

VAIBHAV

ANDHRA EDUCATION SOCIETY SCHOOLS
NEW DELHI
SUMMATIVE ASSESSMENT-I (2015-16)
CLASS - XII
SUBJECT - PHYSICS

Time : 3:00 Hrs.

Max Marks : 80

General Instructions :

1 to 5Q carry 1 Mark each, 6 to 10Q carry 2 Marks each, 11 to 22 Q carry 3 Marks each, 23 Q carry 4 Marks, and 24 to 26 Q carry 5 Marks each.

1. The emf of a cell is always greater than its terminal voltage. Why?
2. Draw V-I graph for ohmic and non-ohmic materials.
3. Calculate the frequency of a photon with energy 7.5 eV. h
4. Two nuclei have mass numbers in the ratio 1:8. What is the ratio of the ratio of their nuclear radii?
5. Give an example each of a system that uses the sky wave and space wave mode of propagation.
6. Explain how electron mobility changes for a good conductor when (a) the temperature of the conductor is decreased at constant potential difference (b) applied potential difference is double at constant temperature?
7. Find the wavelength of electromagnetic waves of frequency 6×10^{12} Hz in free space. Give its two applications. $10pp.$
8. Find the ratio of the de Broglie wavelengths associated with (a) protons, accelerated through a potential of 128 V and (b) a particles accelerated through a potential of 64 V.
9. The electron in hydrogen atom is initially in the third excited state. What is the maximum number of spectral lines which can be emitted when it finally move to the ground state?
10. Define stopping potential and threshold frequency.

$$E = \frac{hc}{\lambda}$$

$$\frac{1}{\lambda} = \frac{1}{\lambda_0} - 1$$

$$\frac{1}{mv^2} = \frac{1}{K}$$
$$\frac{1}{1.6} = \frac{1}{1824}$$

$$v = \frac{hc}{\lambda}$$
$$\frac{1}{\lambda} = \frac{1}{\lambda_0} - 1$$
$$\frac{1}{\lambda} = \frac{1}{1824} - 1$$
$$\frac{1}{\lambda} = \frac{1 - 1824}{1824}$$
$$\frac{1}{\lambda} = \frac{-1823}{1824}$$
$$\lambda = \frac{1824}{-1823}$$

3012 38

24. A) obtain the expression for capacitance of parallel plate capacitor.
 b) Derive an expression for the energy stored in a parallel plate capacitor.
 c) On charging a parallel plate capacitor to a potential V , the spacing between the plates is halved and a dielectric medium of $\epsilon_r = 10$ is introduced between the plates, without disconnecting the d.c source. Explain, how the (i) capacitance, (ii) electric field and (iii) energy density of the capacitor change.

1.5+2+1.5 M.

OR

- a) Explain and derive an expression for electric potential for a dipole.
 b) A parallel plate capacitor is charged to a potential difference V by a d.c source. The capacitor is then disconnected from the source. If the distance between the plates is doubled, state with reason how the following change (i) electric field between the plates (ii) capacitance (iii) energy stored in the capacitor.

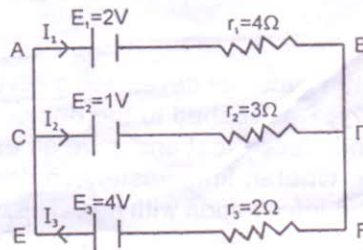
3 + 2 M

25. Explain the principle and working of Meter Bridge with diagram.

In a metre bridge, the null point is found at a distance of 60 cm from A. if now a resistance of 5 ohm is connected in series with S, the null point occurs at 50 cm. determine the values of R and S.

OR

- A) State Kirchhoff's laws.
 b) Calculate the current I_1, I_2, I_3 from from the given figure.



26. Derive lens maker formula with assumptions and sign convention.

OR

Define wave front, Explain Huygen's principles, Derive an expression for fringe width for Young's double slit experiment.

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$u \cdot v = v \cdot f$$

$$v = u \cdot (f - 1)$$

down the expression for oscillating magnetic field.

17. Distinguish between interference and diffraction.

18. A tank is filled with water to a height of 12.4 cm. The apparent depth of a needle lying at the bottom of the tank is measured by a microscope to be 9.3 cm. What is the refractive index of water? If water is replaced by a liquid of refractive index 1.6 up to the same height, by what distance would the microscope have to be moved to focus on the needle again?

19. What is the effect on the interference pattern observed in a Young's double slit experiment when:

- Screen is moved away from the plane of the slits
- Separation between the slits is increased,
- Width of the slits are doubled
- Source is replaced by white light.
- Wavelength is decreased.
- Source of light is moved away from the slits.

20. Explain how photo electric current is affected with potential.

21. Draw the plot of binding energy per nucleon (BE/A) as a function of mass number A . Write two important conclusions that can be drawn regarding the nature of nuclear force. Explain the release of energy in nuclear fusion and fission.

22. A) Define transducer and repeater. 1M
b) From fig 4 draw the waveforms for the (i) input AM wave at A (ii) output, B, of the rectifier and (iii) output signal, C, of the envelope detector.

23. One day Chetan's mother developed a severe stomach ache all of a sudden. She was rushed to the doctor who suggested for an immediate endoscopy test and gave an estimate of expenditure for the same. Chetan immediately contacted his class teacher and shared the information with her. The class teacher arranged for the money and rushed to the hospital. On realising that Chetan belonged to a below average income group family, even the doctor offered concession for the test fee.

The test was conducted successfully.

- Which principle is made use of in endoscopy?
- Explain the values reflected in the action taken by the teacher.
- In what way do you appreciate the response of the doctor on the given situation?

$$v + u = \frac{v \sin \theta}{\sin \phi}$$
$$v(1 - \frac{v}{c}) = \frac{v}{1 - \frac{v}{c}}$$
$$v = \frac{v}{1 - \frac{v}{c}}$$

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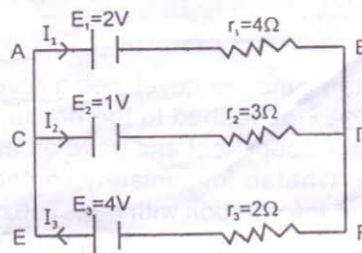
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$$\frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$

$$\text{at } v = \infty \quad v = u(b-1)$$