

19/10/19

VCD S.Y.B.Sc SEM-III ATKT PHYSICS-III 2019-20 100 MARKS 3 HRS

Note: (1) All questions are compulsory.

(2) Figures to the right indicate maximum marks.

(3) Use of non-programmable calculators is permitted.

(4) Symbols used have their usual meaning.

Q.1. (A) Choose correct alternative in each of the following: (12)

(i) The unit of absorption coefficient of sound is

- a) phon b) sone c) sabine d) watt/m^2

(ii) The reverberation time is

- a) Directly proportional to surface area and its absorption coefficient.
b) Directly proportional to volume of the hall and inversely proportional to surface area.
c) Inversely proportional to volume of the hall and directly proportional to surface area.
d) Inversely proportional to volume and surface area and directly proportional to absorption coefficient.

(iii) He-Ne laser is a

- a) Three level laser b) four level laser c) two level laser d) five level laser

(iv) Example of crystal with perfect covalent bonding is

- a) Diamond b) methane c) NaCl d) sugar

(v) AMOLED stands for

- a) Amplitude modulated original light emitting diode
b) Active multimode organic light emitting diode
c) Active matrix original light emitting diode
d) Active matrix organic light emitting diode

(vi) Liquid crystal display is actually a combination of two states of matter

- a) Solid-solid b) solid-liquid c) liquid-liquid d) none of these

Q.1. (B) Answer in one statement: (03)

- (i) State Sabine's formula
(ii) Define viscosity.
(iii) What are LEDs?

Q.1. (C) Fill in the blanks: (05)

- (i) Through holography we can produce _____ dimensional images of objects.
- (ii) The refractive index of core of an optical fibre is _____ than cladding material.
- (iii) Diffusion rate is inversely proportional to _____.
- (iv) Magnetic hysteresis is a property which affects _____ materials.
- (v) The magnetic moment of any electron is always _____ than Bohr magneton.

Q.2. (A) Attempt any one: (08)

- (i) What is meant by reverberation and reverberation time? explain the causes to form reverberation in a hall. How it can be minimised?
- (ii) Describe the construction and working of a He-Ne laser. draw energy level diagram.

Q.2. (B) Attempt any one: (08)

- (i) What is numerical aperture (NA) of an optical fiber? Derive necessary expression for NA.
- (ii) Define absorption coefficient of a material and hence determine the relation between reverberation time of a hall and absorption coefficient.

Q.2. (C) Attempt any one: (04)

- (i) The capacity of a hall is 3398.4 m^3 and its total absorption equals 92.90 m^2 of open window. Entry of people inside the hall raises the absorption by 185.80 m^2 . What is the change in reverberation time?
- (ii) The laser beam is targeted on the moon. A laser of wavelength 7200 \AA and aperture 0.045 m is used for it. If the moon is at a distance of about $4 \times 10^5 \text{ Km}$ from the earth, find a) the angular spread of the beam and b) the axial spread when the laser reaches the surface of the moon. Neglect the earth's atmospheric effect.

Q.3. (A) Attempt any one: (08)

- (i) What are biological fluids? Enlist them. Give physical-chemical properties of any one.
- (ii) What is action potential? State different types of action potential.

Q.3. (B) Attempt any one: (08)

- (i) State and explain Nernst equation.
- (ii) State and explain Fick's law of diffusion.

Q.3. (C) Attempt any one: (04)

- (i) Explain diffusion across biological cell membrane.
- (ii) Give biological importance of surface tension.

Q.4. (A) Attempt any one: (08)

- (i) How the materials are classified as per their structures? Explain each type.
- (ii) What is meant by OLED? Explain construction and working of typical OLED panel.

Q.4. (B) Attempt any one: (08)

- (i) How the materials are classified according to their magnetic properties? Explain.
- (ii) Explain the phenomena of refraction, reflection, absorption and transmission taking place when light is made incident on matter.

Q.4. (C) Attempt any one: (04)

- (i) Write a note on pyroelectric materials.
- (ii) Explain polymers and composite materials.

Q.5. Attempt any four: (20)

- (i) State the factors affecting the acoustics of building.
- (ii) Give brief account of application of laser.
- (iii) Explain in brief Hodgkin-Huxley model of action potential.
- (iv) Write a note on membrane channels.
- (v) Write a note on thin films.
- (vi) Differentiate between soft and hard magnetic materials.