AVIRAL CLASSES

CREATING SCHOLARS

JEE (ADVANCED), PMT & FOUNDATIONS

UTS- NEET -2020
MOCK TEST-06 SOLUTION

ANSWER KEY

PHYSICS

Ques.	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
Ans.	4	1	3	1	3	4	1	2	4	1	3	4	3	2	2	3	4	2	2	1	1	2	2	3	3
Ques.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45					
Ans.	3	2	4	3	2	3	4	1	4	2	1	4	4	3	2	1	2	1	1	1					

CHEMISTRY

Ques.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Ans.	1	3	1	1	1	1	4	2	3	1	1	1	3	4	3	2	4	1	4	1	3	2	1	3	2
Ques.	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90					
Ans.	2	2	2	3	1	3	4	1	3	2	4	2	1	2	4	3	4	1	1	1					

BIOLOGY

Ques.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
Ans.	3	4	3	3	1	1	4	1	1	1	1	3	4	3	3	1	2	4	2	4
Ques.	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
Ans.	1	2	2	3	1	4	1	1	4	1	2	2	2	4	1	3	2	2	4	1
Ques.	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Ans.	2	3	4	4	2	1	2	1	1	2	1	1	3	1	2	2	4	2	2	3
Ques.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
Ans.	3	2	1	4	3	4	3	4	2	3	2	1	2	3	4	1	2	1	2	2
Ques.	171	172	173	174	175	176	177	178	179	180										
Ans.	3	1	3	4	1	4	2	1	3	1										

1.

$$\eta = \frac{F}{6\pi av} = \frac{ML^1T^{-2}}{L^1L^1T^{-1}} = M^1L^{-1}T^{-1}$$

2.

$$\vec{A}.\vec{B} = AB\cos\theta$$

$$\cos\theta = \frac{-12-27-3}{\sqrt{2^2+3^2+1^2}\sqrt{6^2+9^2+3^2}} = 1$$

$$\theta = 0^o$$

3.

$$mgh = \frac{1}{2}mv^2$$

$$v = \sqrt{2gh}$$

4.[1] $v_{av.} = \dfrac{\text{Area under the curve}}{\text{Time}} =$

5.[3] $v_{av.} = \dfrac{10 \times 10 + 300}{10 + 15} = 16 \text{ m/s}$

6.[4] $R = \dfrac{v^2 \sin 2\theta}{g}$

$\sin 2\theta = \dfrac{Rg}{v^2}$

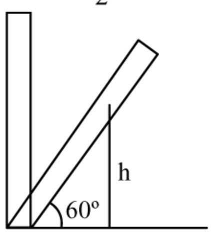
$\theta = \dfrac{1}{2}\sin^{-1}\left(\dfrac{Rg}{v^2}\right)$

7.[1] $mg \sin \alpha = \mu mg \cos \alpha$

$\mu = \tan \alpha = \dfrac{1}{3}$

$\cot \alpha = 3$

8.[2] $U = mg\dfrac{\ell}{2}\sin 60^\circ = \dfrac{mg\ell}{4}$



9.[4] Ring or hollow cylinder

10.[1] $L_A = L_B = mvr$

11.[3] $F = \dfrac{G\left(\frac{4}{3}\pi R^3\rho\right)\left(\frac{4}{3}\pi R^3\rho\right)}{(2R)^2}$

$F \propto R^4$

12.[4] $\dfrac{\mu_2}{\mu_1} \times \dfrac{\mu_3}{\mu_2} \times \dfrac{\mu_4}{\mu_3} = \dfrac{\mu_4}{\mu_1}$

13.[3] $\sin i = \mu \sin \dfrac{i}{2}$

$2 \sin\dfrac{i}{2} \cos\dfrac{i}{2} = \mu \sin\dfrac{i}{2}$

$\cos\dfrac{i}{2} = \dfrac{\mu}{2}$

$i = 2\cos^{-1}\left(\dfrac{\mu}{2}\right)$

14.[2] $45^\circ \geq \theta_C$

$\sin 45^\circ \geq \sin \theta_C$

$\dfrac{1}{\sqrt{2}} \geq \dfrac{1}{\mu}$

$\mu \geq \sqrt{2}$

15.[2] $x = \dfrac{D}{d}(\mu - 1)t$

16.[3] $\dfrac{I_{max}}{I_{min}} = \left(\dfrac{\sqrt{9}+\sqrt{4}}{\sqrt{9}-\sqrt{4}}\right)^2 = \dfrac{25}{1}$

17.[4] $\cot\dfrac{A}{2} = \dfrac{\cos A/2}{\sin A/2} = \dfrac{\sin\left(\frac{\delta_m + A}{2}\right)}{\sin A/2}$

$\sin(90^\circ - A/2) = \sin\left(\dfrac{\delta_m + A}{2}\right)$

$90^\circ - \dfrac{A}{2} = \dfrac{\delta_m + A}{2}$

$\delta_m = 180^\circ - 2A$

18.[2] $T \propto \dfrac{1}{\sqrt{K}}$ and $K \propto \dfrac{1}{\ell}$

$\therefore T \propto \sqrt{\ell}$

19.[2] $T = 2\pi\sqrt{\dfrac{L}{g}}$

and $T' = 2\pi\sqrt{\dfrac{L'}{g}}$

or $\dfrac{T'}{T} = \sqrt{\dfrac{L'}{L}}$

$L' = L(1 \times \alpha\, \Delta t)$

$\therefore\ \alpha = \dfrac{\gamma}{3} = \dfrac{36 \times 10^{-6}}{3}$

$= L(1 + 12 \times 10^{-6} \times 20) = 12 \times 10^{-6}\, {}^\circ C^{-1}$

$L' = L(1.00024)$

$\dfrac{T'}{T} = \sqrt{\dfrac{1.00024\,L}{L}}$

or $\dfrac{T'}{2} = 1.00012$ ($\because$ T = 2 sec)

$T' = 2.00024$

Loss in time per day

$= \dfrac{(2.00024 - 2) \times 24 \times 60 \times 60}{2}$ sec.

= 10.368 sec. Loss/day

20.[1] $v_{closed} = \frac{3v}{4L_{closed}}$

$v_{open} = \frac{3v}{2L_{open}}$

$\frac{3v}{4.L_{closed}} = \frac{3v}{2L_{open}}$

$\Rightarrow \frac{L_{closed}}{L_{open}} = \frac{1}{2}$

22.[2] $V \propto T$

24.[3] In first case:

Average temperature of liquid

$= \frac{80+50}{2} = 65^oC$

Excess temp = $(65 - 20)^oC = 45^oC$

$\frac{d\theta_1}{dt} = \frac{50-80}{5} = -6^oC/min.$

$-6 = K \times 45$ … (1)

In second case:

Average temperature of liquid $= \frac{60+30}{2} = 45^oC.$

Excess temp = $(45 - 20)^oC = 25^oC.$

Rate of fall of temp $\frac{d\theta_2}{dt}$

$\frac{d\theta_2}{dt} = -\frac{60-30}{t_{min}}$

$-\frac{30}{t_{min}} = K \times 25$ … (2)

Divide (1) by (2) t = 9 min.

$$\frac{-6}{\frac{-30}{t_{min}}} = \frac{K \times 45}{K \times 25}$$

$$t_{min} = \frac{45}{25} \times \frac{5}{1} = 9 \text{ min.}$$

25.[3] $A_1 = A_0 e^{-t_1/T}$

$A_2 = A_0 e^{-t_2/T}$

$\frac{A_1}{A_2} = e^{(t_1-t_2)/T}$

$A_2 = A_1 e^{(t_1-t_2)/T}$

26.[3] As free proton is stable because its mass is less than neutron so it can't decay to form neutron

27.[2] $w_A = \frac{6.6\times10^{-34}\times1.8\times10^{14}}{1.6\times10^{-19}} = 0.74$ eV

$w_B = \frac{6.6\times10^{-34}\times2.2\times10^{14}}{1.6\times10^{-19}} = 0.91$ eV

$\therefore$ photoelectrons will emit from A alone

29.[3] τ = PE sin 30

$10\sqrt{3} = \frac{PE}{2}$

$PE = 20\sqrt{3}$

Potential Energy = –PE cos 30

$\therefore$ Potential energy $= -20\sqrt{3} \times \frac{\sqrt{3}}{2}$

$= -10 \times 3 = -30$ J

30.[2] $q_1 = C_{eq} V$

$= \frac{10\times20\times10^{-6}}{30} \times 3 \times 10^3 = 2 \times 10^{-2}$

$= 20000 \times 10^{-6} = 20000\ \mu C$

33.[1] $B = \mu_0 ni$

$B' = \mu_0\left(\frac{n}{2}\right)(2i) = B$

34.[4] $\because F = qvB \sin\theta$

$\therefore F = 0$, if $\theta = 0°$ or $180°$

37.[4] Quantity of heat liberated in the ammeter of resistance R

(i) due to direct current of 3 ampere = [(3)2 R/J]

(ii) due to alternating current of 4 ampere

$= [(4)^2R/J]$

Total heat produced per second

$= \frac{(3)^2R}{J} + \frac{(4)^2R}{J} = \frac{25R}{J}$

Let the equivalent alternating current be I ampere;

then $\frac{I^2R}{J} = \frac{25R}{J}$

or I = 5 amp

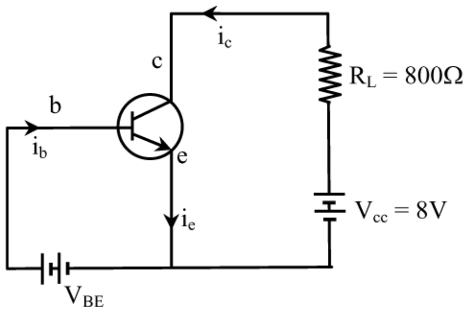
38.[4] If AC is the square wave then all these three options are possible.

39.[3] As D_1 is reversed biased

$R_{eq} = 40 + 10 = 50\ \Omega$

$\therefore i = \frac{3}{50}$ A

40.[2]



$\beta = \frac{25}{26}$

$R_{in} = 200\ \Omega$

$\beta = \frac{i_C}{i_b} = \frac{25}{26}$

Here, $I_C R_L = 0.8$ V

$\therefore I_C = \frac{0.8}{R_L} = \frac{0.8}{800} = 10^{-3}\text{A} = 1$ mA

Power gain $= \beta^2 \times \frac{R_L}{R_{in}} = \left(\frac{25}{26}\right)^2 \times \frac{800}{200}$

$= 3.69$

41.[1] Output is available only when both inputs are available.

42.[2] Remember

43.[1] $d = \sqrt{2Rh}$

$N = \pi d^2 \sigma = 2\pi Rh\,\sigma$

$= 2 \times 3.14 \times 6400 \times 0.1 \times 1000$

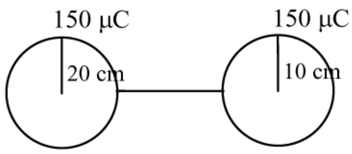
$= 2 \times 3.14 \times 6.4 \times 10^5$

$= 39.5 \times 10^5$

44.[1] $E = -\frac{dV}{dx} = -\frac{d}{dx}(5x^2 + 10x - 9) = -10x - 10$

$\therefore (E)_{x=1} = -10 \times 1 - 10 = -20$ V/m

45.[1]



$V = \frac{Q_1 + Q_2}{C_1 + C_2} = \frac{150 \times 2 \times 10^{-6}}{4\pi\varepsilon_0(r_1 + r_2)}$

$= \frac{300 \times 10^{-6} \times 9 \times 10^9}{30 \times 10^{-2}}$

$= 9 \times 10^6$ V

CHEMISTRY

46.[1] $XY_2 \rightleftharpoons XY + Y$

	XY_2	XY	Y
Initial	600 mm		
At eqm.	600–p	p	p

Total = 600 + p = 800

Actual values	400	200	200

or p = 200 mm

$K = \frac{200 \times 200}{400} = 100$

47.[3] Suppose no. of atoms Q in the ccp arrangement =100. Then no. of tetrahedral sites = 200. As all the tetrahedral sites are occupied by atoms P, therefore their no. = 200. Hence ratio of $P : Q = 2 : 1$ i.e. the formula is P_2Q.

48.[1] K_{sp} of $M_2X = 4s^3$

K_{sp} of $QY_2 = 4s^3$

K_{sp} of $PZ_3 = 27s^4$ (Note $S < 0.1$)

49.[1] HCl is acid. Its pH will be < 7.

50.[1] $\Delta T = \frac{1000 \times K_f \times w}{W \times m}$

$9.3 = \frac{1000 \times 1.86 \times 50}{62 \times W}$

$\therefore W = 161.29$

$\therefore$ Ice separated = 200 – 161.29 = 38.71 g

53.[2] $Ca_3(PO_4)_2$

$K_{sp} = 108\ S^5$

$= 108\left(\frac{w \times 1000}{M \times 100}\right)^5 = 108\left(10 \times \frac{w}{M}\right)^5$

54.[3] $P = P_A^\circ X_A + P_B^\circ X_B$

$= P_A^\circ X_A + P_B^\circ (1 - X_A)$

$= P_A^\circ X_A + P_B^\circ - P_B^\circ X_A$

$P = P_B^\circ - X_A(P_B^\circ - P_A^\circ)$

$P = 254 - X_A \times 119$

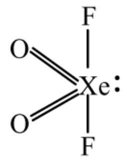
$P_B^\circ = 254$ $\quad P_B^\circ - P_A^\circ = 119$

$P_A^\circ = 135$

55.[1] $B(OH)_3 + HOH \rightarrow [B(OH)_4]^- + H^+$

56.[1] Lattice Energy $\propto \frac{\text{charge}}{\text{size}}$

59.[4] $:XeO_2F_2$ sp^3d



60.[3] Ln(III) compound are generally coloured due to unpaired electron.

61.[2] ${}_{63}Eu = [Xe]\ 4f^7\ 5d^0\ 6s^2$
$Eu^{+3}, Eu^{+2} = [Xe]\ 4f^7$.

69.[3] Selective reduction.

70.[2] $K_b \propto$ +I effect

71.[2] Friedel-Craft reaction

72.[2] Aldol condensation followed by reduction of aldehyde.

74.[3] 3° > 2° > 1° (reactivity order).

76.[3] It is N.S.R.
So Reactivity $\propto$ Stability of carbanion.

77.[4] Wurtz Reaction.

78.[1] Gem dihalide.

80.[2] $M_1V_1 = M_2V_2$
(Ag) (HNO_3)

$$\frac{W}{MM \times V_1} \times V_1 = M_2V_2$$

$$\frac{0.784}{108} = 1.15 \times \frac{V_2}{1000}$$

$V_2 = 6.32$ ml.

81.[4]

$$\overset{-2}{\underset{+4}{FeS_2}} + O_2 \rightarrow \underset{+3}{Fe_2O_3} + \overset{+4}{SO_2}$$

Δ O.N = 12 (S: −2 → +4)

Δ O.N = 1 (Fe: +4 → +3)

$\therefore$ Neft = +12 – 1 = 11

82.[2]

$$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$$

$$r_{O_2} = \frac{\sqrt{28}}{\sqrt{32}} \times 0.0355$$

= 0.0332 mole / min.

83.[1] ΔH = B.E (Reactant) – B.E (Product)
$= [(4 \times 414) + 2 + 243] - [2 \times 414 + 2 \times 150 + 2 \times 432]$
= 150 kJ

85.[4] True

86.[3] True

88.[1] Hydration, energy $\propto \frac{1}{\text{Size}}$
With increase in size of metal cation, hydration decreases.

89.[1] Cupric Fluoride is non volatile.

90.[1] As size of anion increases, covalent character increases and thus solubility in non-polar solvent increases.