STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI - 600086. (For candidates admitted during the academic year 2011-2012 and thereafter)

SUBJECT CODE : 11PH/AC/PC33

## B.Sc. DEGREE EXAMINATION NOVEMBER 2014 <br> BRANCH III - PHYSICS <br> THIRD SEMESTER <br> REG. NO.

$\qquad$

| 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:
Choose the correct answer:

1. The moment of inertia of a body does not depend upon its
a) angular velocity
b) distribution of mass
c) mass
d) axis of rotation
2. The expression for the minimum time period of a compound pendulum is
a) $2 \pi \sqrt{\frac{2 k}{g}}$
b) $2 \pi \sqrt{\frac{k}{g}}$
c) $2 \pi \sqrt{\frac{k}{2 g}}$
d) $2 \pi \sqrt{\frac{k+l}{l g}}$
3. Accelerated frames are called
a) Non - Inertial frames
b) Inertial frames
c) Galilean frames
d) none of these
4. According to theory of relativity, $\qquad$ are variable
a) Mass
b) Velocity
c) Mass and velocity
d) None of these
5. Which of the following examples could be characterized as the result of surface tension
a) A child sips milk through a straw
b) Spilled mercury forms into small drops
c) Table salt is in the form of cubic crystals
d) None
6. 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. Elastic energy stored per unit volume of a wire is
a) Force $x$ extension
b) $1 / 2($ Force $x$ extension)
c) Stress/Strain
d) $1 / 2($ Stress $/$ strain
10. The unit of young's modulus is
a) $\mathrm{Nm}^{-1}$
b) $\mathrm{Nm}^{-2}$
c) Mega pascal
d) Dyne $/ \mathrm{cm}$
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

## Fill in the blanks:

16. The contraction becomes appreciable only when v \& $\qquad$ .
17. The unified mass unit $1 u=$ $\qquad$ .
18. In Torsional pendulum, the expression for period is $\qquad$ .
19. Nicol prism is used as a $\qquad$ and $\qquad$ .
20. Brewster's law can be expressed as $\qquad$ .

## State whether true or false:

21. In a compound pendulum the point of suspension and point of oscillation from a pair of equiperiodic and interchangeable points.
22. The time interval, between two events occurring at a given point in the moving frame s' appears to be longer in the stationary frame s, is called time dilation.
23. The ratio of longitudinal elongation to the lateral contraction is called poisson's ratio.
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.

## Answer Briefly:

26. Write the Lorentz transformation equations.
27. What is frame of reference?
28. Define Hooke's law.
29. Define critical velocity.
30. Define double refraction.

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| TIME | $:$ | $21 / 2$ HOURS |

MAX. MARKS : 70

## SECTION - B

## ANSWER ANY FIVE QUESTIONS:

1. Obtain an expression for $g$ using compound pendulum.
2. A uniform circular disc of 0.2 m radius oscillates in its own plane about a point on its circumference. Calculate the period of oscillation.
3. A bar of length 1 m , breadth 0.02 m and thickness 0.005 m is supported at its two ends and loaded in the middle for a load of 0.4 kg , the depression at the centre is $2 \times 10^{-3} \mathrm{~m}$. Calculate the youngs modulus of the material of the bar.
4. In a drop weight method for the determination of surface tension between water and air, a glass tube of external diameter 2 mm is used, and 100 drops of water are collected. The mass of these drops is 2.8 gms , find the surface tension of water in air.
5. How fast would a rocket have to be relative to an observer for its length to be contracted to $99 \%$ of its length at rest.
6. What is the highest order spectrum, which may be seen with monochromatic light of wavelength $6000 \AA$ by means of a diffraction grating with 5000 lines $/ \mathrm{cm}$.
7. State and explain Brewster's law.

## SECTION - C

## ANSWER ANY TWO QUESTIONS:

8. What is the meaning of mass-energy equivalence? Obtain Einstein's mass-energy relation. Show that $1 U=931 \mathrm{Mev}$.
9. Give the theory of a plane transmission grating and describe how it is used to determine the wavelength of light.
10. Derive an expression for the depression of the loaded end of a light cantilever.
11. Describe Newton's rings experiment and explain how it is used to determine the wavelength of sodium light.
