

11

Reg. No.

110140

Second Mid-Term Test - 2018

PHYSICS

Time : 1.30 hrs.

Max. Marks : 50

PART - I

Choose the correct answer

10 x 1 = 10

1. If the mass and radius of the Earth are both doubled, then the acceleration due to gravity 'g'
 - a) remain same b) $g/2$ c) $2g$ d) $4g$
2. The kinetic energy of the satellite orbiting around the Earth is
 - a) Equal to potential energy b) Less than potential energy
 - c) greater than potential energy d) zero
3. If a wire is stretched to double of its original length then the strain in the wire is
 - a) 1 b) 2 c) 3 d) 4
4. For a given material, the rigidity modulus is $(1/3)$ of Young's modulus. Its Poisson's ratio is
 - a) 0 b) 0.25 c) 0.3 d) 0.5
5. The Young's modulus for a perfect rigid body is
 - a) 0 b) 1 c) 0.5 d) infinity
6. The wettability of a surface by a liquid depends primarily on
 - a) viscosity b) surface tension c) density d) angle of contact
7. In hot summer after a bath, the body's
 - a) internal energy decreases b) internal energy increases
 - c) heat decreases d) no change in internal energy and heat
8. An ideal gas passes from one equilibrium state (P_1, V_1, T_1, N) to another equilibrium state ($2P_1, 3V_1, T_2, N$) then
 - a) $T_1 = T_2$ b) $T_1 = T_2/6$ c) $T_1 = 6T_2$ d) $T_1 = 3T_2$
9. A distant star emits radiation with maximum intensity at 350 nm. The temperature of the star is
 - a) 8280 k b) 5000 k c) 7260 k d) 9044 k
10. An ideal refrigerator has a freezer at temperature -12°C . The coefficient of performance of the engine is 5. The temperature of the air (to which the heat ejected) is
 - a) 50°C b) 45.2°C c) 40.2°C d) 37.5°C

PART - II

Answer any five questions. Question No.16 is compulsory.

11. State Newton's universal law of gravitation.
12. State Hooke's law of elasticity.
13. Which one of these is more elastic steel or rubber? Why?
14. State Archimedes Principle.
15. Distinguish between streamlined flow and turbulent flow.
16. The reading of pressure meter attached with a closed pipe is $5 \times 10^5 \text{ Nm}^{-2}$. On opening the valve of the pipe, the reading of the pressure meter is $4.5 \times 10^5 \text{ Nm}^{-2}$. Calculate the speed of the water flowing in the pipe.
17. Define specific heat capacity and give its unit.
18. What is Wien's law?

PART - III

Answer any five questions. Question No.22 is compulsory

5 x 3 = 15

19. What are geostationary and polar satellites?
20. What are the energies possessed by a liquid? Write down their equations.
21. State the principle and usage of venturimeter.
22. If 5L of water at 50°C is mixed with 4L of water at 30°C , what will be the final temperature of water? Take the specific heat capacity of water as $4184 \text{ J kg}^{-1} \text{ K}^{-1}$.
23. Give an expression for work done in an isothermal process.
24. What is meant by reversible and irreversible processes?
25. State Kelvin-Planck statement of second law of thermodynamics.
26. How will you prove that Earth itself is spinning?

PART - IV

Answer all the questions.

3 x 5 = 15

27. Explain in detail the idea of weightlessness using lift as an example. (OR)
Explain the different types of modulus of Elasticity.
28. Explain the variation of 'g' with latitude and altitude. (OR)
Derive Mayer's relation for an ideal gas.
29. Explain in detail Carnot heat engine. (OR)
Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using Stoke's force.