KCET PHYSICS ANSWER KEYS (19.04.2018)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	D	A	C	B	A	C	C	C	B	A	A	A	A	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B,C,D	C	D	B	C	B	B	C	A	B	D	A	D	C	D
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
B	C	B	C	B	B	B	B	C	B	D	B	A	B	A
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A	B	B	B	C	C	A	A	D	C	A	B	B	C	D

1. $E = mC^2 = 1 \times 10^{-3} \times 9 \times 10^{16} = 9 \times 10^{13} J$

2. $\frac{N}{N_0} = \frac{1}{2x}$ $where\ x = \frac{50}{125} = 4 \Rightarrow N = \frac{N_0}{16} = \frac{64}{16} = 4mg$

3. Fa CE amplifer, input is base amplifires guretion

4. $A + \bar{B} = 1 + 1 = 1 = A$

5. $d_h\ d_e = d_c^2 \Rightarrow 4.5 \times 10^{22}\ d_e = (3 \times 10^{16})^2 \Rightarrow d_e = 2 \times 10^{10}/m^3$

6. $F_8\ CE\ Input = I_6\ output = I_C\ hence\ \frac{I_C}{I_b} = 50. only\ option\ A\ satisfor\ the\ given\ data$

7. Range $= \sqrt{2Rh} = \sqrt{2 \times 6400 \times 10^3 \times 500} = 80 \times 10^3 m = 80cm$

8. $V_e\ \alpha\ \frac{1}{\sqrt{R+h}} \Rightarrow \frac{V_0}{V_e} = \frac{\sqrt{R}}{\sqrt{2R}} = \frac{1}{\sqrt{2}} \Rightarrow V_0 = \frac{V_e}{\sqrt{2}}$

9. Slope is max. at R

10. Conceptual

11. $\frac{d\theta}{dt} = k\left(\frac{\theta_1+\theta_2}{2} - \theta_0\right) \Rightarrow \frac{65.5-32.5}{1} = k\left[\frac{65.5+62.5}{2} - 22.5\right]$ ---- (1)

$$\frac{46.5-10.5}{t} = k\left[\frac{46.5+40.5}{2} - 22.5\right] \text{---- (2)}$$

12. $\phi = B.A\ \alpha\ \mu_0 \frac{I}{d}\ A\ \Rightarrow \frac{Q}{\mu} = \frac{IA}{d} = IL = [\mu^0 L^1 T^0 A^1]$

13. $U_i = \frac{-GMm}{R}; U_f = \frac{-GMm}{R+R} = \frac{-GMm}{2R}$

$\therefore W = U_f - U_i = \frac{-GMm}{2R} = \frac{-mgR}{2}$

14. For closed pipe : $f = \frac{3U}{4l_1}$ Hence $\frac{3u}{4l_1} = \frac{2u}{2l_2}$

$Open\ pipe : f = \frac{2u}{2l_2} \Rightarrow \frac{L_1}{l_2} = \frac{3}{4}$

15. $100 \times \frac{DR}{R} = \left[\frac{\Delta V}{V} + \frac{\Delta I}{I}\right]^{100} = \left[\frac{5}{100} + \frac{0.2}{10}\right] \times 100 = 5 + 2 = 7\%$

16. $f \leq \mu mg\ cos\theta \Rightarrow 10 \leq 0.8m \times 10 \times \frac{\sqrt{3}}{2}$

$\Rightarrow m \geq \frac{1}{0.4\times\sqrt{3}} \geq \frac{10}{4\sqrt{3}} \geq \frac{5\sqrt{3}}{6} \geq 1.44Kg$

Hence mass of the block may be 2Kg 3Kg or 4Kg

17. $K.E = \frac{P^2}{2m} \Rightarrow p\ \alpha\ \sqrt{m}$

18. $p = heg$

19. $\frac{Q_2}{Q_1} = \frac{T_2}{T_1} \Rightarrow \frac{150}{300} = \frac{T_2}{500} \Rightarrow T_2 = 250K$

20. KE of the moteclar depends on the temperature only

21. N = m(g –a) = $60(9.8 - 1.8) = 60 \times 8 = 480N$

22. $I_{33} = I_{xx} + I_{yy} = 20 + 25 = 45kg\ m^2$

23. shress = $\frac{F}{A}$ If A is doubled stress will be halved

24. $E = \frac{1}{4\pi 60}\frac{q}{d^2} \Rightarrow 2 = \frac{9\times10^9\times q}{(30\times10^{-2})^2} \Rightarrow q = 2 \times 10^{-11}C$

25. qV = $\frac{1}{2}mV^2 \Rightarrow u = \sqrt{\frac{2qV}{m}} = \sqrt{\frac{2\times2\times1}{1}} = 2m/s$

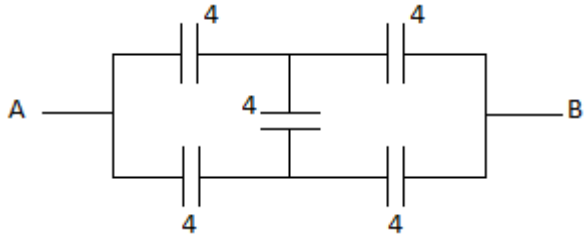
26. If we replace the space occupied by the dietechic with his

$d_a = \sqrt{x}\ d_m \Rightarrow d_a = \sqrt{4}\frac{d}{2} \Rightarrow d_a = d$

Hence the effective distance between the changes is $\frac{d}{2} + d = \frac{3d}{2}$

$Hence\ \frac{F^1}{F} = \frac{d^2}{d^{12}} = \frac{d^2.4}{9d^2} = \frac{4}{9}$

27. The arrangement can be reduced as



Which is a wheastone Bridge

28. Workdone 1n ervipotential surface is zero as $w = q(V_A - V_B)$ & $V_A = V_B$

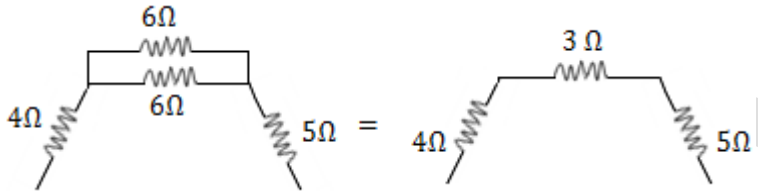
29. Initial charge $q = \left(\frac{3\times6}{3+6}\right)900 = 1800\ \mu C$

Cammon potential $V = \frac{Total\ charge}{Total\ capacity} = \frac{1800}{9} = 200V$

30. Ohm's law is applicable for conductors only

31. conceptual

32. The crircuit can be reduced as now hence $R^1 = 4 + 3 + 5 = 12\Omega$



33. All resistance are in paralal. Hence $I = \frac{300}{R/5} = \frac{300\times5}{R} == \frac{500}{R} = 1A$

Hence current through (A) will be $\frac{3}{5}$ A

34. $E^1 = 2E;$

$R^1 = r_1 + r_2 + R; I = \frac{2E}{r_1+r_2+R}$

$V = E - Ir_1 = 0$

$\Rightarrow E = \frac{2E\,r_1}{r_1+r_2+R} \Rightarrow 2r_1 = r_1 + r_2 + R \Rightarrow R = r_1 - r_2$

35. Shape = $\frac{I}{V} = \frac{1}{R}$. slope of p is lon. Hence its resistance is more

36. conceptual

37. $r = \frac{mu}{Bq} \Rightarrow r_1B_1 = r_2B_2 \Rightarrow r.B = r^1 \times \frac{B}{2} \Rightarrow r^1 = 2r$

38. $\frac{1}{2}mv^2 = qV \Rightarrow v = \sqrt{\frac{2qVm}{m}}. And\ r = \frac{mv}{Bq} = \frac{m}{Bq}\sqrt{\frac{2qV}{m}}$

$\Rightarrow r\alpha\sqrt{V}\ or\ V\alpha r^2$. Since ris doubed; V becomes 4 himes

39. Frequency of cyclofrom = frequency of froton = $10 \times 10^6 Hg = 10^7 Hg$

$$\therefore V = rw = 0.6 \times 2\pi \times 10^2\ m/s$$

$$xE = \frac{1}{2}mv^2\ Also\ r = \frac{mv}{Bq} \Rightarrow m = \frac{Bqr}{v}$$

Hence $KE = \frac{1}{2}\left(\frac{Bqr}{v}\right)v^2 = \frac{1}{2}\ Bqr.v = \frac{1}{2} \times 0.66 \times 0.6 \times 10^7 \times 2\pi \times 0.6e$

$$= (0.66)(0.6)^2\pi(10^6 e) = 7meV$$

40. conceptual

41. conceptual

42. $e = B_v/v$ But $\frac{B_v}{B_H} = lan\ 30^0 = \frac{1}{\sqrt{3}} \Rightarrow B_v = \frac{4\times10^{-4}}{\sqrt{3}}\ T$

$$\therefore e = \frac{4 \times 10^{-4}}{\sqrt{3}} \times 25 \times \left(3600 \times \frac{5}{18}\right) = 5.77V$$

43. $X_2 = wL \Rightarrow X_L \alpha f$

44. $\varepsilon = \frac{d\theta}{dt} = 6t + 4 = 6(2) + 4 = 16V$

45. $P = VI \Rightarrow I = \frac{100}{220} = \frac{5}{11}A$

46. The question should be in a resonate LCR circuits 'L' α 'C' do not dissipate poler

47. 220V is the was value

48. $\frac{I_p}{I_s} = \frac{N_s}{N_p} \Rightarrow \frac{I_p}{2} = \frac{25}{1} \Rightarrow I_p = 50A$

49. F = n

50. Conceptual

51. $\frac{1}{V} + \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{v} + \frac{1}{-20} = \frac{-1}{10} \Rightarrow \frac{1}{v} = -\frac{1}{10} + \frac{1}{20} = \frac{-2+1}{20} = \frac{-1}{20}$

$$v = -20cm$$

The object is placed at center of ocrvature & hence will him image at 'c'

52. $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{75} - \frac{1}{-25} = \frac{1}{f} \Rightarrow \frac{1}{f} = \frac{1}{25} + \frac{3}{75} = \frac{4}{75}$

$f = 18.75\ cm\ \&\ his\ the$

Hence the lens should be convex

53. d sin $\theta = \lambda \Rightarrow sin\theta = \frac{\lambda}{d} = \frac{\lambda}{a}$

54. Conceptual

55. $\frac{\gamma d}{D} = n\lambda \Rightarrow n_1\lambda_1 = (n+1)\lambda_2$

$\Rightarrow n \times 780 = (n+1)520$

$\Rightarrow \frac{n+1}{n} = \frac{78}{52} \Rightarrow \frac{1}{n} = \frac{26}{52}$

$\Rightarrow n = \frac{52}{26} = 2$

56. $\frac{\gamma d}{D} = n\lambda$

$\Rightarrow y_1 - y_2 = \frac{4D}{d}(\lambda_1 - \lambda_2) = \frac{4\times1.2}{2\times10^{-3}}[6500 - 5200] \times 10^{-10}$

$= 0.312\ nm$

57. Conceptual

58. $\lambda = \frac{h}{\sqrt{2mqV}} \Rightarrow \lambda\sqrt{mq} = com$

$\Rightarrow \frac{\lambda_p}{\lambda_\alpha} = \sqrt{\frac{2\times4}{1\times1}} = 2\sqrt{2}$

59. $E_n = \frac{-13.6Z^2}{n^2}\ Z = 1; n = 2\ ; E_n = -3.4eV$

60. $T^2 \alpha R^3\ \alpha\ n^6 \Rightarrow T\alpha n^3$

Hence $\frac{T^1}{T} = 2^3 = 8$