PHYSICS

BOOKS - OSWAAL PUBLICATION PHYSICS (KANNADA ENGLISH)

2018 Solved Paper 4

Exercise

1. What is an equipotential surface ?

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2. Define 'drift velocity' of free electrons .

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3. Write any one application of the cyclotron.

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4. State Faraday's law of electromagnetic induction.

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5. If the peak value of a.c. current is $4.24A$, what is its root mean square value ?

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6. Mention energy losses in a transformer .

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7. Two lenses of power $+1.5D$ and $-0.5D$ are kept in contact on their principal axis . What is the effective power of the combination ?

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8. The decay of proton to neutron is possible only inside the nucleus. Why ?

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9. What is 'depletion region' in a semiconductor diode?

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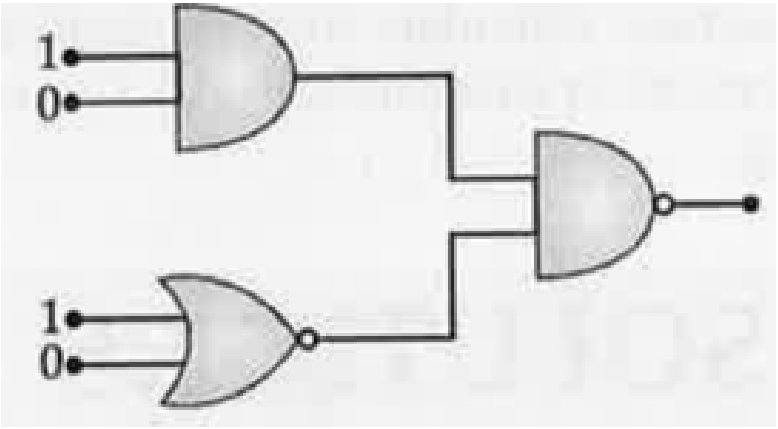
10. 

What is the output of this combination?

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11. Mention any two factors on which the capacitance of a parallel plate capacitor depends.

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12. State Kirchhoff's laws of Electrical network.

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13. Define:

(a) Magnetic declination (b)Magnetic dip. Mention the S.I. unit of magnetisation.

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14. Write an expression for magnetic potential energy of a magnetic dipole kept in a uniform magnetic field and explain the terms.

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15. Give any two applications of X-rays.

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16. What is 'myopia' ? How to rectify it?

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17. Draw the diagram representing the schematic arrangement of Geiger-Marsden experimental alpha particle scattering.

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18. Write any two characteristics of nuclear forces.

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19. Mention any three properties of an electric charge.

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20. State Ampere's circuital law . Using it, derive the expression for magnetic field at a point due to a long current carrying conductor .

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21. What is hysterisis? Define the terms 'coercivity' and 'retentivity' of a ferromagnetic material.

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22. Arrive at Snell's law of refraction, using Huygen's principle for refraction of a plane wave.

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23. Writer Bohr's postulates for the hydrogen atom model.

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24. Derive an expression for the half-life of a radio active nuclide.

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25. Distinguish between p type and n type semiconductors

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26. Draw the block diagram of generalised communication system.

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27. Define electric potential due to a point charge and arrive at the expression for the electric potential at a point due to a point charge.

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28. Obtain an expression for the equivalent emf and internal resistance of two cells connected in parallel.

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29. Derive the expression for magnetic field at a point on the axis of a circular current loop.

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30. Obtain an expression for the impedance of a series LCR circuit. (using phasor diagram method).

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31. Deduce the relation between n,u,v, Q, R for refraction at a spherical surface, where the symbols have their usual meaning.

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32. What is a rectifier ? With suitable circuit describe the action of a full wave rectifier by drawing input and output waveforms.

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33. Three charges each equal to +4nC are placed at the three comers of a square of side 2 cm. Find the electric field at the fourth corner.

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34. 100 mg mass of nichrome metal is drawn into a wire of area of cross-section 0.05 mm. Calculate the resistance of this wire. Given density of nichrome$8.4 \times 10^{3} \mathrm{kgm}^{-3}$ and resistivity of the material as $1.2 \times 10^{-6} \Omega$ m.

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35. A circular coil of radius $10cm$ and 25 turns is rotated about its vertical diameter with an angular speed of $40rads^{-1}$, in a uniform

horizontal magnetic field of magnitude $5 \times 10^{-2} T$. Calculate the maximum emf induced in the coil. Also find the maximum current in the coil if the resistance of the coil is 15Ω.

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36. In Young's double slit experiment the slits are separated by $0.28mm$ and the screen is placed at a distance of $1.4m$ away from the slits. The distance between the central bright

fringe and the fifth dark fringe is measured to be $1.35cm$. Calculate the wavelength of the light used. Also find the fridge width if the screen is moved towards the slits by $0.4m$, for the same experimental set up.

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37. Light of frequency $8.41 \times 10^{14} Hz$ is incident on a metal surface. Electrons with their maximum speed of $7.5 \times 10^{5} ms^{-1}$ are ejected from the surface. Calculate the

threshold frequency for photoemission of electrons. Also find the work function of the metal in electron volt (eV). Given Plank's constant $h = 6.625 \times 10^{-34} Js$ and mass of the electron $9.1 \times 10^{-31} kg$.

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