

- (b) A certain orthorhombic crystal has a ratio of a: b: c of 0.428:1:0.376.
Find Miller indices of the faces with intercepts 0.214:1 0.188.

Q5.

(4,4)

- (a) Discuss the construction and working of a ruby laser.
(b) Give a qualitative idea of formation and reconstruction of hologram.

PART B

Q6.

- (a) What are different kinds of optical fibers. Discuss various kinds of dispersions observed when light propagates through an optical fiber (5,3)
(b) Give three applications of optical fibres.

Q7.

- (a) Show that Heisenberg's uncertainty principle is a natural consequence wave nature associated with moving material particles. (4,4)
(b) Obtain time independent Schrodinger's equation. Argue qualitatively that energy quantization is embedded in this equation.

Q8.

- (a) Derive the expression for length contraction. (5,3)
(b) The mean life of a muon, when it is at rest, is $2.2\mu\text{s}$. Calculate the average distance it will travel in vacuum before it decays, if it has velocity of $0.9c$.

Q9.

- (a) Discuss various techniques for synthesis of nanomaterials. (5,3)
(b) Write a short note on carbon nanotubes.

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