

B.Sc. Semester - 1 (CBCS) Examination

Nov/Dec - 2022 (NEW COURSE)

PHYSICS(CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

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

Q.1(a) Answer the following question (any two). (10)

- (1) Discuss vector product of two vectors.
- (2) Explain scalar triple product.
- (3) Write a note on time dilation.

Q.1(b) Answer the following question (any one). (04)

- (1) Discuss differential calculus as rate measure.
- (2) Explain Einstein's postulates of the special theory of relativity.

Q.2(a) Answer the following question (any two). (10)

- (1) Write a note on energy bands in solids.
- (2) Explain P-type semiconductor.
- (3) Write a note forward biased PN junction.

Q.2(b) Answer the following question (any one). (04)

- (1) Write a note on reverse characteristic of PN-junction diode.
- (2) Explain zener diode with characteristic.

Q.3(a) Answer the following question (any two). (10)

- (1) Explain work energy theorem.
- (2) Explain linear momentum and its conservation principle.
- (3) Derive relation between torque, moment of inertia and angular acceleration.

Q.3(b) Answer the following question (any one). (04)

- (1) Obtain an expression for C. M. of two particle system.
- (2) Calculate the horse power needed to pumping 5000 kg water per minute from a well 50 meter deep to the surface.

Q.4(a) Answer the following question (any two). (10)

- (1) Derive an expression for the gravitational potential and field when a point inside the sphere.
- (2) Obtain an expression for velocity and time period of satellite.
- (3) Write a note on GPS.

Q.4(b) Answer the following question (any one). (04)

- (1) State and prove Kepler's second law of planetary motion.
- (2) Write a note on state of weighlessness.

Q.5(a) Answer the following question (any two). (10)

- (1) Explain various types of stresses.
- (2) Explain the Searl's method for of determining Young's modulus of a long wire.
- (3) Write a note on damped oscillations.

Q.5(b) Answer the following question (any one). (04)

- (1) Explain relation between longitudinal stress and strain.
- (2) Explain simple harmonic motion with the help of block-spring system.
