SUBJECT CODE : 11PH/AC/PC33

B.Sc. DEGREE EXAMINATION NOVEMBER 2015
BRANCH III - PHYSICS
THIRD SEMESTER

REG. NO._____

COURSE   :   ALLIED - CORE
PAPER   :   PHYSICS FOR CHEMISTRY - 1
TIME   :   30 MINUTES   MAX. MARKS : 30

SECTION – A
TO BE ANSWERED IN THE QUESTION PAPER ITSELF
ANSWER ALL QUESTIONS: **(30x1=30)**

Choose the correct answer:

1. The unit for moment of inertia is
    (a) Kg   (b) kg- m   (c) kg- m^2 (d) kg/ m

2. In the compound pendulum the moment of inertia of the rigid body about the axis of rotation is equal to
    (a) mk   (b) mk^2 (c) mkg   (d) ml^2

3.   The unit of acceleration due to gravity is
    (a) m / s^2 (b) m^2 (c) kg   (d) kg-m

4. The velocity of light in free space is always
    (a) zero   (b) constant   (c) increases   (d) decreases

5. Mass – energy relation is
    (a) E = mc   (b) E = mch   (c) E = mc^3 (d) E = mc^2

6. Force per unit area is
    (a) stress   (b) strain   (c) Bulk modulus   (d) Rigidity modulus

7. The ratio between lateral strain and longitudinal strain is
    (a) Young's modulus   (b) Bulk modulus   (c) Rigidity modulus   (d) Poisson's ratio

8. The unit for twisting torque is
    (a) N   (b) Nm   (c) Nm^2 (d) N^2

9. Force per unit length is
    (a) Surface tension   (b) Viscosity   (c) Shearing strain   (d) Volume strain

10. The velocity at every point in the liquid remains constant both in the magnitude and direction is
    (a) Critical velocity   (b) Relative velocity
    (c) Streamline motion   (d) Turbulent motion

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11. Superposition of two coherent waves is called
    (a) Polarisation   (b) Diffraction   (c) Interference   (d) Reflection

12. In Newton's ring experiment, the radii of the dark rings are proportional to
    (a) Natural numbers   (b) Square of the natural numbers
    (c) Cube root of natural numbers   (d) Square root of natural numbers

13. Diffraction is due to
    (a) Reflection of light   (b) Refraction of light
    (c) Polarisation   (d) Bending of light

14. The optical device used for producing and analyzing plane polarized light is
    (a) Convex lens   (b) Concave lens   (c) Nicol prism   (d) Grating

15. Double refraction occurs in
    (a) Grating   (b) Prism   (c) Calcite crystal   (d) Plane mirror

Fill in the blanks:

16. _____ modulus is the ratio of tangential stress to shearing strain.

17. The time interval between the events occurring at a given point in the moving frame
    appears to be _____ to the observer in the stationary frame.

18. In _____ motion, the velocity at every point in the liquid is not constant and
    its magnitude is large.

19. Newton's rings are formed due to _____.

20. The tangent of angle of polarization is numerically equal to the refractive index of
    the refractive medium is known as _____ law.

State whether true or false:

21. The law of physics are the same in all inertial frames of reference.

22. In the length contraction, there is contraction in the direction perpendicular to the
    direction of motion.

23. Drop weight method is used to determine the critical velocity.

24. Diffracting grating is used to determine the velocity of light.

25. Nicol prism is made from a calcite crystal.

Answer Briefly:

26. Define young's modulus.

27. What is the physical significance of mass energy relation?

28. Define critical velocity.

29. What is meant by double refraction?

30. What is polarization?

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TIME   :   **2 ½ HOURS**   **MAX. MARKS : 70**

SECTION – B
ANSWER ANY FIVE QUESTIONS: **(5x6=30)**

1. A thin uniform bar of length 1.2 metre oscillates about an axis passing through one end perpendicular to its length, Find the period of oscillation.
2. A clock in a space ship emits signals at intervals of 1 second as observed by an astronaut in the space ship. If the space ship travels with a speed of 3×10^7 m/s. What is the interval between the successive signals as seen by an observer at the control center on the ground.
3. 100 drops of water falling down a tube of external diameter 3.5 mm are collected under coconut oil of specific gravity 0.8. Calculate the interfacial tension between water and oil if the water collected weighs 12.35 gm.
4. What torque must be applied to a wire of one metre long and diameter of 10^{-3}m in order to twist one end of it through 90 degree, the other end remaining fixed ? The rigidity of the material of the wire is 2.8×10^{10} Nm^{-2}.
5. In a plane transmission grating, the angle of diffraction for the second principal maximum for the wavelength 5×10^{-3} cm is 30 degree. Calculate the number of lines in one cm of the grating surface.
6. Derive the expression for bending moment.
7. Write a note on nicol prism.

SECTION – C
ANSWER ANY TWO QUESTIONS: **(2x20=40)**

8. (a) How would you determine the value of 'g' at a place using compound pendulum
    (b) Derive Mass – Energy relation.

9. Derive Lorentz transformation equations and deduce an equation for length contraction.

10. (a) Derive the equation for torque per unit twist
    (b) Explain the experimental determination of surface tension by drop weight method.

11. Give the theory of Newton's ring and explain how would you determine the wave length of sodium light.

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