



DB-003-001102

Seat No. _____

B. Sc. (Sem. I) Examination

March - 2022

Physics - 101

(Mechanics, Semiconductor Electronics)

(Old Course)

Faculty Code : 003

Subject Code : 001102

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :**
- (1) Symbols have their usual meanings.
 - (2) Figures to the right indicates marks.
 - (3) Non-programmable scientific calculator is allowed.
 - (4) Attempt all questions.

1 Answer the following in short : 20

- (1) Define conservative force.
- (2) State inelastic collision?
- (3) Give the statement of Parallel Axis
- (4) Write the eqn for the moment of inertia of a circular ring.
- (5) State the any one Kepler's Law of Planetary motion.
- (6) Write the eqn for intensity of the gravitational field at the centre of spherical shell?
- (7) State Hooke's law.
- (8) Define the escape velocity of earth.
- (9) Write the units of Bulk modulus, in SI.
- (10) What is Poisson's ratio.
- (11) Define time constant of an L-R circuit while charging.
- (12) Define frequency of an alternating quantity
- (13) Write frequency of an alternating current quantity.

- (14) What is Q-factor?
- (15) What is phase velocity?
- (16) Write the statement for maximum power transfer theorem
- (17) In a purely inductive circuit, define the relation of phase between current & voltage.
- (18) How you will convert Galvanometer into Voltmeter?
- (19) Write the eqn for De-Broglie wave length.
- (20) What is quantum numbers?

- 2** (A) Answer the following (any **three**) **6**
- (1) Explain the law of conservation of Energy.
 - (2) What is state of weightlessness?
 - (3) Explain modulus of rigidity
 - (4) Write about in short: Radius of Gyration.
 - (5) What are the units of work in MKS & CGS.
 - (6) Derive an eqn for orbital speed of a satellite.
- (B) Answer the following in detail (any **three**) **9**
- (1) Write about Poisson ratio.
 - (2) Discuss in short:- moment of inertia with diagram.
 - (3) Derive the eqn for relation between torque and angular momentum.
 - (4) Explain : Work Energy Theorem
 - (5) Write the eqn for gravitational potential at point
 - (6) Discuss in brief work & power.
- (C) Answer the following questions (any **two**) **10**
- (1) What is elastic collision ? Derive an eqn for final velocities of bodies undergoing elastic collisions.
 - (2) Explain with necessary example: conservative forces.
 - (3) Explain experiment for determining Young's modulus.
 - (4) Derive an eqn for escape velocity for a body when it is projected from the surface of the earth.
 - (5) Prove the theorem of Perpendicular axis.

- 3** (A) Answer the following in detail: (any **three**) **6**
- (1) Define spin quantum numbers.
 - (2) Derive the De-Broglie wave eqn
 - (3) What is spatial quantisation?
 - (4) Write limitations of Bohr Atomic Model.
 - (5) Use of Multimeter as ammeter.
 - (6) Discuss resonance in series L-C-R circuit.
- (B) Answer the following (any **three**) **9**
- (1) Define quantum numbers.
 - (2) Derive the relation between phase velocity & group velocity
 - (3) Explain: Wave Atomic Model
 - (4) What is atomic excitation? write a method to excite an atom.
 - (5) Write about Vector atom model
 - (6) Derive an eqn for rms value of an alternating current.
- (C) Answer the following : **10**
- (1) Explain failures of classical mechanics with reference to Compton effect
 - (2) State & Prove Thevenin's Theorem
 - (3) Explain in detail: Bohr's correspondence principle
 - (4) Derive an eqn for growth of charge in an RC circuit.
 - (5) What is the effect of nuclear motion on atomic spectra? Explain in detail.
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