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PHYSICS MOCK TEST

BY

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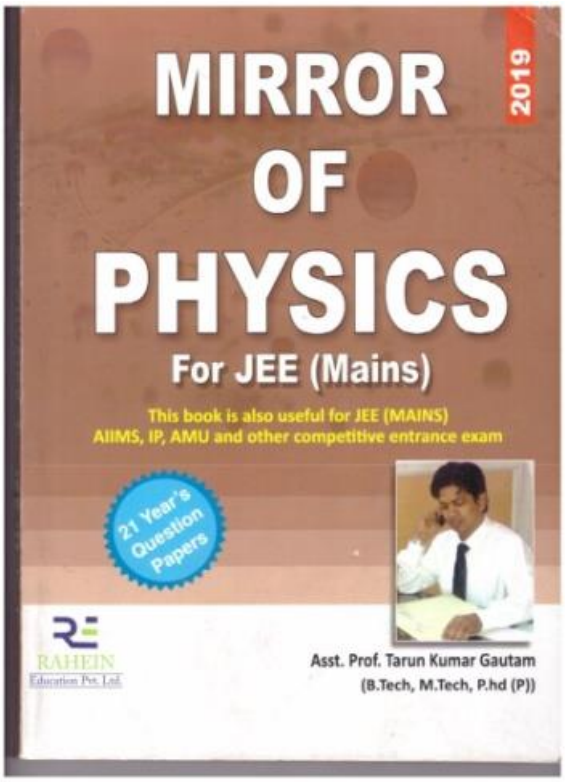
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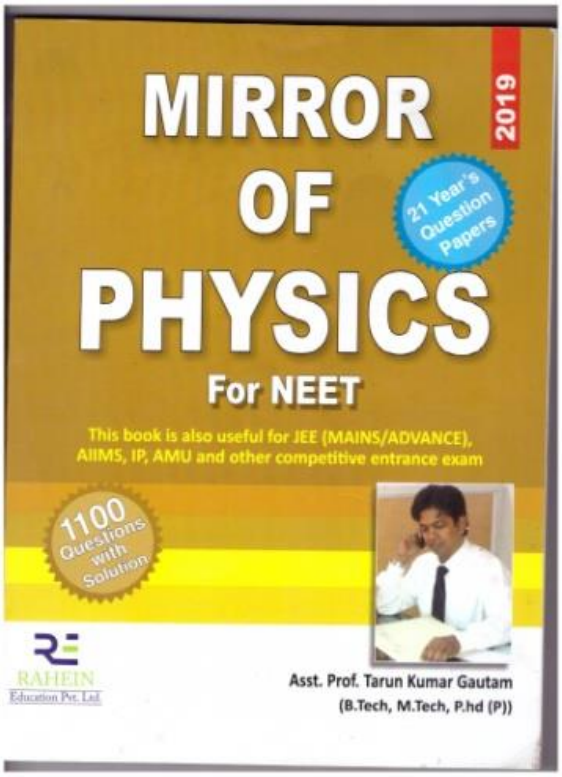
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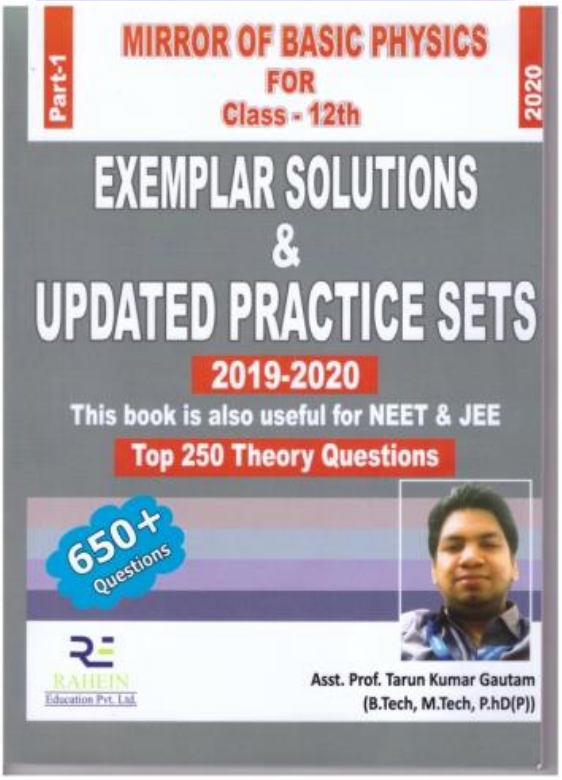
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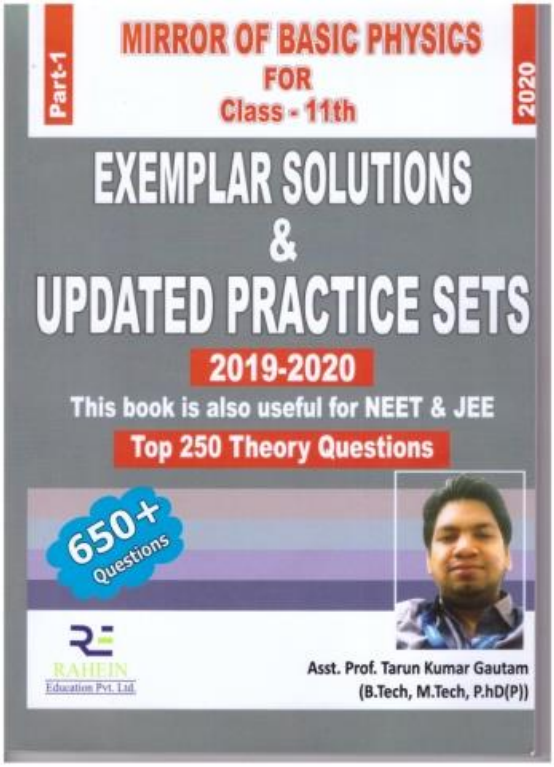
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Mock Test – 5

CLASS – XII

SECTION – A

1) Choose the correct statement.

(a) The speed of the light in the meta- material is v = c$|n|$.

(b) The speed of the light in the meta- material is v = $\frac{c}{|n|}$

(c) The speed of the light in the meta- material is v = c

(d) The wavelength of the light in the meta material (λ_m) is given by $\lambda_m = \lambda_{air}\,|n|$, where λ_{air} is the wavelength of the light in air

2) Two coherent monochromatic light beams of intensities I and 4I are superposed. The maximum and minimum possible intensities in the resulting beams are

(a) 5I and I

(b) 9I and I

(c) 5I and 3I

(d) 9I and 3I

3) In a Young's double- slit experiment, the separation between slits is d and the screen is a distance D from the slits. D is much greater than d and λ is the wavelength of the light. The number of bright fringes per unit width on the screen is:

(a) Dd/λ

(b) Dλ/d

(c) D/dλ

(d) d/Dλ

4) The magnifying power of a telescope in normal adjustment can be increased

(a) by increasing focal lengths of both lenses equally

(b) by fitting eyepiece of high power

(c) by fitting eyepiece of low power

(d) by increasing the distance of object

5) What should be the velocity of an electron so that its momentum becomes equal to that of a photon of wavelength 5,200 Å?

(a) 700 m/s

(b) 1,000 m/s

(c) 1,400 m/s

(d) 2,800 m/s

6) If r_1 and r_2 are the radii of the atomic nuclei of mass numbers 64 and 125 respectively, then the ratio r_1/r_2 is

(a) $\frac{4}{5}$

(b) $\frac{5}{4}$

(c) $\frac{64}{125}$

(d) $\sqrt{\frac{64}{125}}$

7) In order to produce a p- type semi conductor from germanium crystal, the impurity is added of valency:

(a) 3 (b) 4

(c) 5 (d) 6

8) Light of wavelength 5,000 Å falls on a sensitive plate with photoelectric work function of 1.9 eV. The maximum kinetic energy of the photoelectric emitted will be:

(a) 1.16 eV (b) 2.38 eV

(c) 0.58 eV (d) 2.98 eV

9) What is semiconductor?

Or

Define photodiode.

SECTION – B

10) A concave lens of refractive index 1.5 is immersed in a medium of refractive index 1.65. What is the nature of the lens?

Or

A biconvex lens made of a transparent material of refractive index 1.25 is immersed in water of refractive index 1.33. Will the lens behave as a converging lens? Give reason.

SECTION - C

11) (a) The ratio of the width of two slits in Young's double slit experiment is 4:1. Evaluate the ratio of intensities at maxima and minima in the interference pattern.

(b) A biconvex lens made of a transparent material of refractive index 1.25 is immersed in water of refractive index 1.33. Will the lens behave as a converging lens? Give reason.

12) It was Bohr who suggested the stable structure of atom with the help of quantum hypothesis. According to him,

(a) Where can an electron be observed in an atom?

(b) What is the angular momentum of an electron?

(c) How spectral lines are produced?

13) Explain with the help of a circuit diagram how a zener diode works as a DC voltage regulator. Draw its I - V characteristics.

14) Three photo diodes D_1, D_2 and D_3 are made of semiconductors having band gaps of 2.5 eV, 2 eV and 3 eV respectively. Which ones will be able to detect of wavelength 6000 Å

Or

Give reasons for the following:

(i) High reverse voltage do not appear across a LED.

(ii) Sunlight is not always required for the working of a solar cell.

(iii) The electric field of a function of a Zener is very high even for a small reverse bias voltage of about 5V.

15) The ground state energy of hydrogen atom is –13.6 eV. If an electron makes a transition from an energy level –0.85eV to –3.4eV, calculate the wavelength of the spectral line emitted. To which series of hydrogen spectrum does this wavelength belong?

Or

A 12.3eV electron beam is used to bombard gaseous hydrogen at room temperature. Upto which energy level the hydrogen atoms would be excited? Calculate the wavelength of the second member of Lyman series and second member of Bahner series.

SECTION –D

16) Define expression for the de- Broglie wavelength of an electron moving under a potential difference of V volt. Describe Davission and Germer experiment to establish the wave nature of the electrons. Draw a labeled diagram of the apparatus used.

Or

Define 'work function' of a metal. The threshold frequency of a metal is v_0. When the light of frequency $2v_0$ is incident on the metal plate, the maximum velocity of the electrons emitted is v_1.When the frequency of the incident radiation is increased to $5v_0$, the maximum velocity of electrons emitted is v_2. Find the ratio of v_1 and v_2.

17) Figure shows electromagnetic waves of same wavelengths, but different amplitudes.

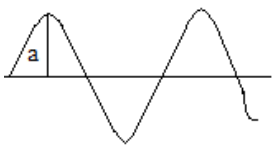
(a) If they are superimposed with a constant phase difference ϕ, obtain the expression for resultant average intensity.

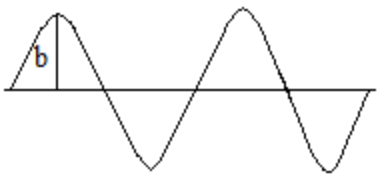
(b) If the phase difference is zero, what is the resultant intensity?

(c) If the phase difference is π (180°), what is the resultant intensity?

(d) The two beams are allowed to form interference fringes on a screen. What change appears on the fringe system, if the amplitudes are made the same?

(e) In what way the changes in common wavelength of the two beams affect the fringe system? Explain.





Or

Obtain the relationship between refraction indices n_1 and n_2, object distance u, image distance v and the radius of curvature R in the case of refraction at a convex spherical surface with the object in the rarer medium index n_1 and image in the denser medium of refraction n_2. What will be the relationship if the positions of object and image are interchanged?

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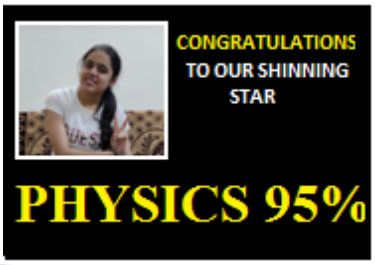

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