K18U 2194

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS – Reg./Supple./Improv.) Examination, November 2018

COMPLEMENTARY COURSE IN PHYSICS

1C01 PHY : Mechanics

(2014 Admn. Onwards)

Time : 3 Hours Max. Marks : 32

***Instruction** : Write answers in **English** only.*

SECTION – A

Very short answer type. **Each** carries **1** mark. Answer **all 5** questions.

1. What is the SI unit of modulus of elasticity ?
2. A wire of length *l* and tension T produces the fundamental note of frequency υ. When the length and tension are both doubled the frequency of fundamental note will be
3. The total energy of a particle executing S.H.M. is proportional to
4. Moment of inertia of a solid sphere and spherical shell of equal masses about their diameters will be
5. Radiation and matter have properties both of particle and of waves is called

(5×1=5)

SECTION – B

Short answer type. **Each** carries **2** marks. Answer **4** questions out of 6.

6. What do you mean by uniform and non-uniform bending ?
7. Derive the general equation of wave motion.
8. Obtain an expression for the time period of a mass attached to the spring.

P.T.O.

9. Draw the energy graph showing the potential energy, kinetic energy and total energy of a particle executing harmonic oscillatory motion.

10. What do you understand by transverse wave ? Give an example.

11. Briefly explain the uncertainty principle. **(4×2=8)**

SECTION – C

Short essay/problem type. **Each** carries **3** marks. Answer **3** questions out of 5.

12. The uncertainty in the momentum Δp of a ball travelling at 20 m/s is $1 \times 10^{-6} \times 10^{-6}$ of its momentum. Calculate uncertainty in position Δx. Mass of the ball is given as 0.5 kg.

13. A cord is 57.1 m long and 1.56 mm in diameter. When it supports a 1.41 kg load it stretches 3.5 cm. What is the Young's modulus of the cord's material ?

14. A 4 kg mass attached to a spring is observed to oscillate with a period of 2 seconds. What is the period of oscillation if a 6 kg mass is attached to the spring ?

15. A thin uniform rod of length 1 m and mass 1 kg is rotating about an axis passing through its centre and perpendicular to its length. Calculate the moment of inertia and radius of gyration of the rod about an axis passing through a point midway between the centre and its edge perpendicular to its length.

16. Obtain an expression for the time period of a compound pendulum. **(3×3=9)**

SECTION – D

Long essay type. **Each** carries **5** marks. Answer **2** questions out of 4.

17. What is the physical significance of moment of inertia ? Obtain an expression for the moment of inertia of a sphere about its diameter.

18. Obtain the expression for quality factor in case of an oscillating LCR circuit. How does the inductance influence the quality factor ?

19. Obtain an equation for the velocity of transverse waves moving along the string.

20. What do you understand by terms neutral surface and bending moment ? Derive an expression for the moment of couple required to bend uniform metallic bar into an arc of a circle of small curvature ? **(2×5=10)**
