



**BBC-003-001102**

Seat No. \_\_\_\_\_

**B. Sc. (Sem. I) (CBCS) (W.E.F. 2010) Examination**

**July - 2021**

**Physics : Paper - 101**

*(Mechanics, Elasticity, Electricity & Modern Physics)*

*(Old Course)*

**Faculty Code : 003**

**Subject Code : 001102**

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

[Total Marks : 70

- Instructions :** (1) Symbols and notations have their usual meaning.  
(2) Total marks of the questions in indicate on the right side of the question.

**SECTION - A**

- 1 Answer the followings : **20**
- (1) 1HP = \_\_\_\_\_ WATT.
  - (2) Define work.
  - (3) Newton's \_\_\_\_\_ law give definition of force.
  - (4) Equation of theorem of parallel axis is \_\_\_\_\_.
  - (5) Angular momentum is remains constant when \_\_\_\_\_ acting is zero.
  - (6) Define Torque.
  - (7) Give minimum value of escape velocity.
  - (8) Give the value of G.
  - (9) What is satellite ?
  - (10) Write unit of stress.

- (11) Write unit of poissonous ratio.
- (12) State hooks law.
- (13) Unit of charge is \_\_\_\_\_.
- (14) For LCR series resonance frequency given as \_\_\_\_\_.
- (15) What is alternating current ?
- (16) Maximum power transfer theorem applies to ac power only (True / False).
- (17) For checking continuity of any wire which meter used.
- (18) According classical theory, path of electron in Rutherford atom model is \_\_\_\_\_.
- (19) Write formula for de-Broglie wavelength.
- (20) Equation of phase velocity.

### SECTION - B

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|----------|--|----------|
| <b>2</b> | <p>(a) Answer any <b>three</b> :</p> <ol style="list-style-type: none"> <li>(1) Explain conservative force.</li> <li>(2) State Newton's second law of motion.</li> <li>(3) Define Angular momentum and torque.</li> <li>(4) Write Newton's universal law of gravitation.</li> <li>(5) Write keepler's second law of planetary motion.</li> <li>(6) Define stress and strain.</li> </ol>  | <b>6</b> |
|          | <p>(b) Answer any <b>three</b> :</p> <ol style="list-style-type: none"> <li>(1) State and prove work energy theorem.</li> <li>(2) Show that torque is the rate of change of angular momentum.</li> <li>(3) State and prove perpendicular theorem axis theorem.</li> <li>(4) What is Poisson's ratio and derive expression for it ?</li> <li>(5) Describe state of weightlessness.</li> <li>(6) Explain elastics constant.</li> </ol> | <b>9</b> |

- (c) Answer any **two** : **10**
- (1) What is conservative force and prove that work done by a conservative force along closed path is zero ?
  - (2) What is escape velocity and derive expression for it ?
  - (3) Describe searls method to determine young modulus of the material of a wire.
  - (4) Derive expression for moment of inertia of a circular disc about diameter.
  - (5) Define centre of mass of a body and a system particle and derive expression for it.

### SECTION - C

- 3** (a) Answer any **three** : **6**
- (1) What is Quality factor and write its expression for LCR series circuit ?
  - (2) What is constant voltage source ?
  - (3) State maximum power transfer theorem.
  - (4) State Heisenberg's Uncertainty principle.
  - (5) Derive de - Broglie wave equation.
  - (6) Discuss the failure of classical theory to explain photo electric effect.
- (b) Answer any **three** : **9**
- (1) Derive an equation of rms value of an ac current.
  - (2) Write short note on a multi-meter as an ammeter.
  - (3) What is a source ? Explain with necessary circuit the constant current source.
  - (4) What is atomic excitation ? Discuss main two methods to excite an atom.
  - (5) Write a short note on wave mechanical atom model.
  - (6) Derive the relation between phase velocity and group velocity.

(c) Answer any **two** :

**10**

- (1) Discuss the charging of a capacitor connected in series with a resistor and a dc source and derive its expression.
  - (2) Derive an expression for resonance frequency in parallel LC resonance circuit.
  - (3) State and prove Thevenin's theorem.
  - (4) State and prove correspondence principle.
  - (5) Prove that group velocity of de Broglie wave associated with the moving particle is same particle velocity.
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