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. (ii) The resistance of a platinum wire of a PRT at the ice point is 4Ω and at the boiling point 4.4Ω. When this thermometer is inserted in a hot bath, the resistance of the platinum wire is found 4.75Ω. Calculate the temperature of the bath.	(07)
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   (05)
      factor?
b)   What do you understand by root mean square value of current? Derive   (05)
      expression for it.
c)   If the young's Modulus of tin is 2×10^{12} dyne/cm^2 , what mass must be
      suspended at the end of a steel wire having 200cm length and 0.1 cm   (04)
      diameter to stretch it by 1mm.

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
c)   600rpm. Calculate its angular velocity, moment of inertia and angular   (04)
      momentum.

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 σ (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   (07)
      change of angular momentum.
      (i) Prove the relations K=Y/3(1-2σ) and Y=9ηk/3k+η.   (04)
b)   (ii)A generator having 50Ω internal resistance produce 100V.Find the power   (03)
      delivered to a load resistance of 200 Ω

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