

# **RAHEIN EDUCATION PVT. LTD.**

**CONTACT: 9205010851**

**Website: [www.raheineducation.com](http://www.raheineducation.com)**

## **PHYSICS PRACTICE PAPER**

**BY**

**Asst. Prof. Tarun Kumar Gautam**

**(B.Tech, M.Tech, PhD (P))**

**Currently working in Jamia Hamdard, (HSC), Delhi**

**Working on Nano Technology with Rise University, USA**

**Author of 8 books regarding Physics and Engineering Subject.**

**Ex-Faculty of Rajshree Institute of Management & Technology (RMIT), Braeilly, Uttar Prdesh**

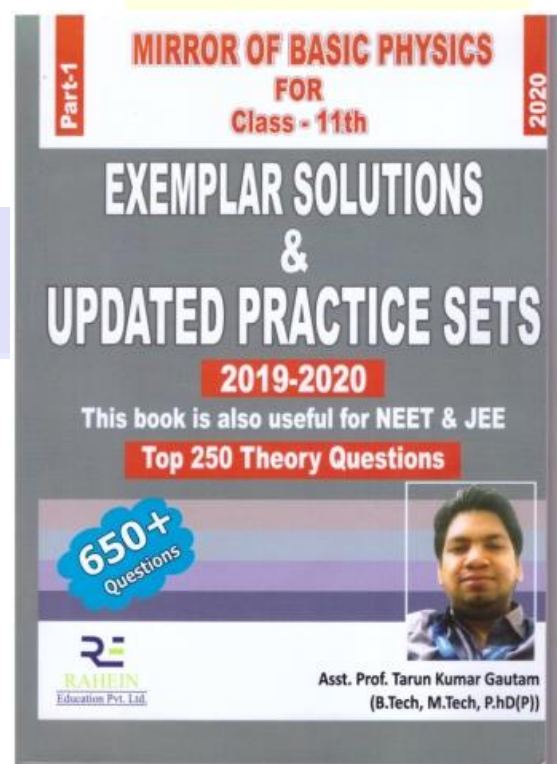
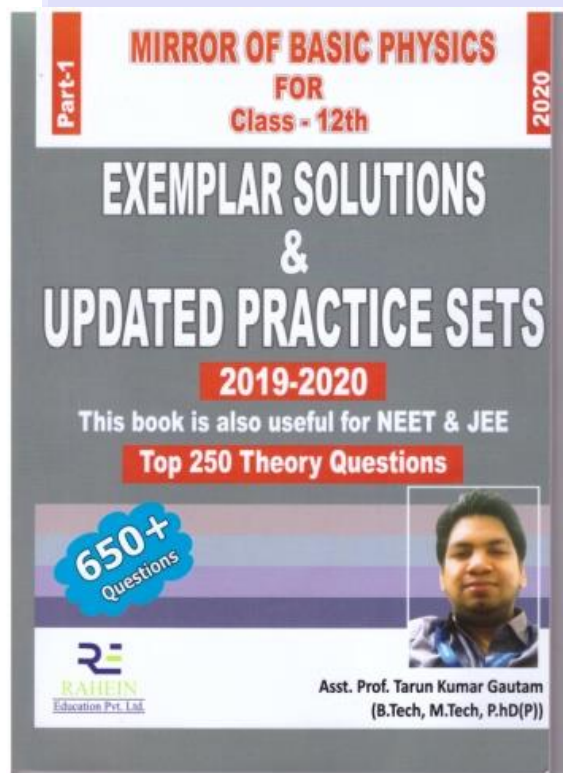
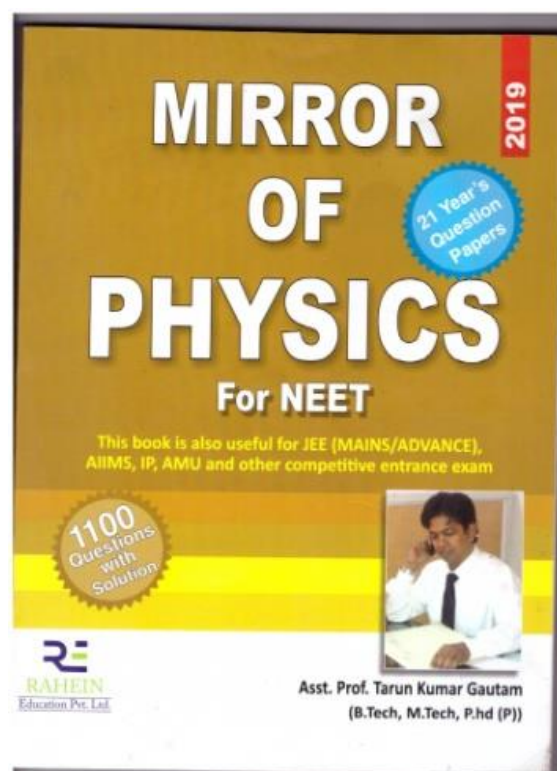
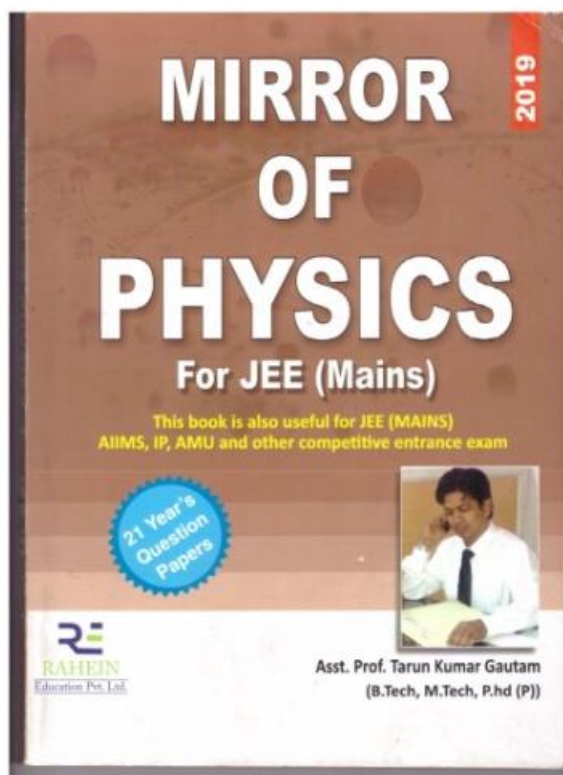
**Ex-Faculty of Assistant professor in Krishna Engineering Collage (KEC), Ghaziabad, Uttar Prdesh**  
**Member of Educational Project in University of Petroleum and Energy Studies (UPES), UK**





**RAHEEM EDUCATION**  
www.raheemeducation.com

**PHYSICS**



## PHYSICS (BASED ON LATEST PATTERN)

### Practice Paper – 2

#### CLASS - XII

#### SECTION – A

- 1) When a charged particle moves perpendicular to a magnetic field, then
  - (a) Speed of the particle is changed
  - (b) Speed of the particle remains unchanged
  - (c) Direction of the particle remains unchanged
  - (d) Acceleration of the particle remains unchanged
- 2) Susceptibility is positive for:
  - (a) Paramagnetic substances
  - (b) ferromagnetic substances
  - (c) non - magnetic substances
  - (d) diamagnetic substances
- 3) A coil of area of cross section  $0.5 \text{ m}^2$  with 10 turns is in a plane which is perpendicular to an uniform magnetic field of  $0.2 \text{ Wb/m}^2$ . The flux through the coil is
  - (a) 100 Wb
  - (b) 10 Wb
  - (c) 1 Wb
  - (d) zero
- 4) Gauss' law for magnetism tells us:
  - (a) the net charge in any given volume
  - (b) that the line integral of a magnetic field around any closed loop must vanish
  - (c) the magnetic field of a current element
  - (d) that magnetic monopoles do not exist
- 5) An infinitely long cylindrical conducting rod is kept along +Z direction. A constant magnetic field is also present in +Z direction. Then current induced will be
  - (a) 0
  - (b) along +Z direction
  - (c) along clockwise as seen from +Z
  - (d) along anticlockwise as seen from +Z
- 6) Displacement current exists in the region between the plates of a parallel plate capacitor if:
  - (a) the capacitor leaks charge across the plates
  - (b) the capacitor is being discharged
  - (c) the capacitor is fully charged
  - (d) along anticlockwise is fully discharged
- 7) As an object is moved from the centre of curvature of a concave mirror toward its focal point its image:
  - (a) remains real and between larger
  - (b) remains virtual and becomes smaller
  - (c) remains real and becomes larger
  - (d) remains real and becomes smaller

8) Huygen's principle help us to find the shape of a wavefront emanating from a source. The shape of the wavefront originating from a tube light is:

- |                 |               |
|-----------------|---------------|
| (a) plain       | (b) circular  |
| (c) cylindrical | (d) spherical |

9) Light can travel in vacuum due to its:

- |                         |                            |
|-------------------------|----------------------------|
| (a) transverse nature   | (b) electromagnetic nature |
| (c) longitudinal nature | (d) both (a) and (c)       |

10) The  $e/m$  value of electron is :

- |  |  |
|--|--|
| (a) $1.76 \times 10^{11} \text{ C/kg}$ | (b) $9.11 \times 10^{21} \text{ C/kg}$ |
| (c) $1.62 \times 10^{10} \text{ C/kg}$ | (d) $1.67 \times 10^{27} \text{ C/kg}$ |

11) The shortest wavelength of X –ray emitted from a X-ray tube, depends upon

- |  |  |
|--|--|
| (a) current in the tube                  | (b) voltage applied to the tube          |
| (c) nature of glass material in the tube | (d) atomic number of the target material |

12) Alpha particle is the nucleus of an atom of

- |             |              |
|-------------|--------------|
| (a) lithium | (b) hydrogen |
| (c) helium  | (d) oxygen   |

13) Light with an intensity of  $1 \text{ kW/m}^2$  falls normally on a surface and is completely absorbed. The radiation pressure is:

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| (a) 1 kPa                           | (b) $3 \times 10^{11} \text{ Pa}$   |
| (c) $1.7 \times 10^{-6} \text{ Pa}$ | (d) $3.3 \times 10^{-6} \text{ Pa}$ |

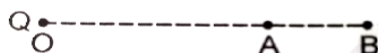
14) The angle of a prism is  $A$  and one of its refracting surfaces is silvered. Light rays falling at an angle of incidence  $2A$  on the first surface return back through the same path after suffering reflection at the second (silvered) surface. The refractive index of the material of the prism is

- |                          |                |
|--------------------------|----------------|
| (a) $2 \sin A$           | (b) $2 \cos A$ |
| (c) $\frac{1}{2} \cos A$ | (d) $\tan A$   |

15) Waves from two slits are in phase at the slits and travel to a distant screen to produce the second minimum of the interference pattern. The difference in the distance traveled by the waves is :

- |                                  |                    |
|----------------------------------|--------------------|
| (a) half a wavelength            | (b) a wavelength   |
| (c) three halves of a wavelength | (d) two wavelength |

16) A point charge  $Q$  is placed at point  $O$  as shown in the figure. The potential difference  $V_A - V_B$  is positive. Is the charge  $Q$  negative or positive?



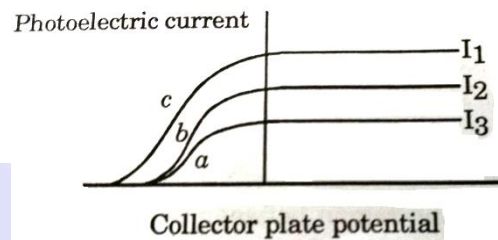
17) What is the cause of refraction of light?

18) Draw a diagram to show refraction of a plane wavefront incident on a convex lens and hence draw the refracted wavefront.

Or

Write the expression of refractive index of a medium in terms of (i) speed (ii) wavelength of light.

19) The figure shows a plot of three curves a, b, c showing the variation of photocurrent vs. collector plate incident on a photosensitive surface.



Point out the two curves for which the incident radiations have same frequency but different intensities.

20) What is electromotive force? State its SI unit.

Or

What so you mean by the power rating of a circuit element?

### SECTION – B

21) Define electron volt. What is its value?

Or

What do you understand by the phrase ‘dual nature of radiation’?

22) A lamp is connected in series with a capacitor. Predict your observation when this combination is connected in turn across (i) ac source and (ii) a dc battery. What change would you notice in each case if the capacitance of the capacitor is increased?

23) Explain with the help of a circuit diagram, the working of a photo- diode. Write briefly how it is used to detect the optical signals.

24) The electric field vector of a plane electromagnetic wave oscillates sinusoidally at a frequency of  $4.5 \times 10^{10}$  Hz. What is the wavelength?

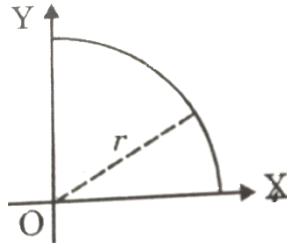
25) A needle placed 45 cm from a lens forms an image on a screen placed 90 cm on the other side of the lens. Identify the type of the lens and determine its focal length. What is the size of the image, if the size of the needle is 15.0 cm?

26) Power ‘P’ is to be delivered to a device via transmission cables having resistance ‘R’. If V is the voltage across ‘R’ and ‘T’ the current through it, find the power wasted and how can it be reduced?

27) Two wires ‘A’ and ‘B’ of the same material and having same length, have their cross-sectional areas in the ratio 1:6. What would be the ratio of the heat produced in these wires when the same voltage is applied across each?

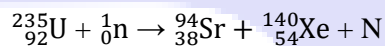
### SECTION – C

28) An arc of radius  $r$ , lying in the first quadrant is shown in the figure. The linear charge density on the arc is  $\lambda$ . Calculate the magnitude and direction of electric field intensity at the point of origin.

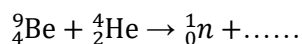


29) State the postulates of Bohr's theory in H - spectrum. Show that the linear velocity of the electron is inversely proportional to principal quantum number.

30) (a) In the following nuclear fission reaction,  $N$  is the number of neutrons released. What is the value of  $N$ ?



(b) Complete the following nuclear reaction equation:



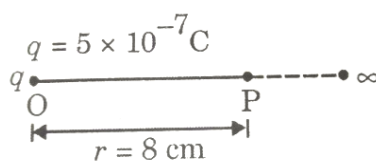
(c) Two nuclei have mass numbers in the ratio 1:8. What is the ratio of their nuclear radii?

Or

Write down the value of charge and mass of an  $\alpha$  - particle. Express charge in terms of electronic charge and the mass in terms of the mass of proton. Can an  $\alpha$ -particle be compared with a helium atom?

31) (a) Find the potential at a point P due to a charge of  $5 \times 10^{-7} \text{ C}$  located 8 cm away as shown in below figure :

(b) Calculate the work done in bringing a charge of  $4 \times 10^{-9} \text{ C}$  from infinity to the point P. Does the answer depend on the path along which the charge is brought?



32) Nuclear atom model required to explain the results of Rutherford experiment. Why?

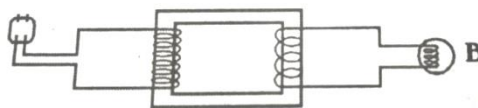
33) Figure shows a step down transformer used in the line AC of 220 V to light up a bulb marked 12V, 30 W.

(i) Calculate the number of turns of the coil in the winding connected to the bulb, if the other coil has 22,000 turns.

(ii) The soft iron core gets heated after some time. Why?

(iii) Suggest a method to modify the core so that the heat produced in the core can be minimized.

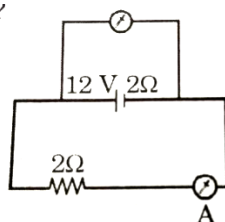




34) A battery of emf 12 V and internal resistance  $2\Omega$  is connected to a  $4\Omega$  resistor as shown in the figure.

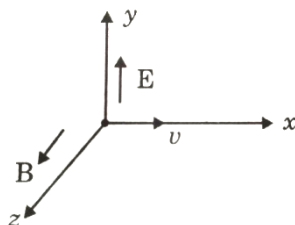
(a) Show that a voltmeter when placed across the cell and across the resistor, in turn, gives the same reading.

(b) To record the voltage and the current in the circuit, why is voltmeter placed in parallel and ammeter in series in the circuit?

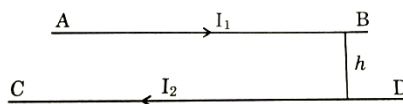


#### SECTION – D

35) (a) A particle of charge  $q$  is moving with velocity  $v$  in the presence of crossed electric field  $\vec{E}$  and magnetic field  $\vec{B}$  as shown. Write the condition under which the particle will continue moving along x-axis. How would the trajectory of the particle be affected if the electric field is switched off ?



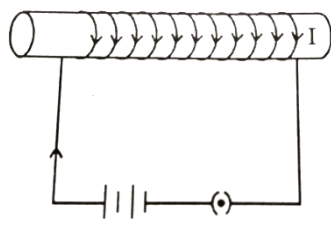
(b) A horizontal wire AB of length 'l' and mass 'm' carries a steady current  $I_1$  free to move in vertical plane is in equilibrium at length of 'h' over another parallel long wire CD carrying a steady current  $I_2$  which is fixed in a horizontal plane as shown. Derive the expression for the force acting per unit length on the wire AB and write the condition for which wire AB is in equilibrium.



Or

(a) An electron in the ground state of hydrogen atom is revolving in anticlockwise direction in a circular orbit of radius  $R$ . Obtain the expression for the orbital magnetic moment of the electron.

(b) Draw the magnetic field lines for a current carrying solenoid when a rod made of (i) copper, (ii) aluminum and (iii) iron are inserted within the solenoid as shown.



36) (a) (i) Draw a labeled ray diagram to show the formation of image in an astronomical telescope for a distant object.

(ii) Write three distinct advantages of a reflecting type telescope over a refracting type telescope.

(b) A convex lens of focal length 10 cm is placed coaxially 5 cm away from a concave lens of focal length 10 cm. If an object is placed 30 cm in front of the convex lens, find the position of the final image formed by the combined system.

Or

(a) In Young's double slit experiment, deduce the conditions for obtaining constructive and destructive interference fringes. Hence deduce the expression for the fringe width.

(b) Show by drawing a suitable diagram that in the double slit experiment the interference pattern on the screen is actually a superposition of single slit diffraction from each slit.

(c) What should be the width of each slit to obtain 10 maxima of the double slit pattern within the central maximum of the single slit pattern, for green light of wavelength 500 nm, if the separation between two slits is 1 mm ?

37) (a) Explain the formation of depletion layer and potential barrier in a p-n junction.

(b) In the figure given below the input waveform is converted into the output waveform by a device 'X'. Name the device and draw its circuit diagram.

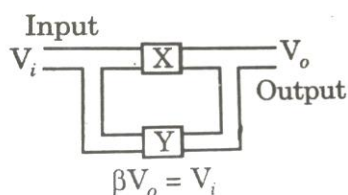


(c) Identify the logic gate represented by the circuit as shown and write its truth table.



Or

The set-up shown below can produce an a.c. output without any external input signal. Identify the components 'X' and 'Y' of this set-up. Draw the circuit diagram for this set-up. Describe briefly its working.



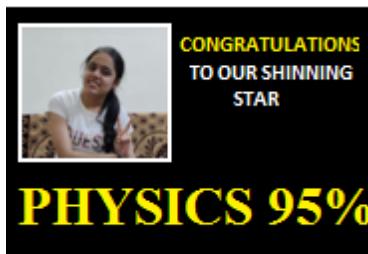




**RAHEIN EDUCATION**  
www.raheineducation.com

**PHYSICS**

## CBSE RESULT 2020



### Special Physics for NEET/JEE

**Timing: 8:30a.m. to 10:30a.m. [Monday to Friday]**

**Saturday: Test**

**Fees: Rs. 25,000 and Online Test Series Rs. 1,000**

**Place: Rahein Education Pvt. Ltd.**

**Contact us: 9205010851, 9711833446**

**For Free Download Notes: [www.raheineducation.com](http://www.raheineducation.com)**

**E-mail: [tarunkumar.csengg@gmail.com](mailto:tarunkumar.csengg@gmail.com)**