PHYSICS

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PHYSICS (KANNADA ENGLISH)

Sample Paper 7

Exercise

1. The emf of a cell is always greater than its terminal voltage. Why? Give reason.

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2. What is attenuation in communication system ?

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3. Define S.I unit of charge .

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4. Define dispersive power of the material of a prism. How can it be measured?

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5. Name the scientist who determined the speed of light most accurately.

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6. Mention one application of Raman effect.

7. What are the directions of electric and magnetic field vectors relative to each other and relative to the direction of propagation of electromagnetic waves?

8. Give one example each of a .system. that uses that Space wave mode of propagation.

9. name the spectral series of hydrogen which lies in the ultraviolet region of elecrongnetic spectrum .

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10. Mention any three application of eddy currents.

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11. What is the effect of the presence of a dielectric medium on Capacitance of a parallel plate capacitor.

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12. How does the electrostatic force between two point charges change, when a dielectric medium is introduced between them ?

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13. Distinguish between 'Analog and Digital signals'.

14. Draw the ray diagram of image formation in case of compound microscope

15. Obtain an expression for the force between two straight parallel conductor carrying current. Hence define ampere.

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16. How are p-type n-type semiconductors formed ?

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17. What is (a) electric dipole moment , (b) dielectric strength ?

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19. The current in a coil is changing from 10 A and 8 A in 0.01 second. The induced emf in the coil is 2 V. Calculate the self-inductance of the coil.

20. Derive the expression for emf induced in a straight conductor moving perpendicular to a uniform magnetic field.

21. State two conditions required for obtaining coherent sources. In Young.s arrangement to produce interference pattern, show that dark and bright fringes appearing on the screen are equally spaced.

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22. Derive an expression for potential energy of a system of two charges in the absence of the external electric field.

23. What is full wave rectification? Explain the working of a full wave rectifier. Indicate the wave forms of input and output voltage.

24. With the help of necessary circuit diagram explain the working of a photo diode used for detecting optical signals.

25. Show that the force on each plate of a parallel plate capacitor has a magnitude equal to $(1/2)$ QE, where Q is the charge on the capacitor, and E is the magnitude of electric field between the plates. Explain the origin of the factor $1/2$.

26. Distinguish between .sky waves. and .space waves. modes of propagation in communication system. Why is sky wave mode propagation restricted to frequencies upto 40 MHz?

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28. Define half-life of a radioactive substance. Derive the expression for half life of a radioactive substance.

29. A small compass needle of magnetic moment .m. is free to turn about an axis perpendicular to the direction of uniform magnetic field .B.. The moment of inertia of the needle about the axis is .I.. The needle is slightly disturbed from its stable position and then released. Prove that it executes simple harmonic motion. Hence deduce the expression for its time period.

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30. A compass needle, free to turn in a vertical plane orients itself with its axis vertical at a certain place on the earth. Find out the values of horizontal component of earth.s magnetic field and

31. A compass needle, free to turn in a vertical plane orients itself with its axis vertical at a certain place on the earth. Find out the values of angle of dip at the place.

32. What is drift velocity of free electrons ? Deduce $I = nAeV_d$ where the symbols have their usual meaning.

33. A charged particle enters a region of uniform magnetic field with its initial velocity directed: parallel to the field. Show that there

is no change in the kinetic energy of the particle in both the cases.

34. A charged particle enters a region of uniform magnetic field with its initial velocity directed: perpendicular to the field. Show that there is no change in he kinetic energy of the particle in both the cases.

35. The spectrum of a star in the visible and the ultraviolet region was observed and the wavelength of some of the line that could be indentified were found to be: $824\overset{\circ}{A}$, $970\overset{\circ}{A}$, $1120\overset{\circ}{A}$, $2504\overset{\circ}{A}$, $5173\overset{\circ}{A}$, $1600\overset{\circ}{A}$. Which of these lines cannot belong to hydrogen atom spectrum? (Give Rydberg constant $R = 1.3 \times 10^7 m$ and $\dfrac{1}{R} = 970\overset{\circ}{A}$. Support your answer with suitable calculations).

36. Calculate the resonant frequency and Q-factor of a series L-C-R circuit containing a pure inductor of inductance 3H, capacitor of capacitance $27\mu F$ and resistor of resistance 7.4Ω

37. In a Young.s slit experiment, the slits are separated by 0.24 mm and the screen is kept 160 cm from the slits. If the fringe width is

measured to be 0.4 cm, calculate the wavelength of light used experiment. What would be the new value of the .fringe width., if for the same set up or the same wavelength light, the screen is moved, .inwards., i.e., towards the slits by 40 cm?