

B.Sc. Semester - 1 (CBCS) Examination
Nov./Dec. -2018 (Old Course)
PHYSICS (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

- Que-1 (A) Answer any one question. (07)
 (1) What is scalar and vector? Explain scalar product of two vectors.
 (2) Derive an expression of growth and decay of charge in RC circuit.
- (B) Answer any one question. (04)
 (1) Write a note on batteries.
 (2) Explain the resolution of vectors.
- (C) Answer any three questions. (03)
 (1) Momentum is a _____ quantity.
 (2) What will be the magnitude of $3\hat{i} + \hat{j}$?
 (3) An ideal voltage source must have _____ internal impedance.
 (4) The rechargeable cells are _____ type cells.
 (5) The dot product of two mutually perpendicular vectors is _____.
- Que-2 (A) Answer any one question. (07)
 (1) Explain zener diode, its breakdown mechanism and V-I characteristics.
 (2) Explain the formation of PN-junction with forward bias and reverse bias.
- (B) Answer any one question. (04)
 (1) Explain energy bands in crystal.
 (2) Write a note on P-type semiconductor.
- (C) Answer any three questions. (03)
 (1) A semiconductor has _____ temperature coefficient of resistance.
 (2) The forward voltage drop across a germanium diode is about _____.
 (3) A zener diode is used in voltage regulator circuit. Is it true?
 (4) The semiconductor has generally _____ valance electrons.
 (5) The ideal diode behaves as perfect insulator in _____ bias condition.
- Que-3 (A) Answer any one question. (07)
 (1) What is elastic collision? Discuss one dimensional elastic collision and derive an expression for the final velocity of two colliding goodies.
 (2) Explain conservation of Energy and conservation of Linear momentum.
- (B) Answer any one question. (04)
 (1) State and prove work energy theorem.
 (2) Explain conservative force with appropriate example.
- (C) Answer any three questions. (03)
 (1) As per work – energy theorem, the work done by a force is equal to _____.
 (2) 1 Horsepower = _____ watt.
 (3) Write the type of the frame of reference.
 (4) In an elastic collision, only kinetic energy is conserved. Is it true?
 (5) Write an equation of the Gravitational potential energy.
- Que-4 (A) Answer any one question. (07)
 (1) State and prove two theorems of moment of inertia.
 (2) Explain gravitational field, gravitational potential and derive relation between gravitational potential and field strength.
- (B) Answer any one question. (04)
 (1) State and prove Kepler's first law of planetary motion.
 (2) What is the escape velocity? Derive an expression for escape velocity.

- (C) Answer any three questions. (03)
- (1) What is the unit of angular velocity?
 - (2) The torque is maximum when the force is applied at _____ to the position vector.
 - (3) What is the unit of gravitational potential?
 - (4) Write an equation of Kepler's third law of planetary motion.
 - (5) Write the value of escape velocity on the surface of earth.
- Que-5 (A) Answer any one question. (07)
- (1) State Hooke's law and explain three types of modulus of elasticity.
 - (2) Explain simple harmonic motion and derive equation of displacement for simple harmonic motion.
- (B) Answer any one question. (04)
- (1) Write a note Poisson's ratio.
 - (2) Explain damped oscillations.
- (C) Answer any three questions. (03)
- (1) Longitudinal strain = _____.
 - (2) The practical value of Poisson's ratio lies between _____ and _____.
 - (3) Write an equation of angular frequency.
 - (4) Write an equation of damping force.
 - (5) Write the CGS unit of modulus.
