

**UNDERGRADUATE END SEMESTER EXAMINATION : OCTOBER 2022****SEMESTER 5 : PHYSICS (OPEN COURSE)****COURSE : 19U50CPHY1 : PHYSICS IN DAILY LIFE***(For Regular - 2020 Admission and Supplementary - 2019 Admission)*

Time : Three Hours

Max. Marks: 75

**PART A****Answer any 10 (2 marks each)**

1. A 500-kg car rounds a turn of radius 20 m at a velocity of 10 m/s. (a) How much centripetal force is required?
2. State and explain Newton's first law of motion.
3. What do you know about superconductivity?
4. Briefly explain apparent weight of an object.
5. What is refraction? Show a ray diagram.
6. What is meant by measurement?
7. What is meant by a geosynchronous satellite?
8. What is a black hole?
9. Explain the meaning of derived units with one example.
10. What are the major uses of GPS?
11. What are longitudinal waves? Illustrate with an example.
12. What is hydroelectric power generation?

**(2 x 10 = 20)****PART B****Answer any 7 (5 marks each)**

13. The velocity of sound in seawater is 1231 m/s. Find the wavelength in seawater of a sound wave whose frequency is 356 Hz.
14. What is meant by a geostationary satellite? How it is different from geosynchronous satellites?
15. Briefly discuss the working of Microwave oven?
16. What is meant by LASER? How it works? Mention any four applications of LASER?
17. A flywheel whose moment of inertia is  $6 \text{ kg m}^2$  is acted upon by a constant torque of 50 N-m. (a) What is its angular acceleration? (b) How long does it take to go from rest to a velocity of 90 rad/s?
18. A transformer connected to a 120-V alternating-current (ac) power line has 200 turns in its primary winding and 50 turns in its secondary winding. The secondary is connected to a 10 ohm light bulb. How much current is drawn from the 120-V power line?
19. Why does a driver use a convex mirror as a rear view mirror? Illustrate your answer with the help of a ray diagram.
20. An object of height 2 cm is placed at a distance of 20 cm in front of a concave mirror of focal length 12 cm. Find the position, size and nature of the image, by graphical construction.

21. A glass slab 2.5 cm thick is placed over a coin. If the refractive index of glass is  $\frac{3}{2}$ , find the height through which coin is raised.
22. A ball is whirled at the end of a string in a horizontal circle 55 cm in radius at the rate of 1 revolution (rev) every 2 s. Find the ball's centripetal acceleration.

**(5 x 7 = 35)**

**PART C**

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

23. Explain a) the variation of acceleration due to gravity with altitude b) the concept of angular velocity and angular acceleration.
24. a) Discuss the phenomenon of interference of light? Hence explain the terms i) path difference ii) coherent sources iii) superposition principle. b) Explain the phenomenon of diffraction and hence comment why microwaves and radiowaves are used for communication.
25. State and explain Bernoulli's theorem. How does an airplane get its lift?
26. Explain a) Newton's law of gravitation b) acceleration due to gravity c) apparent weight.

**(10 x 2 = 20)**