



PHYSICS

BOOKS - BINA LIBRARY PHYSICS (ASSAMESE ENGLISH)

QUESTION PAPER 2012

Exercise

1. Give the dimensional representation of Resistance.



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2. Can a body have a charge of $1.8 \times 10^{-19} \text{ C}$?

Give reason.



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3. β of a given transistor is 99. What is the value of α ?



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4. What is the maximum value of power-factor and when does it occur ?



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5. Which of the following waves can be polarised (i) X-rays (ii) sound waves. give reasons.



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6. How are β - rays emitted from a nucleus, when it does not contain electrons ?



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7. Write down the Biot- Savart's Law in vector form.



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8. The frequency of a.c is doubled. How do X_L and X_C get affected ?



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9. Draw the circuit diagram for the comparison of e.m.f's of two cells by a potentiometer.



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10. Define 1 tesla. Write down the expression of Lorentz force acting on a charged particle.



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11. The magnetic field of a plane electromagnetic wave is given by

$$B_y = 5 \times 10^{-7} \sin\left(2\pi \times 10^8 t + \frac{2\pi}{3} x\right) \text{tesla.}$$

Find wavelength



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12. The magnetic field of a plane electromagnetic wave is given by

$$B_y = 5 \times 10^{-7} \sin\left(2\pi \times 10^8 t + \frac{2\pi}{3} x\right) \text{ tesla}$$

Find frequency.



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13. Show that the mean value of complete G.C. cycle is zero.



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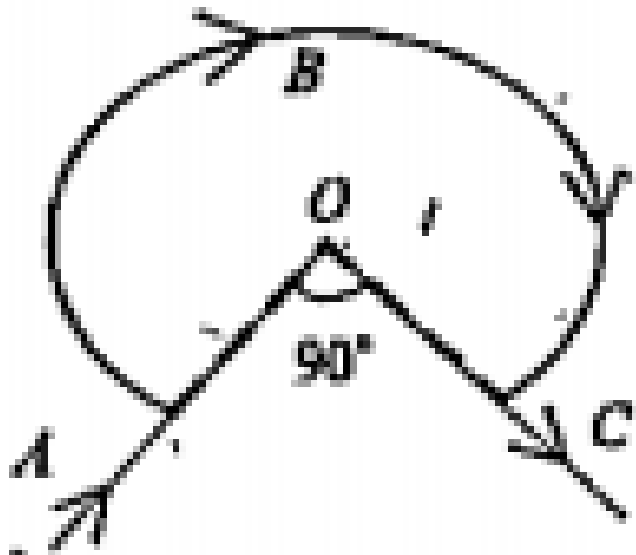
14. Write down Einstein's photo electric equation and explain each of its terms.



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15. The wire shown in the figure carries a current of 10A. What is the magnitude of magnetic field induction at the centre O? Give

the radius of the bend coil is 3 cm.



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16. An α particle is moving in a magnetic field of $(3\hat{i} + 2\hat{j})$ tesla with in velocity of

$5 \times 10^5 \hat{i} \text{ms}^{-1}$. What will be the magnetic force acting on the particle?



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17. In Young's experiment the ratio of intensity at the maxima and minima in the interference pattern is 36:16. What is the ratio of the widths of the two slits?



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18. Draw block diagram of a generalized communication system.



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19. The angle of reflection for mono - chromatic X - rays from a crystal whose atomic spacing is 2.5\AA is 15° . Calculate the wavelength of X - rays.



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20. Express wavelength of matter wave as

$$\lambda = \frac{h}{\sqrt{2mE_k}}$$



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21. Mention two limitations of Rutherford's model of atom.



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22. Using Gauss's theorem find the field due to a charged thin spherical shell at a point outside the shell.



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23. Find an expression for electric field at any position on an axial line of an electric dipole.



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24. Apply Kirchhoff's laws to establish the principle of a balanced Wheatstone's bridge.



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25. Establish Brewster's Law regarding polarisation of light by reflection.



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26. A condenser of capacity 500 pF is charged to a potential 100V . Find the charge on the condenser and energy stored in it.



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27. State Lenz's Law of electromagnetic induction.



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28. Draw the circuit diagram of a common emitter n-p-n transistor as an amplifier. Would you prefer to use a transistor as a common base or a common emitter amplifier and why?



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29. What is magnifying power of an astronomical telescope? Draw the necessary ray diagram of the final image at distinct vision by an astronomical telescope.





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30. Draw a ray diagram to show the formation of final image by a compound microscope. Find an expression for magnification of an image formed by a compound microscope.



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31. Find the expression of fringe-width

$\beta = \frac{\lambda D}{d}$ for Young's double slit interference

pattern, where d is the separation between the two coherent sources.



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32. In a certain star, three alpha particles undergo fusion in a single reaction to form ${}_{6}^{12}\text{C}$ nucleus. Calculate the energy released in this reaction in MeV. Given: $m({}_{2}^{4}\text{He})=4.002604\text{ u}$ and $m({}_{6}^{12}\text{C})=12.000000\text{ u}$.



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33. What is nuclear fission and nuclear fusion?



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34. What is the function of cladding in a typical optical fibre?



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35. For refraction at spherical surface establish the following relation.

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$$



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36. State two important differences between interference and diffraction.



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37. Find an expression for the magnetic field at points on the axis of a circular current loop.



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38. A rectangular coil carrying current is placed in a uniform magnetic field in such a way that normal to the coil makes an angle θ with the direction of magnetic flux density. Find the magnitude of torque acting on the coil. Define magnetic moment of a current loop.



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39. Draw a circuit diagram of a full rectifier and explain its working.



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40. What is LED ? State two advantages of LED over incandescent lamps.



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