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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2023-2026 ONLY)

SUBJECT CODE **23UPS101**

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : NOVEMBER - 2023

B.Sc. – PHYSICS **MAXIMUM MARKS: 75**
I - SEMESTER **TIME : 3 HOURS**

PART – III

GRAVITATION, PROPERTIES OF MATTER AND SOUND

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(MULTIPLE CHOICE QUESTIONS) (k1)

1. What is the gravitational potential energy of an object of mass ‘m’ at a height ‘h’ above the surface of the Earth?
   a) mgh b) mg/h c) mg^2h d) mgh^2
2. The point beyond which a material will no longer return to its original shape after stress is called:
   a) Plastic limit b) Yield point c) Breaking point d) Elastic limit
3. Which instrument is used to determine the coefficient of viscosity of a liquid based on falling bodies?
   a) Ostwald viscometer b) Falling body viscometer
   c) Rotation viscometer d) Torricelli's apparatus
4. Which experiment is used to determine surface tension using the weight of a liquid drop?
   a) Fick's law b) Berkeley and Hartley method
   c) Jaeger’s experiment d) Capillary rise method
5. What is the unit of measurement for sound intensity?
   a) Decibel b) Hertz c) Bel d) Phon

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. Express the value of the density of Earth with proper units?
7. What do you mean by modulus of elasticity?
8. What is the application of Bernoulli's theorem in determining the velocity of efflux of a liquid?
9. How is osmotic pressure governed by the laws?
10. Give any two applications of ultrasonics.

SECTION – B (5X5 = 25 MAKRS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a). Describe Newton’s law of universal gravitation.

(OR)

b). Define a compound pendulum and explain its principle of operation.

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12. a). Define Modulus of Elasticity and explain the relationship between the elastic constants.

(OR)

b). Describe Searle's method to determine the rigidity modulus.

13. a). Discuss the concept of velocity of efflux in the context of a gas. How does it differ from that of a liquid?

(OR)

b). Describe Rankine's method for determining the viscosity of gases.

14. a). Derive the equations for excess pressure inside a liquid drop and inside a soap bubble.

(OR)

b). What is Graham's law of diffusion of gases? Provide some examples.

15. a). Define musical sound and noise. What are the key differences between them? Provide examples to illustrate your points.

(OR)

b). Describe Melde's experiment and its significance in understanding wave phenomena.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4/K5)

16. a). Explain Kepler's three laws of planetary motion. How do these laws apply to planets in our solar system?

(OR)

b). Discuss the gravitational potential and field due to a circular disc.

17. a). What is torsional oscillation of a body? How can it be used to determine the Rigidity modulus using the Dynamic torsion method?

(OR)

b). Discuss the method of measuring Young's modulus by bending of beam by Non-uniform bending and explain with a suitable diagram.

18. a). Explain Bernoulli's theorem and its significance in fluid dynamics. How does it relate to the principle of conservation of energy?

(OR)

b). What is Stokes' law? How is it used in the determination of the coefficient of viscosity of a liquid using the Stokes falling body viscometer?

19. a). Discuss Jaeger's experiment, drop weight method, and capillary rise method for the determination of surface tension.

(OR)

b). Describe the Berkeley and Hartley method for the experimental determination of osmotic pressure

20. a). State and explain the laws of transverse vibration of strings. How do these laws help us understand the behavior of vibrating strings?

(OR)

b). Define ultrasonics and explain how ultrasonic waves are produced using the piezo electric oscillator method.

ETHICAL PAPER

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