Samle paper-2

Class 12th

Physics (Theory)

Term-2

M.M: 35 TIME-2 Hrs

Here Physics classes by Nayan jha providing CBSE Term-2 Physics sample paper .

There are 12 questions in all and all questions are compulsory.

This question paper consists of three section A,B and C.

SECTION A has three questions of two marks each ,

SECFTION- B there are eight questions carrying three marks each and

SECTION- C is case study based questions of five marks.

There is no overall choice . However , an internal choice has been provided.

Uses of calculator is not allowed.

SECTION-A

1. . Draw the graph showing the variation of potential energy between a pair of nucleons as a function of their separation. Indicate the regions in which the nuclear forces is (i) attractive, (ii) repulsive. Write two important conclusions which you can draw regarding the nature of the nuclear forces.

2. How is a light emitting diode fabricated? Briefly state its working. Write any two important advantage of LEDs over the conventional incandescent low power lamps.

3. Plot a graph showing variation of de-Broglie wavelength λ Vs $1/\sqrt{V}$, when V is accelerating potential for two particles A and B carrying same charge but of mass m_1 , m_2 ($m_1 > m_2$) . which one of the two represents a particle of smaller mass and why?

Or,

A proton and a Deuteron are accelerated through the same potential . Which one of the two has (i) greater wavelength , (ii) less momentum and (iii) less kinetic energy ?

SECTION-B

4. Answer the following:

(a) Name the em waves which are suitable for radar systems used in aircraft navigation. Write the range of frequency of these waves. (b) If the earth did not have atmosphere, would its average surface temperature be higher or lower then what it is now? Explain

5. Draw a circuit diagram of a full wave rectifier. Explain the working principle. Draw the input/output wave forms indicating clearly the function of the two diodes used.

6.Draw a ray diagram for formation of image of a point object by a thin double convex lens having radii of curvature R_1 and R_2 and hence derive the lens maker formula.

Or,

Draw a ray diagram , showing the passage of light through a glass prism . hence obtain the relation between the angle of deviation , incidence , emergence and angle of prism , also show that no ray can pass through a prism whose refracting angle A is greater than the twice the critical angle for the material of the prism.

7. What are coherent sources of light ? Why two independent sources can't be coherent ?why coherent sources are necessary to observing a sustained interference pattern ? How are the coherent sources are obtained in the Young's double slit experiment?

8.What is interference of light? Write dawn the conditions to obtain the sustained interference fringe pattern. Show that the superposition of wave originating from two sources having displacement $Y_1 = a\cos\omega t$, $Y_2 = a\cos(\omega t+\phi)$ at a point produces a resultant intensity ,$I=4a^2\cos^2(\phi/2)$ hence write the conditions for the appearance of dark and bright fringes.(* this question may be asked as deduce the conditions for constructive and destructive interference and hence write the expression for the distance between two consecutive bright or dark interference).

9. Sketch the graphs showing the variation of stopping potential with frequency of incident radiations for two photosensitive radiations for two photosensitive materials A and B having threshold frequencies $v_0 > v_0'$ respectively . (I) which of the two metals ,A and B has higher work function ? (II) what information do you get from the slope of the graphs ? (III) what does the value of the intercept of graph A on the potential axis represent ?

Or,

Draw the graphs showing the variation of photoelectric current with anode potential of a photocell for (I) the same frequencies but different intensities $I_1 > I_2 > I_3$ incident radiation, (II) the same intensities but different frequencies $v_1 > v_2 > v_3$ of incident radiation . Explain why the saturation current is independent of the anode potential.

10. Draw the binding energy per nucleon curve . using the curve state clearly how the release in energy in the process of nuclear fission and nuclear fusion can be explained.

11.Draw a plot of potential energy of a pair of nucleons , as a function of their separation . write two important conclusions which you can draw regarding the nature of nuclear force. Also, explain the mass of a nucleus , in the ground state is always less than total mass of its constituents neutron and proton .

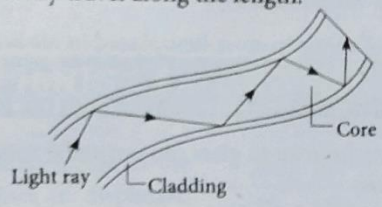
Or, We are given the following atomic masses ; $^{238}U_{92}$ =238.05079u; $^{234}Th_{90}$=234.04363u ; $^{237}Pa_{91}$=237.05121u; $^{1}H_{1}$=1.00783u; $^{4}He_{2}$=4.00260 u ;(a) calculate the energy released during alpha decay of uranium (b) calculate the kinetic energy of alpha particle ,and (c) show that ; $^{238}U_{92}$ cannot spontaneously emit a proton

SESTION-C

12. Case study-

Optical Fibre

An optical fibre is a thin tube of transparent material that allows light to pass through, without being refracted into the air or another external medium. It make use of total internal reflection. These fibres are fabricated in such a way that light reflected at one side of the inner surface strikes the other at an angle larger than critical angle. Even, if fibre is bent, light can easily travel along the length.



(i) Which of the following is based on the phenomenon of total internal reflection of light?

(a) Sparkling of diamond (b) Optical fibre communication

(c) Instrument used by doctors for endoscopy (d) All of these

(ii) A ray of light will undergo total internal reflection inside the optical fibre, if it

(a) goes from rarer medium to denser medium

(b) is incident at an angle less than the critical angle

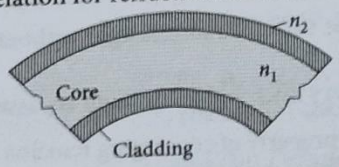
(c) strikes the interface normally

(d) is incident at an angle greater than the critical angle

(iii) If in core, angle of incidence is equal to critical angle, then angle of refraction will be

(a) 0° (b) 45° (c) 90° (d) 180°

(iv) In an optical fibre (shown), correct relation for refractive indices of core and cladding is



(a) $n_1 = n_2$ (b) $n_1 > n_2$ (c) $n_1 < n_2$ (d) $n_1 + n_2 = 2$

(v) If the value of critical angle is 30° for total internal reflection from given optical fibre, then speed of light in that fibre is

(a) 3×10^8 m s^{-1} (b) 1.5×10^8 m s^{-1} (c) 6×10^8 m s^{-1} (d) 4.5×10^8 m s^{-1}