans (1)

Total power is

$(15 \times 45) + (15 \times 100) + (15 \times 10) + (2 \times 1000)$
$= 4325$ W

So current is = $\frac{4325}{220} = 19.66$ A

41. Ans (2)

at $x_1 = 0$, $y_1 = 2 \sin 3\pi t$

at $x_2 = 1$ cm, $y_2 = 2 \sin\left(3\pi t - \frac{\pi}{8}\right)$

Here $\omega = 3\pi$, $k(x_2 - x_1) = \frac{\pi}{8}$

$\Rightarrow k = \frac{\pi}{8}$, wave velocity

$\Rightarrow v_w = \frac{\omega}{k} = \frac{3\pi}{\pi/8} = 24$ cm/s

42. Ans (1)

$\omega = 2\pi b$

$n = b$

$V_{max} = 2v$

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

$a = \frac{2}{2\pi c}$

$c = \frac{1}{a\pi}$

43. Ans (1)

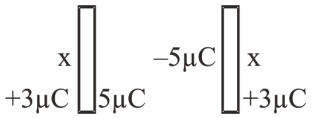
$V_{sound} \propto \frac{1}{\sqrt{p}} \Rightarrow \frac{V_1}{V_2} = \sqrt{\frac{\rho_2}{\rho_1}} = \sqrt{\frac{4}{1}} = \frac{2}{1}$

$\Rightarrow \quad V_2 = \frac{V_1}{2} = \frac{V_3}{2}$

44. Ans (4)

Potential of both spheres are same so no charge will flow.

45. Ans (4)



$x = \frac{8-2}{2} = 3\mu C$

$C = \frac{q}{V} = \frac{5}{6}\ \mu F$

47. Ans (4)

$d = \frac{ZM}{a^3 N_A}$

for fcc structure $Z = 4$

$3.19 = \frac{4 \times M}{(0.559 \times 10^{-7})^3 \times 6.02 \times 10^{23}}$

$M = 83.9$

52. Ans (4)

Fog is a colloidal solution of liquid in a gas in which liquid is the dispersed phase where as gas is the dispersion medium

65. Ans (1)

$P_{N_2} = 0.8 \times 5 = 4$;

$P_{N_2} = K_H \times X_{solute}$

$X_{solute} = 4 \times 10^{-5}$

so mole of N_2 dissolved in 10 mole of H_2O

$= 4 \times 10^{-5} \times 10$

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

66. Ans (3)

$\Delta T_f = \frac{1000 \times K_f \times n_{solute}}{W_{solvent}}$

$2.8 = \frac{1000 \times 1.86 \times x}{1000 \times 62}$

$x = 93$ g

68. Ans (3)

Meq. of NaoH $= 100 \times 0.5 = 50$

Meq. of HCl $= \frac{1}{5} \times 100 = 20$

Meq. of $H_2SO_4 = \frac{1}{10} \times 100 = 10$

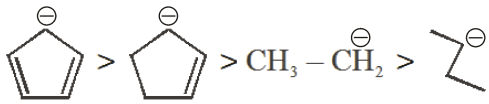
Total Meq. of acid $= 20 + 10 = 30$

Total Meq. of NaOH $= 50$

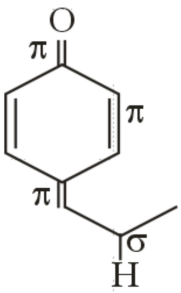
$\therefore$ Meq. of NaOH left $= 50 - 30 = 20$

Thus, resulting solution will be alkaline.

73. Ans (2)



74. Ans (2)



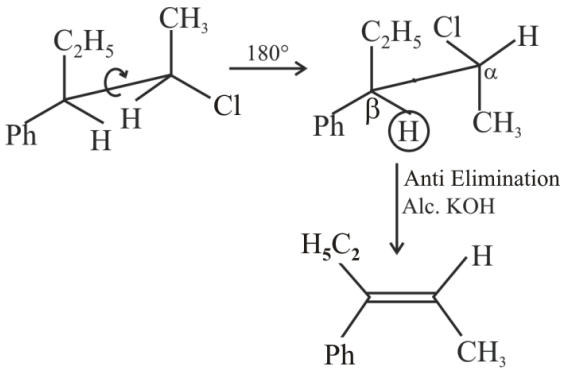
Here $-\overset{\overset{O}{\|}}{C}-$ is in conjugation with $C_{sp^3} - H$ σ bond.

75. Ans (1)

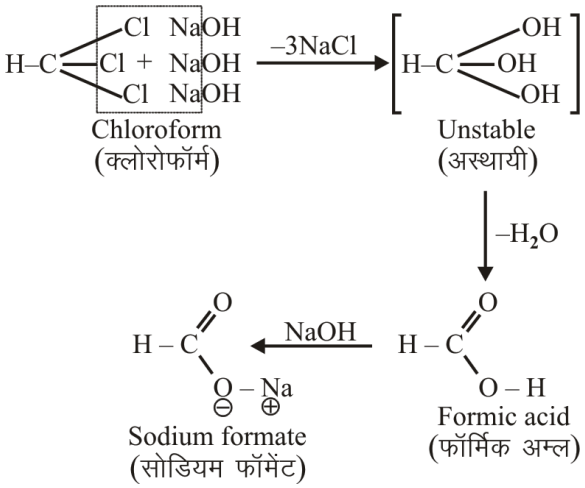
S_N2 reaction

77. Ans (1)

E^2 reaction : Anti elimination of H and Cl takes place



78. Ans (2)



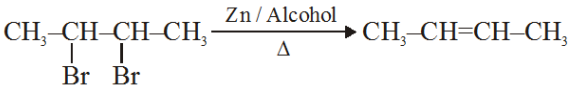
83. Ans (3)

Absence of αH

84. Ans (3)

NCERT (XIIth) Part-2, Pg. # 338 - (Para-1)

85. Ans (3)



86. Ans (1)

Fact

92. Ans (1)

NCERT Pg. # 53

93. Ans (2)

NCERT Pg. # 60

98. Ans (3)

NCERT Pg. # 53

100. Ans (4)

NCERT XII Pg # 61, Fig 4.4 (b)

102. Ans (2)

NCERT XII Pg # 60-61 (E), 66-67 (H)

103. Ans (3)

NCERT XII Pg # 60 (E), Pg # 66 (H)

117. Ans (4)

NCERT XIth Pg. # 107

118. Ans (1)

NCERT XIth Pg. # 108

137. Ans (4)

NCERT (XII) Pg. # 22, Fig 2.3(b)

138. Ans (4)

NCERT (XII) Pg. # 23–2.2.1

140. Ans (2)

NCERT (XII) Pg. # 28, 2.2.3

146. Ans (4)

NCERT (XIIth) Eng. Pg. # 23, Para 2, line 8,9,10

148. Ans (3)

NCERT Pg. # 317(E), 317(H)

150. Ans (3)

NCERT Pg. # 316(E), 316(H)

151. Ans (4)

NCERT Pg. # 321(E), 321(H)

154. Ans (4)

NCERT XI Pg. # 285

155. Ans (3)

NCERT XI, Pg. # 283

157. Ans (4)

NCERT (XI) Pg. # 294,298 (Hindi)

170. Ans (3)

NCERT XI Pg. # 141 Para 7.9

171. Ans (4)

NCERT XI Pg. # 138 Para 7.8 Fig.7.9

172. **Ans (4)**
NCERT(XII) Pg#138/148(H) Para: 7.8

173. **Ans (2)**
NCERT(XII) Pg#128/138(H) Para: 7.1

175. **Ans (3)**
NCERT(XII) Pg#141/152(H) Para: 7.9

177. **Ans (4)**
NCERT-XII, Pg-130

178. **Ans (3)**
NCERT-XII, Pg-135

179. **Ans (3)**
NCERT-XII, Pg-136