

HOT QUESTIONS

MEANT TO ENHANCE THINKING SKILLS

THINKING SKILLS ARE

1. Focusing skills

clarifying discrepancies
establishing direction

2. Information gathering skills

relevant data needed for cognitive processing.
observing
seeing new information through enquiry

3. Remembering skills

storing information
retrieving information

4. Organising skills

comparing i.e. similarities & dissimilarities
grouping & labelling on the basis of their attributes
sequencing entities according to a given criterion

5. Analysing skills

identifying attributes & components
identifying relationship and patterns.

6. Generating skills

inferring
predicting
elaborating (explaining by adding details)

7. Integrating skills

combining information efficiently into a cohesive
idea
changing existing knowledge structures to
incorporate new information

8. Evaluating skills

setting standards for making judgement
confirming the accuracy

SOME HOT QUESTIONS

1. An electron is revolving around a long line charge having charge density λ . Find an expression for KE of an electron assuming that it is independent of the radius of an electron orbit.
2. In the figure given below X, Y represent parallel plate capacitors having the same area of plates and the same distance of separation between them. What is the relation between the energies stored in the two capacitors?
3. Two heated wires of same dimensions are first connected in series and then in parallel to the same source. What will be the ratio of heat produced?
4. A i) series ii) parallel combinations of two given resistors is connected one by one, across a cell. In which case will the terminal potential difference, across the cell, have a higher value?
5. The graph shows the variation of charge Q , with voltage V , for two capacitors K and L. In which capacitor is more electrostatic energy stored?

6. Two wires which connect the battery of an automobile to its starting motor carry a current of (300 A) what is the Force per unit length between the wires if they are 70 cm long and 1.5cm apart?
7. A long wire first bent into a circular coil of one turn and then into a circular coil of smaller radius having 'n' turns. If the same current passes in both cases, find the ratio of magnetic fields produced at the centre in the two cases?
8. If a toroid uses bismuth for its core will the magnetic field in the core be more or less than when the core is empty?
9. Why do we say that at places like Delhi and Mumbai, a magnetic needle shows the true North direction quite accurately as compared to other places in India?
10. For a series LCR circuit, connected to a sinusoidal ac voltage source, identify the graph that corresponds to $\omega > 1/ LC$. Give reason.
11. What is the impedance & power factor of a pure LC circuit for which the applied alternating voltage has a frequency,

12. Show that SI unit of coefficient of self inductance can be expressed equally as

- i) Weber (ampere)⁻¹
- ii) Ohm second
- iii) Joule – (ampere)⁻²

13. An ac voltage $V = V_m \sin \omega t$ is applied across a series RC circuit in which capacitive reactance is 'a' times the resistance in the circuit. Prove that power factor is independent of resistance.

14. Which of the following can act as a source of em wave?

- i) a charge moving with constant velocity
- ii) a charge moving in a circular orbit

15. A thin symmetric double convex lens of power P is cut into 3 parts. What will be the power of A & B?

16. Two coherent waves of equal amplitude produce interference pattern in Young's Double Slit Experiment. What is the ratio of intensity at a point where phase difference is $\pi/2$ to intensity at centre.

17. How will the visibility of fringes in Young Double Slit experiment change when i) screen is moved away from the plane of slits and ii) width of source slit is increased?

18. Draw a plot showing the variation of power of a lens with the wavelength of the incident light.
19. Explain why must both the objective and eyepiece of a compound microscope have short focal length?
Explain while viewing through a compound microscope, why should our eyes be positioned not on the eyepiece but a short distance away from it for best viewing?
20. An electron, alpha particle and proton have same K.E. which has i) shortest λ ii) largest λ
21. A graph between λ and $1/\nu$ is given for two particles of same charge. Which has heavier mass?
22. An electromagnetic wave of wavelength λ is incident on a photosensitive surface of negligible work function. If the photo electrons emitted from this surface have the de-Broglie wavelength λ_1
- Prove that $\lambda = \left(\frac{2mc}{h} \right) \lambda_1^2$
23. How do you estimate the size of nucleus from Geiger Marsden experiment?

24. Assuming the nuclei to be spherical in shape, how does the surface area of nucleus of mass number A_1 , compare with that of nucleus of mass A_2 ?
25. Zener diode have higher dopant densities as compared to ordinary pn diode. How does it affect i) width of depletion layer? ii) junction field?
26. Why is an 'n' type semi conductor, electrically neutral, though it has an excess concentration of negative charge carriers?
27. Visible light photons are known to have energies from 1.8 eV to 2.8 eV. Use this information to reason out why silicon is not a suitable semi conductor for designing visible light LEDs?
28. Why is it that it is usually enough to determine only one input characteristics of a semi conductor transistor?
29. The small signal current gain is (β_{ac}), of a transistor, can be taken as nearly equal to its dc current amplification factor, β_{dc} . Why?
30. Why do we need carrier wave of high frequency in the modulation of signals?
31. Draw a plot of the variation of amplitude verses (ω) for an amplitude modulated wave.

