

B.Sc. Semester - 1 (CBCS) Examination
Jan/Feb.-2022 (NEW COURSE)
PHYSICS(CORE)

Time: 1:30 Hours**Marks: 42****Instructions:**

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

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- Q.1(A) Answer any two questions out of three. (10)**
1. Explain scalar product of two vectors.
 2. Explain vector triple product.
 3. Write a note on length contraction.
- Q.1(B) Answer any one questions out of two. (04)**
1. Discuss maxima and minima as a differential calculus.
 2. Write a short note on time dilation.
- Q.2(A) Answer any two questions out of three. (10)**
1. Explain energy bands in solids: metals, semiconductors and insulators.
 2. Write a note on formation of P-N junction.
 3. Explain forward characteristic of a PN- junction diode.
- Q.2(B) Answer any one questions out of two. (04)**
1. Explain P-type semiconductor.
 2. Explain zener diode characteristic.
- Q.3(A) Answer any two questions out of three. (10)**
1. Explain Newton's laws of motion.
 2. Explain work energy theorem.
 3. Derive the equation of moment of inertia of a solid cylinder about its axis.
- Q.3(B) Answer any one questions out of two. (04)**
1. Two particles of mass 1 kg and 3 kg have position vector $2\mathbf{i}+3\mathbf{j}$ and $-2\mathbf{i}+3\mathbf{j}-4\mathbf{k}$. find the centre of mass.
 2. Derive relation between angular velocity and angular acceleration.
- Q.4(A) Answer any two questions out of three. (10)**
1. State the Kepler's first law of planetary motion and prove it.
 2. Explain Escape velocity.
 3. Write a note on GPS.
- Q.4(B) Answer any one questions out of two. (04)**
1. Derive an expression of gravitation potential and gravitational field due to solid sphere in case of a point outside the sphere.
 2. Explain state of weightlessness.
- Q.5(A) Answer any two questions out of three. (10)**
1. Explain various types of strain.
 2. Explain the determination of Young's modulus by Searl's method.
 3. Obtain the equation of a SHM.
- Q.5(B) Answer any one questions out of two. (04)**
1. Explain various types of stresses.
 2. Explain damped oscillations.
