

**C.U.SHAH UNIVERSITY**

WADHWAN CITY

University (Winter) Examination -2013

Course Name : B.Sc Sem-I

Subject Name: - Physics-I

Duration :- 3:00 Hours

Date : 6/12/2013

**Instructions:-**

- (1) Attempt all Questions of both sections in same answer book / Supplementary.
- (2) Use of Programmable calculator & any other electronic instrument is prohibited.
- (3) Instructions written on main answer Book are strictly to be obeyed.
- (4) Draw neat diagrams & figures (If necessary) at right places.
- (5) Assume suitable & Perfect data if needed.

**SECTION-I**

- Q-1 Do as Directed.(All Questions are compulsory) (07)
- a) Write Kepler's first law of planetary motion. (01)
  - b) What is Piezoelectric effect? (01)
  - c) What is meant by the Specific heat of Substance? (01)
  - d) Write the Newton's third law of motion. (01)
  - e) What is the frequency range of Ultrasonic waves? (01)
  - f) State Newton's laws of universal gravitation. (01)
  - g) Define conservative force. (01)
- Q-2 Answer the following in detail.
- a) What is a linear restoring force? Derive an expression for the potential energy of a spring. (05)
  - b) State and prove the Work Energy Theorem. (05)
  - c) Ultrasonic waves of 60 kHz are used for depth measurement of a sea spot. It returns after 0.65 sec. the velocity of this wave in sea water is 1800m/s. calculates the depth of sea and wavelength of the wave. (04)

**OR**

- Q-2 Answer the following in detail.
- a) State and Explain the law of conservation of linear momentum. (05)
  - b) What is Escape velocity? Derive its formula. (05)
  - c) Give application of Ultrasonic waves. (04)
- Q-3 Answer the following in detail.
- a) Explain production of ultrasonic waves by magnetostriction oscillator with its principle, construction, circuit diagram, working, merits & demerits. (07)
  - b) What is collision? What are elastic and inelastic collision? Obtain expression for the final velocity of bodies undergoing elastic collision. (07)

**OR**

- Q-3 Answer the following in detail.
- a) (i) Write a short note on Disappearing filament optical pyrometer. (07)  
(ii) The resistance of a platinum wire of a PRT at the ice point is  $4\Omega$  and at the boiling point  $4.4\Omega$ . When this thermometer is inserted in a hot bath, the resistance of the platinum wire is found  $4.75\Omega$ . Calculate the temperature of the bath.
  - b) Gives the statement of Kepler's laws of planetary motion and prove it. (07)



## SECTION-II

- Q-4 Do as Directed.(All Questions are compulsory) (07)
- a) Define the term: Alternating Current. (01)
  - b) Give the Definition of Torque in a rotational motion. (01)
  - c) Give the statement of Thevenin's theorem. (01)
  - d) Give the name of different types of strain. (01)
  - e) Explain Bulk modulus. (01)
  - f) Define the term: Amplitude. (01)
  - g) Define Moment of Inertia. (01)

- Q-5 Answer the following in detail.
- a) Discuss the condition for resonance in a series L-C-R circuit. What is quality factor? (05)
  - b) What do you understand by root mean square value of current? Derive expression for it. (05)
  - c) If the young's Modulus of tin is  $2 \times 10^{12}$  dyne/cm<sup>2</sup>, what mass must be suspended at the end of a steel wire having 200cm length and 0.1 cm diameter to stretch it by 1mm. (04)

OR

- Q-5 Answer the following in detail.
- a) Explain in details maximum power transfer theorem. (05)
  - b) Derive an Expression for the moment of inertia of a circular ring. (05)  
A circular ring of diameter 40cm and mass 1kg is rotating about an axis normal to its plane and passing through the centre with a frequency of 600rpm. Calculate its angular velocity, moment of inertia and angular momentum.
  - c) (04)

- Q-6 Answer the following in detail.
- a) Define : Young's Modulus, Rigidity Modulus & Bulk Modulus, Poisson's ratio and derive the relation between Y,K and  $\sigma$  (07)
  - b) State and prove thevenin's theorem with necessary circuit diagram in detail (07)

OR

- Q-6 Answer the following in detail.
- a) Define Torque and angular momentum and prove that Torque is the rate of change of angular momentum. (07)  
(i) Prove the relations  $K=Y/3(1-2\sigma)$  and  $Y=9\eta k/3k+\eta$ . (04)
  - b) (ii)A generator having  $50\Omega$  internal resistance produce 100V.Find the power delivered to a load resistance of  $200\Omega$  (03)

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