

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

SUBJECT CODE : PH/AC/PC13

B.Sc. DEGREE EXAMINATION NOVEMBER 2009
BRANCH IV - CHEMISTRY
FIRST SEMESTER

COURSE : ALLIED – CORE
PAPER : PHYSICS FOR CHEMISTRY – I
TIME : 30 MINS.

REG. No. _____
MAX. MARKS : 30

SECTION – A

TO BE ANSWERED IN THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30 x 1 = 30)

I CHOOSE THE CORRECT ANSWER:

- Inertia is that property of a body by virtue of which the body is unable to change itself the state of
a) rest
b) uniform linear motion
c) rest and uniform linear motion
d) none
- The expression for the minimum time period of a compound pendulum is
a) $2\pi\sqrt{\frac{2k}{g}}$
b) $2\pi\sqrt{\frac{k}{g}}$
c) $2\pi\sqrt{\frac{k}{2g}}$
d) $2\pi\sqrt{\frac{k+l}{lg}}$
- Accelerated frames are called
a) Non – Inertial frames
b) Inertial frames
c) Galilean frames
d) none of these
- According to theory of relativity, _____ are variable
a) Mass
b) Velocity
c) Mass and velocity
d) None of these
- With the rise in temperature, the surface tension of liquids
a) Decreases
b) Increases
c) Remains unchanged
d) None
- Surface tension mainly arises due to
a) Gravitational force
b) Electrostatic force
c) Cohesive molecular force
d) Adhesive molecular force

7. Streamline motion is that motion in which there is
 a) Only longitudinal velocity gradient
 b) Only radial velocity gradient
 c) Longitudinal as well as radial velocity gradient
 d) Neither longitudinal nor radial velocity gradient
8. Hair of a shaving brush align together when it is removed from water, due to
 a) Surface tension
 b) Viscosity
 c) Elasticity
 d) None of these
9. Steel has high modulus of elasticity and hence it is a
 a) Low elastic material
 b) High elastic material
 d) Normal elastic material
 d) None of these
10. The unit of young's modulus is
 a) Nm^{-1}
 b) Nm^{-2}
 c) Mega pascal
 d) Dyne /cm
11. When white light is used in Newton's rings experiment, then all fringes are
 a) Black
 b) White
 c) Colored
 d) None
12. A soap bubble appears multicolored in white light due to
 a) Interference
 b) Diffraction
 c) Polarization
 d) Scattering
13. Light transmitted by a single Nicol crystal
 a) Plane polarized
 b) Un polarized
 c) Circularly polarized
 d) Elliptically polarized
14. The bending of beam of light around corners of an obstacle is called
 a) Interference
 b) Diffraction
 c) Dispersion
 d) Polarization
15. Polarized glass is used in sun glasses because
 a) It reduce the light intensity to half on account of polarization
 b) It is fashionable
 c) It has good colour
 d) It is cheaper

II FILL IN THE BLANKS:

16. The contraction becomes appreciable only when $v \approx$ _____.
17. Sound waves having frequencies above 20,000 Hz are called _____.
18. In Torsional pendulum, the expression for period is _____.
19. Nicol prism can be used as a _____ and _____.
20. Brewster's law can be expressed as _____.

III STATE WHETHER TRUE OR FALSE:

21. In a compound pendulum the point of suspension and point of oscillation form a pair of equiperiodic and interchangeable points.
22. A system of co-ordinates axes which defines the position of particle in two or three dimensional space is called a frame of reference.
23. The modulus of elasticity is equal to strain/stress.
24. In Newton's ring experiment, the diameter of the rings formed is inversely proportional to square root of wavelength.
25. Spectrum obtained from a grating is usually called as grating spectrum.

IV ANSWER BRIEFLY:

26. Write the Lorentz transformation equations.
27. What is time dilation?
28. Define poisson's ratio.
29. Define critical velocity.
30. Define double refraction.

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

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 x 6 = 30)

1. Obtain an expression for g using compound pendulum.
2. What is the wavelength of ultrasonic wave of frequency 330KHz at 0°C ?
Velocity of sound at $0^{\circ}\text{C} = 330 \text{ ms}^{-1}$.
3. State and explain the basic postulates of Einstein's special theory of relativity?
4. In a drop weight method for the determination of surface tension between water and air, a glass tube of external diameter 2mm is used, and 100 drops of water are collected. The mass of these drops is 2.8gms. find the surface tension of water in air.
5. Determine the radius of the drop of water falling through air, if the terminal velocity of the drop is $1.2 \times 10^{-2} \text{ ms}^{-1}$.
6. In a Newton's rings experiments, the diameter of the 5th ring was 0.336cm and the diameter of the 15th ring = 0.590cm. Find the radius of curvature of the plano-convex lens, if the wavelength of light used is 5890\AA .
7. State and explain Brewster's law.

SECTION – C

ANSWER ANY TWO QUESTIONS: (2 x 20 = 40)

8. What is the meaning of mass-energy equivalence? Obtain Einstein's mass-energy relation. Show that $1\text{amu} = 931 \text{ Mev}$.
9. What are Ultrasonic waves? How are they produced? And list the applications in various fields.
10. Derive an expression for the depression of the loaded end of a light cantilever.
11. Give the theory of a plane transmission grating and describe how it is used to determine the wavelength of light.

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