

# Engineering physics (2015)

(vii) Photons of frequency  $f$  are incident on a metal surface with threshold frequency  $f_0$ . The maximum kinetic energy of emitted photo electrons is

- (a)  $h(f - f_0)$  (b)  $hf$   
(c)  $hf_0$  (d)  $h(f + f_0)$

Ans.(a)

(viii) The splitting of a beam of white light into different colours is known as

- (a) refraction (b) reflection  
(c) interference (d) dispersion

Ans.(d)

(ix) What type of waves carry sound in air?

- (a) Transverse waves (b) Longitudinal waves  
(c) Electromagnetic waves  
(d) Transverse and longitudinal waves

Ans.(b)

(x) What happens when fast moving electrons strike a metallic target in an evacuated glass bulb?

- (a)  $\gamma$ -rays are produced (b) X-rays are produced  
(c)  $\beta$ -particles are produced (d) Reflected back

Ans.(b)

Q.2(a) Define stress, strain and elastic limit. Also state Hooke's law.

Ans. Refers to Chapter 5.1 Q.no. 2

Q.2(b) Define the terms - Viscosity, velocity gradient and co-efficient of viscosity. What is Reynold's number?

Ans. Refers to Chapter 5.3 Q.no. 1, 2 & 3

Q.3(a) Define surface tension and write its S.I. unit. What is angle of contact?

Ans. Refers to Chapter 5.2 Q.no. 3 & 4

Q.3(b) State the principle of superposition of waves. Also explain the phenomenon of interference of light.

Ans.: Out of Syllabus

OR

Q.3(a) Explain capillary action with examples. What is the shape of meniscus for water and mercury in a capillary tube? Also write a relation between surface tension, capillary rise and radius of capillary tube.

Ans. Refers to Chapter 5.2 Q.no. 5

Q.3(b) What do you know about reflection and refraction of light? State Snell's law.

Ans. Out of Syllabus

Q.4(a) Define wave motion, frequency and wavelength of a wave. Also establish a relation between wave velocity, frequency and wavelength.

Q.1 Choose the correct answer in the following question:

(i) The maximum value of stress for which Hooke's law holds good is called

- (a) elasticity (b) strain  
(c) elastic limit (d) young's modulus

Ans. (c)

(ii) A liquid does not wet a solid surface if the angle of contact for the given pair of liquid and solid surfaces is

- (a)  $0^\circ$  (b)  $90^\circ$  (c)  $60^\circ$  (d)  $120^\circ$

Ans.(d)

(iii) For a liquid of density  $\rho$  and co-efficient of viscosity  $\eta$ , flowing through a pipe of diameter  $d$ , Reynold's number is given by

- (a)  $\frac{\rho V_c d}{\eta}$  (b)  $\frac{\rho \eta d}{V_c}$   
(c)  $\frac{\rho V_c \eta}{d}$  (d)  $\frac{\rho V_c d}{\rho}$

Ans.(a)

(iv) Ratio among the co-efficients of linear expansion ( $\alpha$ ), superficial expansion ( $\beta$ ) and cubical expansion ( $\gamma$ ) is:

- (a) 3 : 2 : 1 (b) 1 : 2 : 3  
(c) 4 : 3 : 2 (d) all of the above

Ans.(b)

(v) Which of the following is a unit of specific heat?

- (a)  $\text{J kg}^\circ\text{C}^{-1}$  (b)  $\text{J/kg}^\circ\text{C}$   
(c)  $\text{kg}^\circ\text{C/J}$  (d)  $\text{J/kg}^\circ\text{C}^{-2}$

Ans.(b)

**Q.4(b) What is photo electric effect and what are its characteristics ?**

Ans. Out of Syllabus

**OR**

**Q.4(a) Describe the construction and working of a photoelectric cell in brief.**

Ans. Out of Syllabus.

**Q.4(b) What are longitudinal waves, transverse waves and stationary wave ? Also define node and antinode.**

Ans. Refers to Chapter 7.1 Q.no. 3

**Q.5 What are significant figures ? Write the rules to identify significant figures in a given measurement.**

Ans. Refers to Chapter 1 Q.no. 10

**Q.6 Define the co-efficients of linear expansion ( $\alpha$ ), superficial expansion ( $\beta$ ) and cubical expansion ( $\gamma$ ).**

Ans. Refers to Chapter 6 Q.no. 5

**OR**

**Q. The length of a copper rod at  $0^\circ\text{C}$  is 90cm. When it is heated to  $100^\circ\text{C}$ , its length increases by 0.14cm. Find the co-efficients of linear expansion ( $\alpha$ ) and superficial expansion ( $\beta$ ) of copper.**

Ans. Refers to Chapter 6 (Solved Example- 1)

**Q.7 Define the specific heat capacities of a gas at constant volume ( $C_v$ ) and at constant pressure ( $C_p$ ).**

Ans.: Out of Syllabus

**Q.8 What are X-rays ? Write four properties of X-rays.**

Ans. Out of Syllabus

**OR**

**Q. Find the minimum wavelength of X-rays produced by an X-rays tube operated at 20KV.**

Ans. Out of Syllabus

**Q9. Describe the construction and working of He-Ne Laser.**

Ans. Out of Syllabus

**OR**

**Q. Write the full form of Laser. Also explain population inversion and optical pumping.**

Ans. Out of Syllabus