+2 Half yearly exam 2017-2018

Physics answer key

1. (a) $C^2N^{-1}m^{-2}$

Solution: $\phi = \frac{q}{\varepsilon_0}$ (or) $\varepsilon_0 = \frac{q}{\phi}$

$\varepsilon_0 = \frac{C}{NC^{-1}m^2} \Rightarrow C^2N^{-1}m^{-2}$

2. (c) 4m

Solution: $E_1 = \frac{1}{r_1^2}$

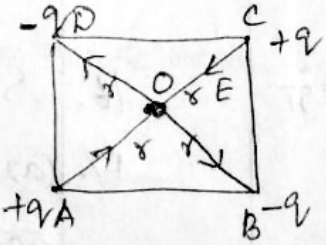
$E_2 = \frac{1}{r_2^2}$

$\frac{E_1}{E_2} = \frac{1}{r_1^2} \times \frac{r_2^2}{1} \Rightarrow \frac{400}{100} = \frac{r_2^2}{4}$

$r_2^2 = 16$ $\boxed{r_2 = 4m}$

3. (a) Zero volt and Zero V/m

Solution:



Voltage in O.

$V = \frac{1}{4\pi\varepsilon_0 r}(+q-q+q-q)$

$V = 0$

electric field in O

A,C point charges of (+q)

electric field $\Rightarrow E - E = 0$

B,D point charges (-q)

electric field = $E - E = 0$

4. $\frac{\sigma}{\varepsilon_0}$ (c)

5. (c) $n^2 : 1$

Solution: $R_s = nR$

$R_p = \frac{R}{n}$

$\frac{R_s}{R_p} = \frac{nR}{\frac{R}{n}} = \frac{n^2}{1}$

$R_s : R_p = n^2 : 1$

6. (d) 0°

7. (b) 1:1 (a)

Solution:

$T = \frac{2\pi m}{Bq}$

$T_1 = \frac{m_1}{q_1}$ $T_2 = \frac{m_2}{q_2}$

$T_1 = \frac{3.34 \times 10^{-27}}{1.6 \times 10^{-19}}$ $(_1H^2)$

$T_2 = \frac{6.64 \times 10^{-27}}{2 \times 1.6 \times 10^{-19}}$ $(_2He^4)$

$\frac{T_1}{T_2} = \frac{3.34 \times 10^{-27}}{1.6 \times 10^{-19}} \times \frac{2 \times 1.6 \times 10^{-19}}{6.64 \times 10^{-27}}$

$\frac{T_1}{T_2} = \frac{6.68}{6.64} = \frac{1}{1}$

$T_1 : T_2 = 1 : 1$

8. Capacitor (b)

9. (b) $\pi/3$

Solution:

$$\cos\phi = \frac{P_{av}}{\text{apparent power}}$$

$$\cos\phi = \frac{100}{200} = \frac{1}{2}$$

$$\phi = \cos^{-1}\left(\frac{1}{2}\right) \Rightarrow \phi = 60^\circ$$

$$\boxed{\phi = \pi/3}$$

10. Zero (a)

11. (d) brushes

12. (c) diffraction pattern becomes narrower and crowded together

13. (c) partially polarised

14. (b) an odd multiple of π

Solution:

$\lambda = 5000\,Å$

distance (or) length $= 6.25 \times 10^{-6}$ m $= 62500\,Å$

$$\text{Count of wavelengths} = \frac{62500\,Å}{5000\,Å} = 12.5$$

wavelength is Original (or) whole number (முழு எண்ணில் வரும்) 0° (or) 2π phase

but

wavelength is partial (or) half number (அரைஎண்ணில் வரும்) π (or) odd multiple of π

15. (c) $6000\,Å$ & $5980\,Å$

Solution:

Raman Shift Stoke's line $= 5990 + 10 = 6000\,Å$

Raman Shift Antistokes line $= 5990 - 10 = 5980\,Å$

16. Sommerfeld (c)

17. (a) 6×10^{18} HZ

Solution:

$$\lambda_{min} = \frac{12400}{V}\,Å$$

$$\frac{c}{\nu} = \frac{12400\,1}{24800\,2} \times 10^{-10}$$

$$\frac{3 \times 10^8 \times 2}{10^{-10}} = \nu$$

$$\boxed{\nu = 6 \times 10^{18}\ \text{HZ}}$$

18. Continuous Spectrum

19. (a) 1 : 25

Solution

lyman: $\bar{\nu} = R\left(\frac{1}{1} - \frac{1}{n_2^2}\right)$

pfund: $\bar{\nu} = R\left(\frac{1}{25} - \frac{1}{n_2^2}\right)$

Ans: 1 : 25

20. (d) charge

Solution: $\lambda = \frac{h}{mv}$ & $\frac{h}{P}$

21. (a) $h(\nu - \nu_0)$

22. (d) ${}_8O^{16}$, ${}_6C^{14}$

Solution:

different elements,
same neutrons

23. (d) neutron number decreases by one

24. (b) 34

Solution:

$$Z = \frac{q}{e}$$

$$Z = \frac{4.8 \times 10^{-18}}{1.6 \times 10^{-19}}$$

$$Z = 30$$

$$A = Z + N$$

$$\boxed{A = 30 + N}$$

$$R = 1.3F \times A^{1/3}$$

$$R = 5.2F$$

$$5.2F = 1.3F \times A^{1/3}$$

$$A^{1/3} = \frac{5.2F}{1.3F}$$

$$A^{1/3} = 4 \Rightarrow A = 4^3 (00) 64$$

$$64 = 30 + N$$

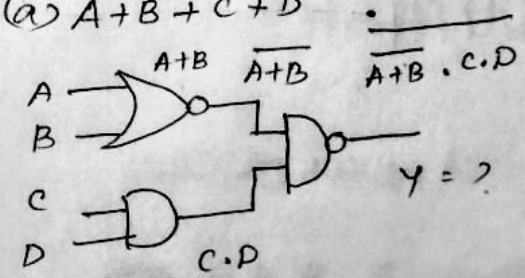
$$N = 64 - 30 \Rightarrow \boxed{N = 34}$$

25. 200 MeV (b)

26. (a) collision

27. (a) an amplifier with feed back

28. (a) $A + B + \bar{C} + \bar{D}$



$$Y = \overline{\overline{A+B}} + \overline{C.D}$$

$$Y = A + B + \bar{C} + \bar{D}$$

29. (a) The amplitude of the Carrier wave Varies in accordance with the amplitude of the modulating Signal.

30. (a) To avoid flicker in the picture

Prepared by

P. KATHIRAVAN M.Sc., B.Ed., (Physics) & (Chemistry)

P.G. Asst in physics

Milton Matric Higher Secondary School

Melur - 625106 Madurai (D.t)

Cell: 7639371604, 9965484608