



QP CODE: 19101733



Reg No :

Name :

B.Sc. DEGREE (CBCS) EXAMINATION, MAY 2019

Second Semester

Complementary Course - **PH2CMT01 - PHYSICS-MECHANICS AND ASTROPHYSICS**

(Common for B.Sc Mathematics Model I ,B.Sc Statistics Model I)

2017 ADMISSION ONWARDS

DDA8C4C3

Maximum Marks: 60

Time: 3 Hours

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. What is meant by velocity? Give its unit.
2. What is the basic principle of Kater's pendulum?
3. Define angular acceleration. Give its unit.
4. If the radius of earth become double of its present value keeping mass as constant, what will be the length of a day ?
5. Discuss any two applications of the flywheel.
6. Give the expression for total energy of simple harmonic motion.
7. State the differential equation of damped harmonic oscillator.
8. Define wave number and write the expression connecting wave number and wavelength.
9. Differentiate between progressive and stationary wave.
10. Mention the uses of beats.
11. What is an HR diagram?
12. What do you mean by the term nebula? What is its content?

(10×1=10)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Show that the centre of suspension and centre of oscillation of a compound pendulum are interchangeable.





14. An object moves round a circular track of radius 4m. The object makes one revolution in 10s. Determine (i) the speed of the car and (ii) its centripetal acceleration.
15. A small disc of 2cm radius is removed from a large disc of radius 8cm. The centre of the hole so formed is at a distance of 2cm from the centre of the large disc. The mass of the remaining disc is 180gm. Calculate its M.I about an axis passing through the two centers.
16. A sphere of uniform density 5520 kg/m^3 and radius 6400 km, calculate the moment of inertia about its axis through its diameter.
17. A body executing Simple Harmonic Motion has velocities 80 cm/s and 60 cm/s when displacements are 3 cm and 4 cm respectively. Calculate the amplitude of vibration and the time taken to travel 2.5 cm from positive extremity of the oscillation.
18. A particle executing simple harmonic motion, has angular frequency 6.28 s^{-1} and amplitude 10 cm. Find (a) the time period, (b) the maximum speed, (c) the maximum acceleration, (d) the speed when the displacement is 6 cm from the mean position assuming that the motion starts from rest at $t = 0$.
19. A train standing in a station yard blows a whistle of frequency 400 Hz in still air. A wind starts blowing in the direction from the yard to the station with a speed of 10 m/s. What are the frequency, wavelength and speed of sound for an observer standing at station platform?
20. What is a white dwarf and how is it formed?
21. Calculate the magnitude difference between two celestial objects having their brightness in the ratio 100.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Obtain the expression for the moment of inertia of a thin circular disc about an axis
(a) perpendicular to the plane and passing through the center of mass and (b) diameter
23. Derive an expression for the M.I of a solid cylinder about an axis perpendicular to its length and passing through its centre
24. Set up the differential equation of a simple harmonic oscillator. Solve the equation to get expressions for acceleration, velocity, period and displacement.
25. Write short note on :
(a) magnitude of stars (b) temperature and color of a star (c) stellar spectra (d) mass and luminosity of a star.

(2×10=20)

