SOLUTIONS WITH ANSWERS

FOR MOCK-CET PHYSICS PAPER 1

1. $\mathrm{E} = \frac{\mathrm{I}\omega^2}{2}$ $I = \frac{2E}{\omega^2} = \frac{ML^2T^{-2}}{T^{-1^2}}$=$ML^2T^0$

Answer: **(1)**

2. we have $\mathrm{f} = \frac{1}{2\pi\sqrt{\mathrm{LC}}}$ $\therefore \frac{C}{L}$ has no dimension of frequency

Answer**: (3)**

3. $\boldsymbol{F = \frac{d(mv)}{dt} = v\frac{dm}{dt} = 6X\frac{10}{60} = 1N}$

Answer**: (1)**

4. Let F be the normal reaction, then $\mu F = W$ $\therefore F = \frac{W}{\mu}$

Answer **: (1)**

5. $R_1<R_2$ because flying bird will get its weight shared by air

Answer : **(3)**

6. $\boldsymbol{= 1 - \frac{T_2}{T_1} = 1 - \frac{350}{T_1} = 0.3}$

0.7 T_1 = 350 therefore $\boldsymbol{T_1 = \frac{350}{0.7} = 500\,K = 227^0c}$

Answer : **(4)**

7. Answer **(3)** It is unity

8. $n_1v_1=n_2v_2$ $1X3X10^8 = 2 X V_2$

Answer **: (3)**

9. law of conservation of energy

Answer : **(1)**

10. $n_1 \sin i = n_2 \sin r$ 1.6 X sini= 1 X sin 2i =2 sini cos i

Cos i =1.6/2 = 0.8 $\cos^{-1}\frac{4}{5} = i$ $\sin^2 i = 1-\cos^2 i = 1-16/25 = 9/25$

Sin i = 3/5 therefore i =$\sin^{-1}(3/5)$

Answer **: (1)**

11. Intensity ratio $\frac{I_1}{I_2} = \frac{9}{1}$ amplitude ratio $\frac{A_1}{A_2} = \frac{3}{1}$

A_1 = 3 unit A_2 =1 unit

At maximum $A_{max} = A_1 + A_2 = 3+1 = 4$

$A_{min} = A_1 - A_2 = 3-1 = 2$

$$\frac{I_{max}}{I_{min}} = \frac{A_{max}^2}{A_{min}^2} = \frac{16}{4} = \frac{4}{1}$$

Answer : **(2)**

12. Two different sources cannot produce interference

Answer : **(1)**

13. No force is produced on charges at rest

Answer : **(3)**

14. There is no d.c. output in a transformer

Answer **(4)**

15. To avoid eddy current loss

Answer : **(3)**

16. two half adders and one OR gate

Answer : **(4)**

17. the emitter-base junction is forward biased and

The collector-base junction is reverse biased

Answer : **(1)**

18. $$\mathbf{f^1 = \frac{V+V_0}{V-V_s} f = \frac{V+V/2}{V-V/2} f = \frac{3}{1} f = 3f}$$

Change in frequency = 3f – f = 2f = 200%

Answer **: (3)**

19. $\boldsymbol{R = R_o A^{\frac{1}{3}}}$ **3.9 X 10^{-15} = 1.3 X 10^{-15} $A^{1/3}$**

$A^{1/3}$ = 3 therefore A = 3^3 = 27

Answer : **(4)**

20. Total energy before collision = kinetic energy + potential energy

= ½ mv^2 + mgh

After collision = ½(½ mv^2 + mgh)

Since the ball rebounds to a height 10 m mg(10)= ½ (½ mv^2 + mg(10))

20g-10g =1/2 v^2 V^2=20 g=20 X 9.8 = 196

$$V = \sqrt{196} = 14$$

Answer : **(1)**

21. the action of the object on the table & the weight of the object act downwards. Therefore the angle is 0^0

Answer **: (2)**

22. $\boldsymbol{h \propto \frac{1}{R}}$ $\boldsymbol{h \propto \frac{1}{R/2}}$ $\boldsymbol{h \propto 2h}$

Answer **: (4)**

23. boiling point increases with increase in pressure.

Answer: **(3)**

24. $\frac{mgh}{2}$=mc▲□ ▲□ = $\frac{gh}{2c} = \frac{10\ X\ 84}{2\ X\ 4.2\ X10^3} = 0.1$

Answer : **(1)**

25. comparing the given equation with y = A sin 2π (t/T –x/λ) we get

f = 3 & λ = 100

v = fλ = 3 X 100 = 300

Answer **: (1)**

26. alternately accelerated or retarded

Answer : **(3)**

27. $n = \frac{\sin\left(\frac{A+D}{2}\right)}{\sin\frac{A}{2}}$ Here A = 60^0 n = $\sqrt{2}$ $\therefore \sqrt{2}\ \frac{1}{2} = \sin\frac{A+D}{2} = \frac{1}{\sqrt{2}}$

$\sin\frac{A+D}{2} = 45^0$ A + D = 90^0 therefore D = 30^0

Refracted ray is parallel to the base. Therefore the angle made by the ray inside the prism with the base is zero degree.

Answer : **(2)**

28. $P = P_1 + P_2 = 12\text{-}2 = 10$ D is the effective power of the combination

Therefore f =1/P = 1/10 = 0.1 m

Answer : **(1)**

29. Laser diode is forward biased p-n junction LED in which the energy of the emitted photon is equal to the energy gap

Answer : **(2)**

30. $\boldsymbol{T = \frac{0.693}{\lambda} = \frac{0.693}{1.1\ X\ 10^{9}} = \frac{6.93\ X\ 10^{8}}{1.1} = 6.3\ X10^{8}}$

Answer : (2)

31. during β- decay the electron comes from the decay of a neutron in a nucleus

Answer : **(4)**

32. Since the reflected beam is completely plane polarised the angle of incidence is equal to polarising angle.

At polarising angle of incidence $n=\tan i_p$ $\quad n = \tan 60^0 = \sqrt{3}$

Answer **: (1)**

33. polarisation confirms the transverse nature of light

Answer **: (4)**

34. $\beta = \frac{\lambda D}{d} = \frac{\lambda\ 2\ D}{d/2} = \frac{4D\lambda}{d}$

Answer : **(2)**

35. Polarisation will not produce colours

Answer **: (4)**

36. The electric lines of force always originate from a +ve point charge

Answer **(4)**

37. At end-on position $E = \frac{1}{4\pi\epsilon_0}\frac{2p}{r^3}$

F= Eq $\qquad F = \frac{1}{4\pi\epsilon_0}\frac{2pq}{(2r)^3}$ $\qquad$ E=F/8

Answer : **(3)**

38. Time constant T=RC therefore C=T/R = 10/500 = 0.002 = 2mF

Answer : **(3)**

39. Answer : (1)

40. Given main current I = 4.5 A V = 50 V R = 10Ω r=?

V = I (R + r) r = V/I - R = 50/4.5 - 10 = 11.1-10= 1.1Ω

Answer **: (3)**

41. If $\vec{p}$ is dipole moment then $\vec{p}\ X\vec{B} = \vec{p}\ X\overrightarrow{B_o}$

Therefore p B Sin □ = p B_0 sin (90-□) Angle between p & B_o is (90 - □)

Answer : **(4)**

42. E = n A B ω = n A B 2 π f = 50 X 0.1 X 0.1 X 2 X 2X 3.14 X 50 = 314

Answer : **(3)**

43. C = n B I A = 1000 X 1 X 1X 10^{-6} X 3 X 10^{-4} = 3 X 10^{-7}

Answer : **(3)**

44. Just by observation one can say that answer is (2) that is 5 V, since the Voltage across both the inductor and capacitor is same.

$V = \sqrt{V_R^2 + (V_L - V_c)^2}$ $=\sqrt{5^2 + (20 - 20)^2}$ = 5V

Answer **: (2)**

45. momentum $\lambda = \frac{h}{p}$ $E \propto \frac{1}{\lambda}$

Answer : **(1)**

46. In the given equation ω = 2πf = 38 π ↔ f = 19

V_{rms} = 240/$\sqrt{2}$ = 120$\sqrt{2}$

Answer : **(4)**

47. Given $R_1 + R_2 = 30$ and $\frac{R_1 R_2}{R_1 + R_2} = \frac{20}{3}$

Solving we get $R_1 = 10$, & $R_2 = 20$

Answer **: (2)**

48. 3.2 e V

Answer : **(1)**

49. $I \propto \frac{1}{d^2}$

Answer : **(4)**

50. Answer **: (4)** Somerfield

51. For second excited state n = 3, $E_3 = 13.6/3^2 = 13.6/9 = 1.51$ eV

Answer : **(1)**

52. Answer : **(3)** NOR

53. $K.E = \frac{p^2}{2m}$ $\frac{p_1^2}{m_1} = \frac{p_2^2}{m_2}$

Answer **: (1)**

54. $m V^2/R = mg$ therefore $V^2 = R g = 4.9 X 10 = 49$ V=7

Answer : **(1)**

55. $\frac{T}{\sin 135} = \frac{T}{\sin 135} = \frac{5}{\sin 90}$ **T=5 X sin 45^0 = $5/\sqrt{2}$**

Answer **: (1)**

56. Answer (3) quinine iodo sulphate

57. Answer (1) 5 in parallel gives 10 micro F

10, 2, 2, in series gives (10/12) micro farad

58. Answer : (2)

59.Answer : (3) $S = \frac{I_g G}{I - I_g} = \frac{\left(\frac{I}{10}\right)99}{I - \left(\frac{I}{10}\right)} = 11\Omega$

60. Answer : (4)

$M_{ice}\, L + M_w\, (t - t_{ice}) = M_w\, (t_w - t_{mixture})$

Using the above formula and simplifying we get $t = 10^0$ C

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