

Time allowed: 2:40 Hrs

BN-XIXVII-I
PHYSICS
(PART-I)
SECTION- B & C

Marks : 67

Note: Attempt section B & C accordingly.

SECTION -B

Marks: 40

Q.No 2. Attempt any (TEN) parts of the following. All parts carry equal marks.

- i. Find the dimension of kinetic energy.
- ii. Explain how cranes are able to lift very heavy load without toppling?
- iii. For any specific velocity of projection, the range of a projectile cannot exceed from a value equal to 4 times of the corresponding height, discuss.
- iv. Define power and show that $P = \vec{F} \cdot \vec{V}$.
- v. Show that $K.E_{rot} = \frac{1}{2} I \omega^2$.
- vi. Why a car has oblong shape design?
- vii. A simple pendulum set into vibrations and left untouched, eventually stops, why?
- viii. How might one can locate the position of nodes and anti-nodes in a vibrating string?
- ix. Why it is not possible to obtain the diffraction of x-rays by Young's double slits experiment?
- x. What is diffraction grating?
- xi. What are the conditions for a process to be reversible?
- xii. Define elastic and inelastic collision.
- xiii. Does a hydrogen filled balloon possess any P.E? Explain.

SECTION -C

Marks: 27

Note: Attempt any (THREE) of the following. All questions carry equal marks.

- Q.No:3 a). Define rectangular components of a vector. Explain addition of vectors by rectangular components method.
- b). Find the angle between two forces of equal magnitude such that the magnitude of their resultant is also equal to either of them.
- Q.No:4 a). Show that a satellite near the earth will have greater velocity.
- b). The moon revolves around the earth in almost a circle of radius 382400 km in 27.3 days. What is the centripetal acceleration?
- Q.No:5 a). State the equation of continuity. Show that how it is based on law of conservation of mass?
- b). Calculate the length of a second pendulum?
- Q.No:6 a). Show that for one mole of an ideal gas $C_p - C_v = R$.
- b). Calculate the change in entropy when 10 kg of water is heated from 90°C to 100°C. (specific heat of water is 4180J/mol.K)