

MODEL QUESTION PAPER

Subject code: 2110007

Subject Name: PHYSICS

Remembrance based sample questions	
Question no	Question description
A1	Recall the SI unit of surface tension. a) N/m^2 b) Nm c) N/m d) Joule
A2	In a silica crystal, by dopinggroup of impurity atoms an N type semiconductor is realized. a) First b) Second c) Third d) Fifth
A3	Impulse of force is represented as: a) $\text{M}^1\text{L}^{-1}\text{T}^{-1}$ b) $\text{M}^1\text{L}^1\text{T}^{-1}$ c) $\text{M}^1\text{L}^{-1}\text{T}^{-2}$ d) $\text{M}^1\text{L}^{-3}\text{T}^{-1}$
A4	Discover the relational-equivalent of 10^3 V/m against the options given below: a) 10^3 N/C b) 10^{-3} N/C c) 10^5 N/C d) 10^{-5} N/C
A5	The rate of change of momentum is called: a) Displacement b) Acceleration c) Force d) impulse

A6	<p>Tiny insects are able to walk and float on the surface of water due to</p> <p>a) Buoyancy b) surface tension c) buoyancy and surface tension d) neither buoyancy nor surface tension</p>
A7	<p>Kirchhoff's second law is based on the law of conservation of.....</p> <p>a) Charge b) energy c) momentum d) mass</p>
A8	<p>The energy stored in an inductor is in the form of :</p> <p>a) Electrostatic Field b) Electromagnetic Field c) Core d) Magnetic field</p>
A9	<p>The resistance associated with an ideal Ammeter is :</p> <p>a) Infinite b) Zero c) high d) low</p>
A10	<p>Which of the below mentioned units express magnetic induction.</p> <p>a) Wb/m^2 b) A/m^2 c) T/m^2 d) J/m^2</p>

Understanding based sample questions	
Question no.	Question description
B1	In acoustics, what do you understand by the term sound absorption co-efficient? Starting from basic principle of sound wave propagation, can you arrive at the expression to determine the absorption co-efficient of a bare wall when replaced with a sound absorbing material?
B2	In a factory producing steel bars, ultrasonic equipment is utilized to detect possible defects. The test engineer uses eco method to discover the defects. This method, consist of shooting ultrasonic pulses on the specimen (steel – bar) to discover the defects. The thickness of the specimen (steel bar) is 40 cm. The setup of measurement is such that the pulse is injected from top end of the specimen and travels down and returns back. The arrival times are 30 μs and 80 μs respectively. Find the physical distance (depth) of the defect in the specimen (steel bar) from the top-end of the bar.
B3	What do you understand by reflective index, profile the sketch of step index & graded index fibers? Also give one example of each fiber in real world application.
B4	Expand the acronym LASER and explain its physics. How does LASER differ from an ordinary source of light? (use Sketch if necessary)
B5	What do you understand by a superconductor? Distinguish between type-I and type-II superconductor, give examples of each.
B6	<p>Calculate the critical current of LEAD wire as per data given below:</p> <ol style="list-style-type: none"> 1. Diameter of wire 1 mm at 4.2 K. 2. Critical temperature of LEAD is 7.18 K. 3. Critical magnetic field at 0 K. is $6.5 \times 10^4 \text{ A/m}$.
B7	Derive an expression for Claussius – Mosotti relation, and explain the assumptions involved.

B8	Explain the concept of Nd:YAG Laser. Draw a neat diagram showcasing its construction and describe it's working, along with energy level diagram.
B9	What do you understand by hard and soft ferromagnetic materials? Spot the key differences between the two, also cite application examples.
B10	Explain in detail the concept of recording and reading an audio tape. Draw suitable diagrams.

Application sample questions	
<i>Question no.</i>	<i>Question description</i>
C1	Conceptualize three engineering applications of ultrasonic waves. Draw appropriate diagrams depicting the application setup.
C2	An optical fiber has a numerical aperture of 0.20 and a cladding refractive index of 1.59. Find the acceptance angle for the fiber in water having a refractive index of 1.33. Further if numeric aperture varies by 10% & 15% what affects is expected in the acceptance angle. Share your opinion as a physicist.
C3	Discuss the phenomena of cooper pair formation and the concept of SQUID along with applications.
C4	What do you understand by dielectrics, and what is the relationship between permittivity and permeability of a dielectric material? Outline the design of a three layer electrolytic capacitor.
C5	What is a ferrite? Mention three properties of ferrite material that you have known and list some useful applications of Ferrites.
C6	<ol style="list-style-type: none"> 1. Mention at least two industrial process applications of metallic glasses. 2. Describe at least two applications of Shape Memory Alloys.
C7	What is sol-gel technique and why is it important to nano materials. Can you describe the process steps involved in preparing a specific nano-material you know using sol-gel technique? Use diagram or flow-chart as applicable.
C8	Describe applications of carbon nanotubes in electronics, material design and medicine.

-Best of Luck-