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PHYSICS MOCK TEST

BY

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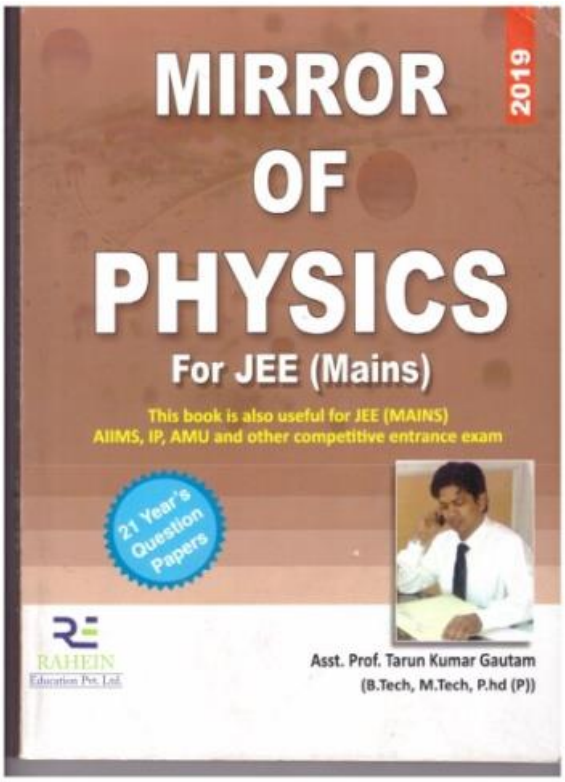
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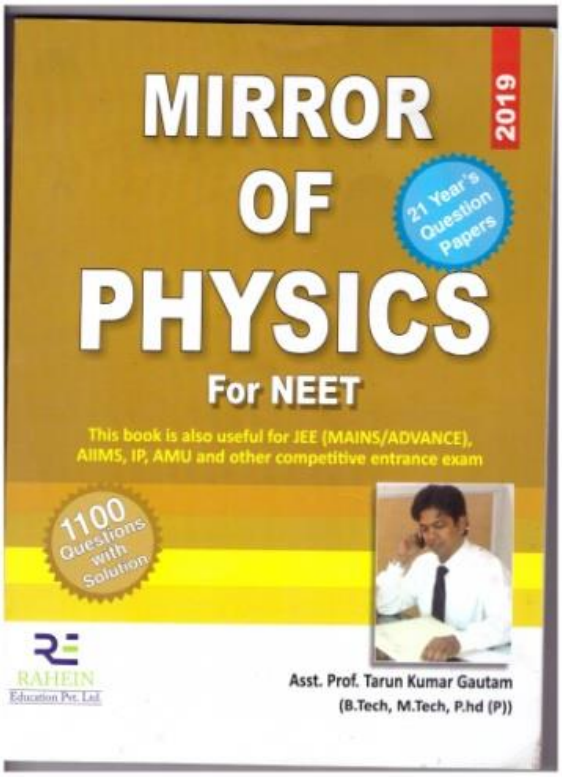
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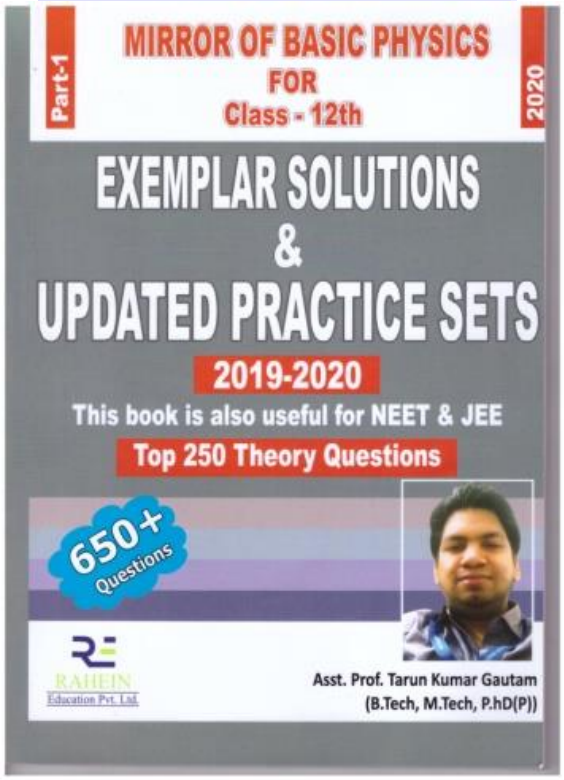
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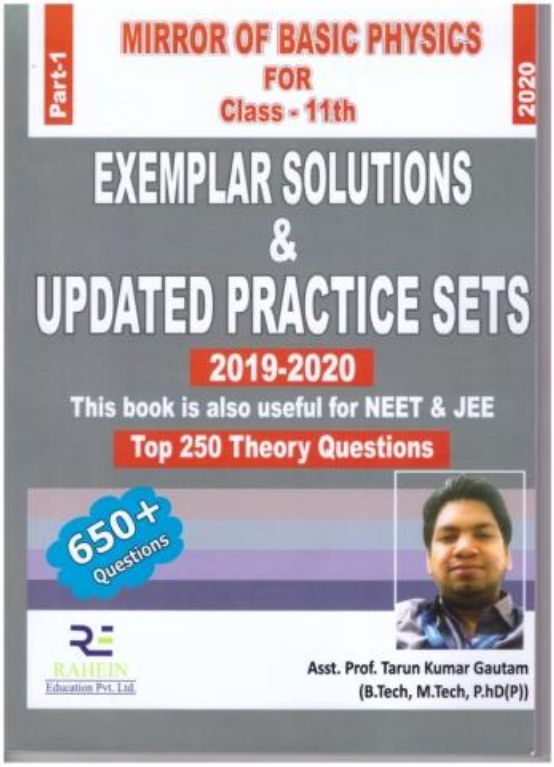
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Mock Test - 3

Class –XII

SECTION – A

1) The reddish appearance of rising and setting sun is due to

(a) Reflection of light

(b) diffraction of light

(c) Scattering of light

(d) interference of light

2) The coherence of two light sources means that the light waves emitted have

(a) Same frequency

(b) same intensity

(c) Constant phase difference

(d) same velocity

3) The energy E and momentum p of a photon is given by E = hv and p =h/λ. The velocity of photon will be:

(a) E/p

(b) Ep

(c) $(E/p)^2$

(d) $(E/p)^{1/2}$

4) The mass defect of an atom of mass M, atomic number Z and mass number A is given by

(a) M/A

(b) M/ZA

(c) $(A - Z)m_p$

(d) $[Zm_p + (A - Z)m_n + Zm_e] - M$

5) A particle of mass M at rest decays into two particles of masses m_1 and m_2, having non – zero velocities. The ratio of the de- Broglie wavelengths of the particles, λ_1/λ_2, is

(a) m_1/m_2

(b) m_2/m_1

(c) 1.0

(d) $\sqrt{m_2}/\sqrt{m_1}$

6) An α- particle moves in a circular path of radius 0.83 cm in the presence of a magnetic field of 0.25 Wb/m^2. The de-Broglie wavelength associated with the particle will be

(a) 1Å

(b) 0.1 Å

(c) 10 Å

(d) 0.01 Å

7) The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by:

(a) $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$

(b) $\lambda_p \propto \lambda_e^2$

(c) $\lambda_p \propto \lambda_e$

(d) $\lambda_p \propto \sqrt{\lambda_e}$

8) The radius of germanium (Ge) nuclide is measured to be twice the radius of ^9_4Be. The numbers of nucleons in Ge are:

(a) 72

(b) 73

(c) 74

(d) 75

9) Why must both the objective and the eye piece of a compound microscope have short focal lengths?

10) Out of three radiations of wavelengths 8000 Å , 5000 Å and1000 Å, which one corresponds to Lyman series of hydrogen spectrum ?

Or

Define plum pudding model of the atom.

11) Can we measure the potential barrier of a p-n junction by putting a sensitive measuring device across its terminals?

12) The de- Broglie wavelength associated with an electron accelerated through a potential difference V is λ. What will be its wavelength when the accelerating potential is increased to 2V?

SECTION – B

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

Or

The current in the forward bias is known to be more (~mA) than the current in the reverse bias (~μA). What is the reason, then to operate the photodiode in reverse bias?

SECTION – C

14) You are given two p-n junction diodes.

(a) Mention the name of an electronic circuit which make use of these diodes to convert alternating current to continuous D.C. current.

(b) Draw the circuit diagram of the above mentioned circuit.

Or

(i) State the resistivity and conductivity range of metals, semiconductors and insulators.

(ii) C, Si and Ge have same lattice structure. Why is C insulator while Si and Ge intrinsic semiconductors?

15) A deuteron and an alpha particle are accelerated with the same accelerating potential. Which one of the two has

(a) Greater value of de Broglie wavelength, associated with it? And

(b) Less kinetic energy? Explain.

16) Explain the following giving reason:

(a) If light from an ordinary source (like a sodium lamp) passes through a Polaroid sheet, its intensity is reduced to half and rotating the Polaroid has no effect on the transmitted intensity.

(b) A convex lens when immersed in a medium whose refractive index is more than that of the material of the lens, behaves like a diverging lens.

(c) Both the objective and the eyepiece of a compound microscope have short focal lengths.

17) Explain how radioactive nuclei can emit β - particles even through atomic nuclei do not contain these particles. Hence explain why the mass number of a radioactive nuclide does not change during b-decay.

Or

The ground state energy of hydrogen atom is –13.6 eV. If an electron makes a transition from an energy level –0.85 eV to –1.51 eV, calculate the wavelength of the spherical line emitted. To which series of hydrogen spectrum does this wavelength belong?

SECTION – D

18) (a) Define de – Broglie hypothesis. Show that a moving particle of kinetic energy 'E' has de – Broglie wavelength $\lambda = \frac{h}{\sqrt{2mE}}$.

(b) Show that the de – Broglie wavelength associated with an electron accelerated through a potential difference of V will be $\lambda = \frac{12.3}{\sqrt{V}}$ Å.

Or

Draw properly labeled graphs to show the following concerning photoelectric emission:

(i) Variations of photo- electric current with the intensity of incident radiation.

(ii) Variations of photo- electric current with the accelerating and stopping potential.

(iii) Variations of stopping potential with frequency of the incident radiation. From the graph, how the following can be determined:

(1) Planck's constant
(2) The work function of the material?

19) (a) In what way is diffraction from each slit related to the interference pattern in a double slit experiment?

(b) Two wavelengths of sodium light 590 nm and 596 nm are used, in turn, to study the diffraction taking place at a single slit of aperture 2×10^{-4} m. The distance between the slit and the screen is 1.5 m. Calculate the separation between the positions of the first maxima of the diffraction pattern obtained in the two cases.

Or

A convex lens and a concave lens each of focal length 10 cm are given.

(a) Which lens will produce images of magnification greater than 1 and less than 1?

(b) If these two lenses are kept in contact, what will be the effective power? Explain.

(c) The optic axis of a lens is the x-axis. The coordinates of a point object and image are (-30cm, 1cm) and (10cm, –1cm) respectively. Find the position of lens from the origin.

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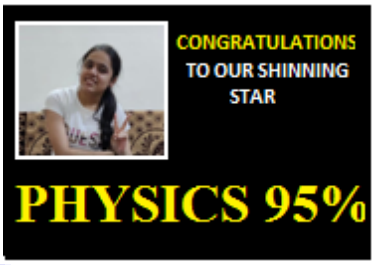

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