

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2008-09)

SUBJECT CODE : PH/MC/PA14

B.Sc. DEGREE EXAMINATION NOVEMBER 2008
BRANCH III - PHYSICS
FIRST SEMESTER

REG. No. _____

COURSE : MAJOR – CORE
PAPER : PROPERTIES OF MATTER AND ATOMIC PHYSICS
TIME : 30 MINS. MAX. MARKS : 30

SECTION – A

TO BE ANSWERED IN THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30 x 1 = 30)

I CHOOSE THE CORRECT ANSWERS:

- Modulus of elasticity is
a) $\frac{\text{stress}}{\text{strain}}$ b) $\frac{\text{strain}}{\text{stress}}$ c) $\frac{\text{elastic limit}}{\text{stress}}$ d) $\frac{\text{strain}}{\text{stress}}$
- What is the dimension of stress
a) $ML^{-1} T^{-2}$ b) $ML^{-2} T^{-2}$ c) MLT^{-2} d) $M^{-1} LT^{-1}$
- The ratio of shearing stress to angle of shear is
a) Young's modulus b) rigidity modulus
c) bulk modulus d) modulus of elasticity
- What is the unit of surface tension
a) N b) N-m c) N-s d) N/m
- Which of the following decreases surface tension of water?
a) soap b) soap nut c) wax d) pitch
- What is the angle of contact of glass with mercury
a) 35° b) 0° c) 121° d) 131°
- The dimensional formula for viscosity is
a) $ML^2 T^{-2}$ b) $ML^{-1} T^{-1}$ c) MLT^{-1} d) MLT^{-2}
- For Turbulent flow, the value of Reynold's number is
a) 1800 b) 2800 c) 3200 d) 600
- Which law gives the viscous force opposing the motion of metal sphere through high viscous liquid
a) Stokes b) Poisuilles c) Newtons d) Kepler's law

10. Positive rays are also called as
 a) β rays b) canal rays c) γ rays d) α rays
11. Einstein was awarded noble prize for establishing
 a) $E=mc^2$ b) $E=W+\frac{1}{2} m v^2$ c) $E=\frac{m_0 c^2}{\sqrt{1-v^2/c^2}}$ d) $E = mc$
12. The unit of wavelength is
 a) metre b) \AA c) cm d) all the above
13. Splitting of spectral lines due to electric field is called as
 a) Zeeman b) Stark c) electric d) Paschen effect
14. Atomic number is
 a) Number of protons
 b) Number of neutrons
 c) Number of electrons
 d) Number of protons + number of neutrons
15. No two electrons can have same quantum state. This principles is called
 a) Zeeman b) Paschen Back c) Pauli's exclusion d) stark principle

II FILL IN THE BLANKS:

16. Reynolds number for streamline flow is_____.
17. The angle of contact of glass water with impurities is _____.
18. Surface tension is defined as_____.
19. Electrons have spin _____ and _____.
20. The equation $2d \sin \theta = n \lambda$ is _____.

III STATE WHETHER TRUE OR FALSE:

21. The reason for existence of three different states of matter is interatomic force.
22. Strain has no dimension.
23. The value of molecular range in liquid is 10^9 m.
24. Einstein photoelectric equation is $E = W + \frac{1}{2} m v^2$.

25. 'n' is called the principal quantum number.

IV ANSWER BRIEFLY:

26. What is bending moment.

27. What are torsional oscillation.

28. Define viscosity.

29. What is angle of contact.

30. What is Compton effect.

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

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 x 5 = 25)

1. Calculate rigidity modulus (n) and σ for silver, given Y and K for silver = $7.25 \times 10^{10} \text{ N/m}^2$ and $11 \times 10^{10} \text{ Nm}^2$.
2. Find the amount of work done in twisting a steel wire of radius 10^{-3} and length 0.25m through an angle of 45° . Given n for steel = $8 \times 10^{10} \text{ N/m}^2$.
3. Calculate the work done in spraying a spherical drop of water of 10^{-3}m radius into million droplets all of same size, the surface tension of water being $72 \times 10^{-2} \text{ Nm}^{-1}$.
4. Water flows through a horizontal tube of length 0.2 metre and internal radius 8.1×10^{-4} metre under a constant head of liquid 0.2 metre high. In 12 minutes $8.64 \times 10^{-4} \text{ m}^3$ of liquid issues from tube. Calculate coefficient of viscosity of water (Density of water = 1000 kg m^{-3} and $g = 9.8\text{ms}^{-2}$).
5. Light of wavelength 2000\AA falls on aluminum surface work function of aluminium 4.2 eV . Calculate a) kinetic energy of fastest and slowest photoelectrons. B) stopping potential c) cut-off wavelength for Aluminium.
6. State Laws of photoelectric effect.
7. Explain vector atom model.

SECTION – C

ANSWER ANY THREE QUESTIONS: (3 x 15 = 45)

8. a) Obtain expression for torque per-unit twist.
b) How is rigidity modulus determined.
9. Explain the surface tension on basis of kinetic theory. Give examples of surface tension.
10. How is the viscosity of highly viscous liquids determined. Explain.

11. Obtain Einstein photoelectric equation. Give the experimental significance of photoelectric equation.
12. Write short note on
 - a) Bending of beams
 - b) Excess of pressure
 - c) Variation of viscosity with temperature
 - d) Positive rays
 - e) Excitation and Ionization potentials.

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