

CLASS: 12

REVISION TEST – PHYSICS ( UNITS 1, 2,5,8 AND 9 )

MARKS: 70

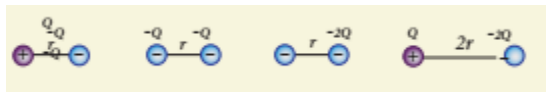
TIME: 3 HRS

PART – A

15 X 1 = 15

CHOOSE THE BEST ANSWER

1. Rank the electrostatic potential energies for the given system of charges in increasing order



a)  $1 = 4 < 2 < 3$

b)  $2 = 4 < 3 < 1$

c)  $2 = 3 < 1 < 4$

d)  $3 < 1 < 2 < 4$

2. A PPC stores a charge Q at a voltage V. Suppose the area of the PPC and the distance between the plates are each are doubled then which is the quantity that will change?

a) capacitance

b) charge

c) voltage

d) energy density

3. Electric charges are distributed in a small volume. The flux of the electric field through a spherical Surface of radius 10 cm surrounding a total charge is 25 V m. The flux over a concentric sphere of Radius 20 cm will be

a) 25 V m

b) 50 V m

c) 100 V m

d) 200 V m

4. Two wires of A and B with circular cross section are made up of the same material with equal lengths. Suppose  $R_A = 3 R_B$ , then what is the ratio of radius of wire A to that of B?

a) 3

b)  $\sqrt{3}$

c)  $1 / \sqrt{3}$

d)  $1 / 3$

5. The temperature coefficient of resistance of a wire is 000125 per  $^{\circ}C$ . At  $20^{\circ}C$ , its resistance is  $1 \Omega$ . The resistance of the wire will be  $2 \Omega$  at

a)  $800^{\circ}C$

b)  $700^{\circ}C$

c)  $850^{\circ}C$

d)  $820^{\circ}C$

6. A strip of copper and another and another of germanium are cooled from room temperature to 80 K. The resistance of

a) each of them increases

b) each of them decreases

c) copper increases and germanium decreases

d) copper decreases and germanium increases

7. Which of the following electromagnetic radiations is used for viewing objects through fog?

a) microwave

b) gamma rays

c) X-rays

d) infrared

8. Fraunhofer lines are an example of ..... Spectrum

a) line emission

b) line absorption

c) band emission

d) band absorption

9. If speeds of gamma rays, X-rays and microwave are  $V_g$ ,  $V_x$  and  $V_m$  respectively, then

a)  $V_g > V_x > V_m$

b)  $V_g < V_x < V_m$

c)  $V_g > V_x < V_m$

d)  $V_g = V_x = V_m$

10. Particle like behaviour of light arises from the fact that each quanta of light has definite .....x..... and a fixed value of .....y..... just like a particle. Here x and y refer to

a) frequency, energy

b) shape, volume

c) energy, frequency

d) energy, momentum

11. A light source of wavelength 520 nm emits  $1.04 \times 10^{15}$  photons per second while the second source of

460 nm produces  $1.38 \times 10^{15}$  photons per second. Then the ratio of power of second source to that of the first source is a) 1.00 b) 1.02 c) 1.5 d) 0.98

12. When a metallic surface is illuminated with radiation of wavelength  $\lambda$ , the stopping potential is  $V$ .

If the same surface is illuminated with radiation of  $2\lambda$ , the stopping potential is  $V/4$ . The threshold Wavelength for the metallic surface is a)  $4\lambda$  b)  $5\lambda$  c)  $5\lambda/2$  d)  $3\lambda$

13. A radioactive element has  $N_0$  number of nuclei at  $t = 0$ . The number of nuclei remaining after half of a Half life ( that is, at time  $t = \frac{1}{2} T_{1/2}$ ) a)  $N_0/2$  b)  $N_0/\sqrt{2}$  c)  $N_0/4$  d)  $N_0/8$

14. The ratio between the first three orbits of hydrogen atom is

a) 1 : 2 : 3 b) 2 : 4 : 6 c) 1 : 4 : 9 d) 1 : 3 : 5

15. The curve of binding energy per nucleon as a function of atomic mass number has a sharp peak for helium. This implies that helium

a) can easily be broken up b) is very stable c) can be used a fissionable material d) is radioactive

Answer any 6 qns. Qn.No. 24 is compulsory. PART – B  $6 \times 2 = 12$

16. Write a note on microwave oven.

17. A sample of HCl gas is placed in a uniform electric field of magnitude  $3 \times 10^4 \text{ N C}^{-1}$ . The dipole moment of each HCl molecule is  $3.4 \times 10^{-30} \text{ Cm}$ . Calculate the maximum torque experienced by each HCl molecule.

18. State Kirchhoff's voltage law. 19. Why are electromagnetic waves non-mechanical?

20. Define threshold frequency. 21. What is Bremsstrahlung? 22. Define atomic mass unit u.

23. Write the properties of cathode rays.

24. Resistance of a material at  $20^\circ \text{ C}$  and  $40^\circ \text{ C}$  are  $45 \Omega$  and  $85 \Omega$  respectively. Find its temperature co-efficient of resistivity.

Answer any 6 qns. Qn.No.33 is compulsory. PART – C  $6 \times 3 = 18$

25. Derive an expression for the equivalent capacitance of capacitors in series.

26. Obtain an expression for torque acting on an electric dipole in a uniform electric field.

27. State Seebeck effect. Write its applications.

28. Derive the relation connecting current and drift velocity.

29. Explain the importance of Maxwell's correction.

30. Find the de Broglie wavelength associated with an alpha particle which is accelerated through a P.D. of 400 V. Given that the mass of the proton is  $1.67 \times 10^{-27} \text{ kg}$ .

31. Write a note on characteristic X-ray spectra.

32. Explain the variation of average binding energy with the mass number using graph and discuss

any three features.

33. Half life of two radioactive elements A and B are 20 minutes and 40 minutes respectively. Initially, the samples have equal number of nuclei. Calculate the ratio of decayed numbers of A and B nuclei after 80 minutes.

Answer all questions.

PART – D

5 x 5 = 25

34. Compute the electric field of an electric dipole at a point on its axial line. OR

Explain the effect of dielectric placed in a parallel plate capacitor when the capacitor is disconnected from the battery.

35. Obtain the condition for bridge balance in Wheatstone network. OR

How will you determine internal resistance of a cell using potentiometer.

36. Discuss the Hertz experiment. OR

Explain the types of emission spectra in detail.

37. Explain how frequency of incident light varies with stopping potential OR

Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

38. Discuss the determination of radius of the oil drop and electric charge in Millikan's oil drop experiment

OR

Derive the radius expression for an electron in the hydrogen atom using Bohr atom model.