AVIRAL CLASSES
CREATING SCHOLARS
JEE (ADVANCED), PMT & FOUNDATIONS

UTS NEET -2020
MOCK TEST-02 SOLUTION

ANSWER KEY

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

1.

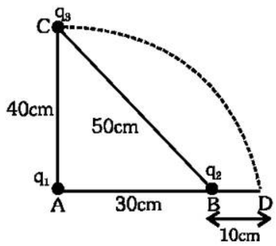
Lyman series produces U.V. radiation
Balmer series produces Visible radiation
Pachan series produces Infrared radiation
So correct answer is $4 \rightarrow 3$

2.

For transistor action the base region must be very thin and lightly doped & the emitter-base junction is forward biased and base-collector junction is reverse biased

3. (1)

4.



$$U_i = \frac{1}{4\pi \epsilon_0}\left[\frac{q_1q_3}{(0.4)} + \frac{q_1q_2}{(0.3)} + \frac{q_2q_3}{(0.5)}\right]$$

$$U_f = \frac{1}{4\pi \epsilon_0}\left[\frac{q_1q_3}{(0.4)} + \frac{q_1q_2}{(0.3)} + \frac{q_2q_3}{(0.1)}\right]$$

Therefore $\Delta U = U_f - U_i = \frac{1}{4\pi \epsilon_0} q_2q_3\left(\frac{1}{0.1} - \frac{1}{0.5}\right)$

$$= \frac{q_3}{4\pi \epsilon_0}(8q_2) \quad \Rightarrow K = 8q_2$$

5.

$$(\vec{A}+\vec{B}).(\vec{A}-\vec{B})=0$$
$$\Rightarrow A^2 - \vec{A}.\vec{B} + \vec{B}.\vec{A} - B^2 = 0$$
$$\Rightarrow A = B\ (\because\ \vec{A}.\vec{B} = \vec{B}.\vec{A})$$

6.

Active fraction at instant t_2, $\frac{1}{2^{t_2/T_{1/2}}} = \frac{1}{3}$

Active fraction at instant t_1, $\frac{1}{2^{t_1/T_{1/2}}} = \frac{2}{3}$

$$\Rightarrow \frac{2^{t_2/T_{1/2}}}{2^{t_1/T_{1/2}}} = 2 \Rightarrow 2^{\frac{t_2-t_1}{T_{1/2}}} = 2^1$$
$$\Rightarrow t_2 - t_1 = T_{1/2} = 50 \text{ days}$$

7.

A	B	Y
1	1	0
0	0	1
0	1	1
1	0	1

$Y = \overline{AB}$ = (NAND)

8.

$\because\quad x = a\sin\omega t$

$\therefore\quad \frac{a}{2} = a\sin\omega t \Rightarrow \omega t = \frac{\pi}{6}$

$$\Rightarrow \left(\frac{2\pi}{T}\right)t = \frac{\pi}{6} \qquad \Rightarrow t = \frac{T}{12}$$

9.

$$B = \frac{\mu_0 I}{2R} = \frac{\mu_0}{2R}\left(\frac{e}{T}\right) = \frac{\mu_0}{2R}\left(\frac{ev}{2\pi R}\right)$$
$$\Rightarrow R^2 = \frac{\mu_0 ev}{4\pi B} \Rightarrow R \propto \sqrt{\frac{v}{B}}$$

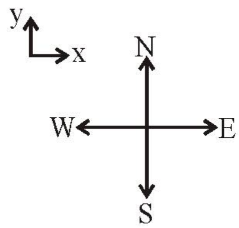
10.

Source is stationary $\Rightarrow \lambda$ = constant & $f' = \frac{v+v_s}{v}$

$$f = \left(1+\frac{v_s}{v}\right)f = \left(1+\frac{1}{5}\right)f = 1.2f$$

11.

$$\overrightarrow{\Delta V} = \vec{V}_f - \vec{V}_i = 20(-\hat{j}) - 20(\hat{i}) = -20(\hat{i}+\hat{j})$$
$$\therefore |\overrightarrow{\Delta V}| = \sqrt{20^2+20^2} = 20\sqrt{2} \text{ in S.W. direction.}$$



12.

option (c) and (d) are incorrect because
option (c) is true only for spherically symm. bodies
option (d) radius of gyration is irrelevant with C.G.

13.

Net P.d. = 18 − 13 = 5V

$C_{eq} = \frac{3\times2}{3+2} = \frac{6}{5}\mu F \qquad Q = CV = 6\mu C$

14.

$N_\alpha = \frac{A_i - A_f}{4}$ and $N_B = (Z_f - Z_i) + 2N_\alpha$

15.

Use $\eta = 1 - \frac{T_2}{T_1} = \frac{W}{Q}$

16.

$$n \propto \sqrt{T} \Rightarrow \frac{\Delta n}{n} = \frac{1}{2}\frac{\Delta T}{T} \Rightarrow \frac{\Delta T}{T} = 2\left(\frac{\Delta n}{n}\right)$$
$$= 2\left(\frac{6}{600}\right) = 0.02$$

17.

$$\text{Power} = Fv = v\left(\frac{m}{t}\right)v = v^2(\rho A v)$$
$$= \rho A v^3 = (100)(2)^3 = 800\text{ W}$$

18.

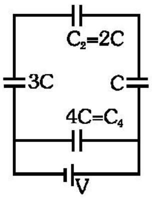
Induced emf in primary coil

$$E_P = \frac{d\phi}{dt} = \frac{d}{dt}(\phi_0 + 4t) = 4\text{volt}$$

Induced emf in secondary coil

$$\frac{E_S}{E_P} = \frac{N_S}{N_P} \Rightarrow \frac{E_S}{4} = \frac{1500}{50} \qquad \Rightarrow E_S = 120\text{volt}$$

19.

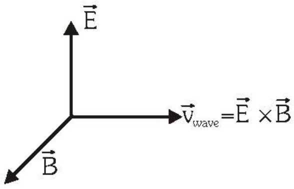


$Q_4 = 4CV$

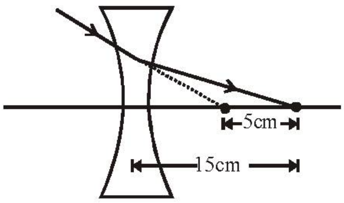
$Q_2 = \left(\frac{6}{11}C\right) V = \frac{6CV}{11} \Rightarrow \frac{Q_2}{Q_4} = \frac{6CV}{11} \times \frac{1}{4CV} = \frac{3}{22}$

20.

For electromagnetic wave



21.



Here u = + 10 cm v = + 15 cm

By lens maker formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{+15} - \frac{1}{+10} = \frac{1}{f} \Rightarrow f = -30$ cm

22.

$\frac{Q}{t} = \frac{kA(T_1 - T_2)}{\ell}$

$\frac{Q'}{t} = \frac{k\left(\frac{A}{4}\right)(T_1 - T_2)}{4\ell} = \frac{1}{16}\frac{kA(T_1 - T_2)}{\ell} \Rightarrow Q' = \frac{Q}{16}$

23.

$V_A - V_B = \left[V - \left(\frac{V}{8} \times 4\right)\right] - \left[V - \left(\frac{V}{4} \times 1\right)\right]$

$= -\frac{V}{2} + \frac{V}{4} = -\frac{V}{4} \Rightarrow V_B > V_A \Rightarrow$ Ans (4)

24. (4)

25.

$V_2^2 = V_1^2 + 2gh$

$V_2^2 = (0.04)^2 + 2 \times 10 \times 8 \times 10^{-1}$

$V_2 \simeq 4$ m/s $D_1^2 V_1 = D_2^2 V_2$

$(8 \times 10^{-3})^2 \times 0.04 = D_2^2 \times 4 \Rightarrow D_2 = 0.8 \times 10^{-3}$ m

26.

$I_{net} = I_{disc} - I_{removed}$

$= \frac{1}{2}(9M)R^2 - \frac{1}{2}M\left(\frac{R}{3}\right)^2 = \frac{40}{9}MR^2$

27.

f' = f & Intensity ∝ Area so $I' = I - \frac{I}{4} = \frac{3I}{4}$

28.

$v = at + \frac{b}{t+c} \Rightarrow [c] = [t] = T$;

$[v] = [at] \Rightarrow [a] = \frac{[v]}{[t]} = LT^{-2}$;

$[b] = (LT^{-1})T = L$

29.

$PV = \mu RT$ where $\mu = \frac{5}{32}$ moles

30.

$W = 8\pi(r_2^2 - r_1^2)T$

31.

Additional kinetic energy = $TE_2 - TE_1$

$= -\frac{GMm}{2R_2} - \left(-\frac{GMm}{2R_1}\right) = \frac{1}{2}GmM\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

32. (1)

33.

According to question and by using COME

$-\frac{GMm}{R+R} + \frac{1}{2}m(fv)^2 = 0 + 0$

$\Rightarrow fv = \sqrt{\frac{GM}{R}}$ but $v = \sqrt{\frac{2GM}{R}}$

Therefore $f\sqrt{\frac{2GM}{R}} = \sqrt{\frac{GM}{R}} \Rightarrow f = \frac{1}{\sqrt{2}}$

34.

$\Delta U = \mu C_V \Delta T$ & $0 = W + \Delta U$

$\Rightarrow \Delta U = -6R$ ($\because$ W = 6R)

Therefore $-6R = 1\left(\frac{R}{\gamma - 1}\right)\Delta T = \frac{3}{2}R\Delta T$

$\Rightarrow \Delta T = -4 \Rightarrow T_{final} = (T - 4)K$

35.

$$\frac{\rho_s}{\rho_w} = \frac{w}{w - w_{app}} = \frac{15}{15-12} \qquad \frac{\rho_s}{\rho_w} = 5$$

36.

$$h = \frac{1}{2}gt^2 \Rightarrow g = \frac{2h}{t^2}$$

then $\frac{\Delta g}{g} \times 100 = \left(\frac{\Delta h}{h} + 2\frac{\Delta t}{t}\right) \times 100 = e_1 + 2e_2$

37.

$$I_g = \frac{3}{50+2950} \propto 30,\ I_g' = \frac{3}{50+R} \propto 20$$

$$\Rightarrow \frac{50+R}{50+2950} = \frac{3}{2} \Rightarrow 50 + R = 4500 \Rightarrow R = 4450\Omega$$

38.

As voltage drop across $8\Omega = \sqrt{2\times 8} = 4V \left(\because P = \frac{V^2}{R}\right)$

Therefore voltage drop across $3\Omega = 3V$

[$\because$ 4V is divided in ratio of resistances between 1Ω and 3Ω]

Hence power dissipated in $3\Omega = \frac{(3)^2}{3} = 3$ watt

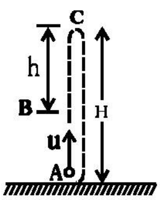
39.

Let time of flight be T then $T = \frac{u}{g}$

Let h be the distance covered during last 't' second of its ascent

Velocity at point B = $v_B = u - g(T - t)$

$= u - g\left(\frac{u}{g} - t\right) = gt$



$\Rightarrow h = v_Bt - \frac{1}{2}gt^2 \Rightarrow h = gt^2 - \frac{1}{2}gt^2 = \frac{1}{2}gt^2$

40. (1)

41.

On axial point, electric field is along the direction of dipole moment.

42.

$V_{max} = \omega A$

$\omega_1 A_1 = \omega_2 A_2$

$$\boxed{\frac{A_1}{A_2} = \frac{\omega_2}{\omega_1} = \sqrt{\frac{k_2}{k_1}}} \qquad \omega = \sqrt{\frac{k}{M}}$$

43.

Energy of photon $= \frac{12400}{4100} \approx 3eV$

44.

$a_t = r\alpha = $ const. $\Rightarrow \alpha = $ const.

$\omega_i = 0 \qquad \theta = 2\pi$

$$\omega_f = \frac{v}{r} = \frac{80}{(20/\pi)} = 4\pi$$

$$\alpha = \frac{\omega_f^2 - \omega_i^2}{2\theta} = 2\pi \text{ rad/sec}^2$$

$$a_t = \frac{20}{\pi} \times 2\pi = 40 \text{ m/s}^2$$

45. (3)

46. (4)

Fact

47.

$$\Delta H = \sum(\Delta_{B.E}H)_{React} - \sum(\Delta_{B.E.}H)_{Product}$$

48. (4)

All the given causes water pollution.

49.

$$V \propto \frac{Z}{n} \qquad \frac{V_2^{He^+}}{V_3^{B^{+4}}} = \frac{2/2}{5/3} = \frac{3}{5}$$

50. (2)

There are two TV and one OV present per atom in ccp

51. (4)

LiF sparingly solute in water due to high lattice enthalpy

52.

$$\Delta S = \frac{q}{T} = \frac{0}{T} = 0$$

53.

$$CH_3-C\equiv CH + \underset{\substack{23gm \\ (1mole)}}{Na} \longrightarrow CH_3\equiv C^{\ominus}Na^{\oplus} + \underset{(\frac{1}{2}mole)}{\tfrac{1}{2}H_2}$$

54.

For limiting line of Lyman series $n_1 = 1$ and $n_2 = \infty$

$$\frac{1}{\lambda} = R_H.Z^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

For second line of Balmer series, $n_1 = 2$ and $n_2 = 4$

$$\frac{1}{\lambda} = R\left(\frac{1}{4} - \frac{1}{16}\right) \qquad \nu = \frac{C}{\lambda}$$

For minimum frequency of Paschen series $n_1 = 3, n_2 = \infty$

55.

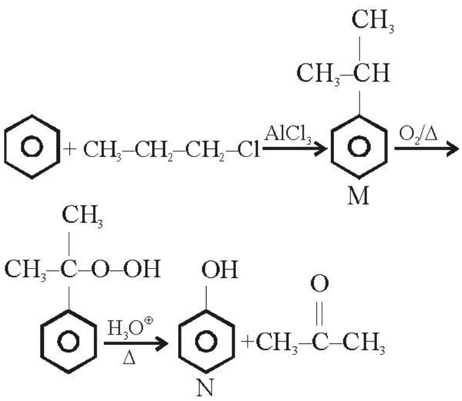
$$\frac{r_2}{r_1} = \frac{[A]_2^2[B_2]_2}{[A]_1^2[B]_1} = \frac{4[A]^2\frac{[B]}{2}}{[A]^2[B]} = 2$$

$r_2 = 2 \times r_1$

56. (1)
Fact

57. (2)
Concentrated HNO_3 produces NO_2 and dilute HNO_3 produces and N_2O with zinc

58.



59.

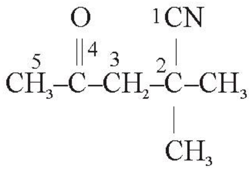
$$Q = \frac{[C]^2}{[A][B]^2} = \frac{[1/10]^2}{[2/10][3/10]^2} = \frac{10}{2 \times 9}$$

$= Q < K_c$ Forward direction.

60. (3)
$K = 10^5 \, . \, 10^{-2000/T}$

61. (3)
When pairing energy is more than CFSE pairing will not take place

62.



63.

EWG($-NO_2$) at ortho or para-position in given complex stabilised it more in comparison to meta position.

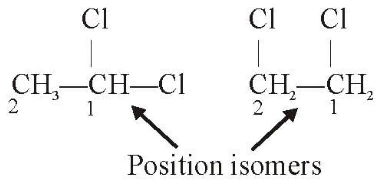
64.

$$K_a = \frac{C\alpha^2}{1-\alpha} = \frac{0.1\left(\frac{1}{100}\right)^2}{1-0.01} \simeq 10^{-5}$$

65. (3)
Refer theory Roult's law

66. (1)
Fact

67.



68.

Chlorobenzene does not reacts with aq NaOH at room temperature.

69.

$$8H^+ + 3SO_4^{2-} + Cr_2O_7^{2-} \rightarrow 2Cr^{+3} + 3SO_4^{2-} + 4H_2O$$

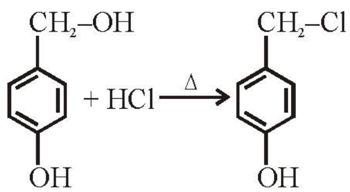
70. (4)
When alkali metal dissolved in liquid ammonia blue coloured solution forms which is good conductor of electricity due to presence of electrons

71. (2)

72.

–I effect order $\rightarrow -NO_2 > -CN > -F > -NH_2$.

73.



74.

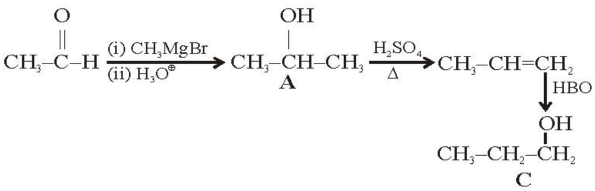
Critical temperature α polar nature and molecular weight.

75. (3)

Dipole moment depend on both that is magnitude of charge and distance between dipoles chloromethane show more dipole moment than fluoromethane

76. (2)
True alum is potassium sulphate aluminium sulphate 24 molecules of water of crystallisation

77.
$$\text{Stability of carbanion} \propto \text{EWG} \propto \frac{1}{\text{ERG}}$$

78.


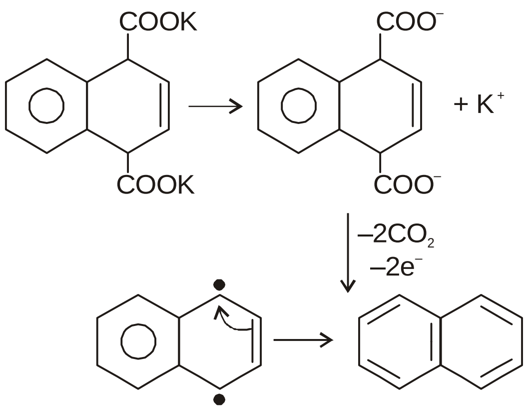
A & C are position isomer.

79.
$$\text{Empirical formula} \Rightarrow C_{\frac{60}{12}}H_{\frac{13.33}{1}}O_{\frac{26.67}{16}}$$
$$\Rightarrow C_5H_{13.33}O_{1.67} \qquad EF = C_3H_8O,$$
$$n = \frac{60}{60} = 1 \qquad MF = C_3H_8O.$$

80. (3)
Smelting is the reduction of metal oxide with the help of coke or carbon monoxide

81. (4)
The four P=O bonds have short PO bond length

82.
Enzymes are proteins in nature.

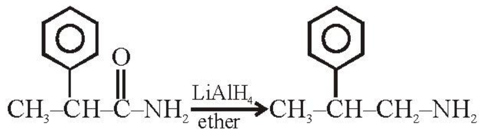
83. (3)


84.
$$E^{\circ}_{cell} = E^{\circ}_{Co^{+2}|Co} - E^{\circ}_{Ti^{3+}|Ti^{2+}} \quad 0.09 = -0.28 - E^{\circ}_{Ti^{3+}|Ti^{2+}}$$
$$-E^{\circ}_{Ti^{2+}|Ti^{3+}} = 0.37\text{ V} \qquad E^{\circ}_{Ti^{3+}|Ti^{2+}} = -0.37\text{ V}$$
$$E^{\circ}_{Ti^{2+}|Ti^{3+}} = 0.37\text{ V}$$

85. (1)
The fourth option will show optical and geometrical both isomerism

86. (1)
ICl_4^- is square planar and involve $d_{z^2}, d_{x^2-y^2}$ orbital

87.
Nylon 6,6 is not homopolymer but a copolymer of adipic acid and hexamethylenediamine.

88.


89.
$$M = \frac{d \times a^3 \times N_A}{Z}$$
$$= \frac{1.287 \times (12.3 \times 10^{-7})^3 \times 6.02 \times 10^{23}}{4} = 3.6 \times 10^5\ \text{g mol}^{-1}$$

90. (4)
Transition element show variable oxidation state