

B.Sc. Semester - 1 (CBCS) Examination
Oct/Nov-2023 (Syllabus Year - 2016)
PHYSICS (CORE)

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

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

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- Que.1(A) Answer the following question. (any one) (07)
1. Write a note on vector product of two vectors.
 2. Derive an expression of growth and decay of charge in RC circuit.
- Que.1(B) Answer the following question. (any one) (04)
1. Explain resolution of vectors.
 2. Explain concept of current source and practical current source.
- Que.1(C) Answer the following question. (any three) (03)
1. When two vectors $\vec{A}$ and $\vec{B}$ are parallel to each other then $\vec{A} \cdot \vec{B} = \underline{\hspace{2cm}}$
 2. When two vectors $\vec{A}$ and $\vec{B}$ are parallel to each other then $\vec{A} \times \vec{B} = \underline{\hspace{2cm}}$
 3. $\hat{j} \times \hat{i} = \dots\dots\dots$
 4. The unit of capacitance is $\dots\dots\dots$
 5. Draw the symbol of Zener diode.
- Que.2(A) Answer the following question. (any one) (07)
1. Write a note on energy bands in metal, insulators and semiconductor.
 2. Explain forward and reverse characteristic of P-N junction diode.
- Que.2(B) Answer the following question. (any one) (04)
1. Write a note on extrinsic N-type semiconductor.
 2. Explain formation of PN junction.
- Que.2(C) Answer the following question. (any three) (03)
1. Write two names of semiconductor elements.
 2. For silicon $E_g = \dots\dots\dots$ eV.
 3. The electrical resistivity of a semiconductor is $\dots\dots\dots$ if temperature is increased.
 4. In N-type semiconductor, $\dots\dots\dots$ are majority charge carriers.
 5. The critical temperture for silicon is $\dots\dots\dots$ °C.
- Que.3(A) Answer the following question. (any one) (07)
1. Define work and energy and explain work energy theorem.
 2. Write a note on system of variable mass and rocket propulsion.
- Que.3(B) Answer the following question. (any one) (04)
1. Explain Newton's laws of motions.
 2. Explai centre of mass of two particles.
- Que.3(C) Answer the following question. (any three) (03)
1. Newton's first law gives defination of $\dots\dots\dots$
 2. The force is measured as the product of mass and $\dots\dots\dots$
 3. Work is a $\dots\dots\dots$ quantity.
 4. The work done by the conservative force along a closed path is always $\dots\dots\dots$
 5. A collision in which k.e. is not conserved is known as $\dots\dots\dots$ collision.
- Que.4(A) Answer the following question. (any one) (07)
1. Write a note on agular velocity and angular acceleration.
 2. State and prove Kepler's first and second laws of planetary motion.

- Que.4(B) Answer the following question. (any one) (04)
1. Explain angular momentum of a particle.
 2. Give the statements of Kepler's laws of planetary motion.
- Que.4(C) Answer the following question. (any three) (03)
1. Relation between linear velocity v and angular velocity ω is, $v = \dots\dots\dots$
 2. The SI unit of torque is $\dots\dots\dots$
 3. The equation of moment of inertia is $I = \dots\dots\dots$
 4. The mks unit of gravitational constant G is $\dots\dots\dots$
 5. The escape velocity on the surface of the earth is $\dots\dots\dots$ km/s.
- Que.5(A) Answer the following question. (any one) (07)
1. Explain various types of strains.
 2. Derive equation of motion of a simple harmonic motion.
- Que.5(B) Answer the following question. (any one) (04)
1. Explain longitudinal and shearing stress.
 2. Explain damped oscillations.
- Que.5(C) Answer the following question. (any three) (03)
1. The cgs unit of stress is $\dots\dots\dots$
 2. The mks unit of strain is $\dots\dots\dots$
 3. Young modulus is property of $\dots\dots\dots$
 4. The maximum displacement of the particle in either positive or negative direction is called $\dots\dots\dots$
 5. Number of oscillations made by particle per unit time is called $\dots\dots\dots$
