

Reg. No

Name

B. Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2020
SEMESTER 2 : COMPLEMENTARY PHYSICS FOR B Sc CHEMISTRY
COURSE : 19U2CPPHY04 : MECHANICS AND SUPERCONDUCTIVITY
(For Regular - 2019 Admission)

Time : Three Hours

Max. Marks: 60

Section A**Answer any 8 (2 marks each)**

1. What do you mean by center of suspension of a compound pendulum?
2. Obtain the relation between angular velocity and linear velocity.
3. Give an example of conservation of angular momentum.
4. Explain the term sharpness of resonance.
5. Derive an expression for potential energy of a particle executing S.H.M.
6. Derive an expression for kinetic energy of a particle executing S.H.M.
7. State the superposition principle.
8. Explain the phenomenon of beats.
9. What is doppler effect in sound?
10. What are soft and hard superconductors?

(2 x 8 = 16)

Section B**Answer any 6 (4 marks each)**

11. A metal disc of radius 2m with its plane vertical can be made to swing about a horizontal axis passing through any one of the holes bored along its diameter. Determine the minimum time period of the disc .
12. A grind stone has a moment of Inertia of 800 kgm². What constant torque is to be applied on it to develop a speed of 180 rotations per minute in 10 s after starting from rest.
13. A thin uniform rod of mass 1kg and length 2m is bent to form a square . Calculate the M.I of the square about an axis passing its centre and perpendicular to its plane.
14. A progressive harmonic wave is given by $y = 10\sin \pi(0.01x - 2t)$, where y and x are expressed in cm and time t in seconds. Calculate amplitude, frequency, velocity and the phase difference between two points 100 cm apart.
15. A particle in S.H.M makes 300 vibrations/ minute and amplitude of 5cm. Calculate the kinetic energy and potential energy when the displacement is 1 cm. Mass of the particle is 10g.
16. A note produces 4 beats per second with a tuning fork of frequency 512Hz and 6 beats per second with a tuning fork of frequency 514Hz. Find the frequency of the note.
17. Wavelengths of two notes in air are 80/195 m and 80/193 m. Each note produces five beats per second with a third note of a fixed frequency. Calculate the velocity of sound in air.
18. A super conducting material has a critical temperature of 4K at zero magnetic field and a critical field of 0.04 Tesla at 0K. Find the critical field at 2K.

(4 x 6 = 24)

Section C**Answer any 2 (10 marks each)**

19. Discuss an experiment to determine the acceleration due to gravity using an asymmetrical compound pendulum.
20. What is a flywheel. Explain its working and theory.
21. Define simple harmonic motion. Set up the differential equation and find the expressions for its velocity, displacement and period.
22. What is Josephson tunneling? Discuss dc and ac Josephson effects

(10 x 2 = 20)