XII- PHYSICS PUBLIC MODEL QUESTION PAPER -2025

TOTAL MARK : 70M ,TIME ; 3 HRS

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SECTION – A (15 X 1= 15 M)

I. Choose the correct best Answer :

1. The particle size of ZnO material is 30 nm. Based on the dimension it is classified as
 a) Bulk material   b) Nanomaterial   c) Soft material   d) Magnetic material

2. The output of the following circuit is 1 when the input ABC is
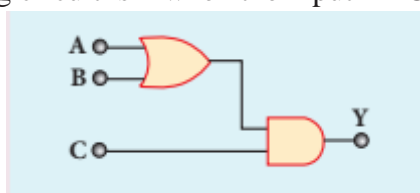
        a)100   b) 110   c) 101   d) All

3. The half-life period of a radioactive element A is same as the mean life time of another radioactive element B. Initially both have the same number of atoms. Then
(a) A and B have the same decay rate initially
(b) A and B decay at the same rate always
(c) B will decay at faster rate than A   (d) A will decay at faster rate than B

4. Two radiations with photon energies 0.9 eV and 3.3 eV respectively are falling on a metallic surface successively. If the work function of the metal is 0.6 eV, then the ratio of maximum speeds of emitted electrons in the two cases will be
                a) 1:1   b) 1: 4   c) 1: 3   d) 1:2

5. One of the of Young's double slits is covered with a glass plate as shown in figure. The position of central maximum will
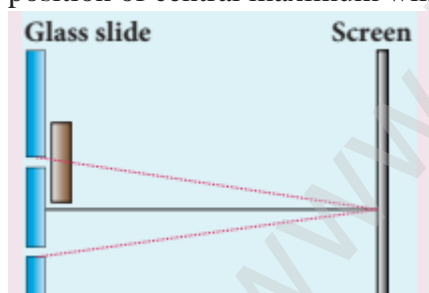
(a) get shifted downwards
(b) get shifted upwards
(c) will remain the same
(d) data insufficient to conclude

6. Calculate the distance up to which ray optics is a good approximation for light of wavelength 500 nm falls on an aperture of width 0.5 mm.
                a) 20cm   b) 10 cm   c) 15 cm   d) 25 cm

7. In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60W bulb for use in India is R, the resistance of a 60W bulb for use in USA will be
                a) R   b) R /2   c) R/3   d) R/4

8. A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is
                a) 83   b) 830   c) 0.83   d) 0.083

9. A flat dielectric disc of radius R carries an excess charge on its surface. The surface charge density is σ. The disc rotates about an axis perpendicular to its plane passing through the centre with angular velocity ω. Find the magnitude of the torque on the disc if it is placed in a uniform magnetic field whose strength is B which is directed perpendicular to the axis of rotation

(a) $\dfrac{1}{4}\sigma\omega\pi BR$ (b) $\dfrac{1}{2}\sigma\omega\pi BR^2$ (c) $\dfrac{1}{4}\sigma\omega\pi BR^3$ (d) $\dfrac{1}{4}\sigma\omega\pi BR^4$

10. If voltage applied on a capacitor is increased from V to $2V$, choose the correct conclusion.
a) C remains same, Q doubled   b) Q is doubled, C doubled
c) Q remains the same, C is doubled   d) All

11. The frequency of the domestic AC supply is increased from 50–60 Hz to around?
     a) 20–40 Hz   b) 20–400 KHz   c) 20–40 GHz   d) 20–40 KHz

12. The frequency of gamma rays ,X rays and Ultraviolet rays are a, b and c respectively ,then
     a) a>b>c   b) a<b<c   c) a=b=c   d) a>c>b

13. The half-life of carbon 14 is 5730 years .the initial number of carbon -14 atoms is 10,000.the number of un decayed atoms after 22920 years is
     a) 62.5   b) 1250   c) 500   d) 625

14. In common emitter (CE) amplifiers ,the phase reversal between input and output voltage is
     a) 0^0 b) 90^0 c) 270^0 d) 180^0

15. 1 Wh (Watt hour) is equal to
     a) 36×10^5 J   b) 36×10^4 J   c) 3600 J   d) $3600\ Js^{-1}$

SECTION –B (6 X 2 =12 M)

II. Answer any six questions .compulsory Q.No : 24.

16. Give the relation between electric field and electric potential.

17. Define magnetic dipole moment.

18. Applications of series RLC resonant circuit

19. Why steel is preferred in making Robots?

20. What is an integrated circuit?

21. What is isotone? Give an example.

22. Find the ratio of the intensities of lights with wavelengths 500 nm and 300 nm which undergo Rayleigh scattering

23. What is presbyopia?

24. How many photons of frequency 10^{14} Hz will make up 19.86 J of energy?

SECTION –C (6 X 3 =18 M)

III. Answer any six questions .compulsory Q.No : 33.

25. Give the construction and working of photo emissive cell.

26. Obtain the equation for lateral magnification of thin lens.

27. Explain the variation of average binding energy with the mass number using graph and discuss about its features.

28. Compute the torque experienced by a magnetic needle in a uniform magnetic field

29. Elaborate the standard construction details of AC generator.

30. Discuss the Hertz experiment

31. The resistance of a wire is 20 Ω. What will be new resistance, if it is stretched uniformly 8 times its original length?

32. Obtain an expression for potential energy due to a collection of three point charges which are separated by finite distances

33. The given circuit has two ideal diodes connected as shown in figure below. Calculate the current flowing through the resistance R_1.
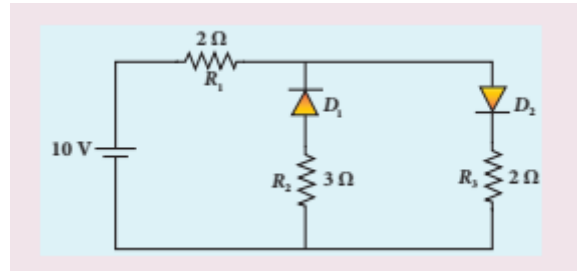
SECTION –D (5 X 5 =25 M)

IV. Answer all questions :

34 .a) Explain the basic elements of communication system with the necessary block diagram.

(or)

b) Explain in detail the construction and working of a Van de Graaff generator.

35.a) Explain the J.J. Thomson experiment to determine the specific charge of electron.

(or)

b) Derive the expression for the force on a current-carrying conductor in a magnetic field

36 a) What do you mean by electron emission? Explain briefly various methods of electron emission

(or)

b) Obtain an expression for average power of AC over a cycle. Discuss its special cases.

37.a) Obtain the equation for resultant intensity due to interference of light.

(or)

b) How the Measurement of internal resistance of a cell by potentiometer

38.a) Derive the equation for acceptance angle and numerical aperture of optical fibre.

(or)

b) Discuss the source of electromagnetic waves.

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