SHRI S.H.KELKAR COLLEGE OF ARTS, COMMERCE & SCIENCE, DEVGAD

FIRST TERM END EXAMINATION 2023

USPH 303

MAX.MARKS: 75   **DURATION: 2 HOURS.**

N.B: 1) All questions are compulsory.

2).Figure to the right indicates maximum marks.

3). Use non-programmable calculators are permitted.

4). Symbols used have their usual meanings.

Q.1. A) Attempt any one.   **(08)**

1) Explain the factors affecting the acoustic quality of building.

2) Write Industrial and Medical Application of of LASER.

Q.1.B) Attempt any one.   **(08)**

1) With the help of neat diagram explain how the communication system is based on optical fibers?

2) What is the numerical aperture (NA) of an optical fiber .Derive necessary expression for numerical aperture (NA)?

Q.1 C) Attempt any one.   **(04)**

1) Define Reverberation?

2) The laser beam is targeted on the moon a laser of wavelength 7200 A° and aperture 0.045m is used for it. If the moon is at a distance of about 4×10^5 KM from the earth, find. A) The angular spread of the beam. B) The axial spread when the laser reaches the surface of the moon.

Q.2. A) Attempt any one   **(8)**

1) Explain FCC structure? Derive atomic packing factor for FCC.

2) Explain hcp structure? Derive atomic packing factor for hcp.

Q.2 B) Attempt any one   **(8)**

1) What are miller indices? How are they determined?

2) Explain the term symmetry elements and Bravasis lattices.

Q.2 C) Attempt any one (4)

1) Draw the planes (111) (110) for simple cubic structure.

2) Define Unit cell and primitive cell.

Q.3.A) Attempt any one (8)

1). Explain any one method to obtain nanoparticales.State the merits of the process.

2) What is mean by Hysteresis? Explain the Magnetic Hysteresis in the material.

B) Attempt any one (8)

1) Explain the terms 1) Magnetic dipoles 2) Permeability of materials 3) Susceptibility 4) Domain.

2) Differentiate between soft and hard magnetic materials.

C) Attempt any one (4)

1) Explain how electrical conductivity of metals and semiconductors varies with temperature.

2) Cu has FCC structure and atomic radius is 1.278 A°. Calculate inter planer spacing for (111) and (321).

Q.4. Attempt any Three. (15)

1) What are the Factors affecting acoustics of building.

2) What do you mean by total internal reflection (TIR)?

3) Write note on Miller indices.

4) Explain Metal, Insulator and Semiconductor on the basis of energy band diagram.

5) Write note on piezoelectric materials.

6) Explain Diamagnetic materials with examples.