

END OF SEMESTER EXAMINATIONS, APRIL / MAY -2018
MECHANICS, PROPERTIES OF MATTER & ACOUSTICS
SUBJECT CODE: 17UAPH01

MAJOR: B.Sc(Physics)
TIME : 3 HOURS

SEMESTER: I
MAX.MARKS: 75

SECTION - A (10 X 1 = 10)

Answer ALL Questions:

1. The total momentum of the particles remain conserved is
 - a) Law of conservation of force
 - b) Law of conservation of linear momentum
 - c) Law of conservation of angular momentum
 - d) None
2. The unit for angular momentum in C.G.S. is
 - a) $gm - cm^2 / sec$
 - b) $kg - m^2 / sec$
 - c) $gm - m^2 / sec$
 - d) None
3. Dimensional formula for moment of Inertia is
 - a) ML^{-2}
 - b) MLT^{-1}
 - c) ML^2
 - d) None
4. Moment of Inertia of a solid sphere is
 - a) $\frac{5}{2} MR^2$
 - b) $\frac{2}{5} MR^2$
 - c) $5 MR^2$
 - d) None
5. The space around a body within which its gravitational force of attraction perceptible is called.
 - a) Gravitational Potential
 - b) Gravitational mass
 - c) Gravitational field
 - d) None
6. Relation between angle of shear and Linear strain is $e =$
 - a) $\phi/2$
 - b) $\phi/4$
 - c) $\phi/8$
 - d) $e = 2\phi$
7. Dimensional formula for η is?
 - a) $M^{-1} L^{-1} T^{-1}$
 - b) MLT^{-1}
 - c) $ML^{-1} T^{-1}$
 - d) None
8. Force of attraction between molecules of different substance known as
 - a) Molecular force
 - b) Adhesive force
 - c) Cohesive force
 - d) None
9. Reverberation time is taken for the energy density to fall to _____ of its value
 - a) One millionth
 - b) One Tenth
 - c) One Hundredth
 - d) None
10. SONAR means _____
 - a) Sound
 - b) Sound Navigation
 - c) Sound Navigation and Ranging
 - d) Ranging

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SECTION – B (5 X 4 = 20)**Answer ALL Questions:**

11. a) Explain centre of mass-frame of reference.
(OR)
b) Write about perfectly (i) Elastic collision (ii) Inelastic collision
12. a) State and Explain parallel axis theorem.
(OR)
b) Define S.H.M and write the characteristics of S.H.M.
13. a) Define gravitational potential and derive an expression for gravitational potential due to a point mass.
(OR)
b) Explain different moduli of elasticity.
14. a) Explain stream line flow and Turbulent flow.
(OR)
b) Write briefly about Venturimeter.
15. a) What is resonance? Give an example.
(OR)
b) Write the chemical applications of ultrasonic waves.

SECTION – C (5 X 9 = 45)**Answer ALL Questions:**

16. a) Explain in detail about the systems of variable mass- the rocket with neat sketch.
(OR)
b) Write in detail about elastic-one dimensional collision.
17. a) Derive an expression for moment of inertia of a
(i) Spherical shell (ii) Circular ring
(OR)
b) Write about compound pendulum and explain the condition for minimum time period.
18. a) Derive an expression for gravitational potential and field due to a spherical shell.
(OR)
b) Determine rigidity modulus-static torsion method using Searle's apparatus.
19. a) Describe with theory, Searle's viscometer to find η .
(OR)
b) Describe Jaeger's method of studying the variation of surface tension of water with temperature. Also write the advantages and disadvantages for the same.
20. a) Write principle, production, advantages and disadvantages of Piezo-electric crystal method.
(OR)
b) Derive an expression for reverberation time using Sabine's formula.
