

B.Sc. DEGREE EXAMINATION NOVEMBER 2014
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:

- 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
- 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
- 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
- Surface tension mainly arises due to
a) Gravitational force b) Electrostatic force
c) Cohesive molecular force d) Adhesive molecular force
- 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
- 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

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.

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-2012 and thereafter)

SUBJECT CODE : 11PH/AC/PC33

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COURSE : ALLIED - CORE
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TIME : 2 ½ HOURS **MAX. MARKS : 70**

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5x6=30)

1. Obtain an expression for g using compound pendulum.
2. A uniform circular disc of $0.2m$ radius oscillates in its own plane about a point on its circumference. Calculate the period of oscillation.
3. A bar of length $1m$, breadth $0.02m$ and thickness $0.005m$ is supported at its two ends and loaded in the middle for a load of $0.4kg$, the depression at the centre is $2 \times 10^{-3}m$. Calculate the young's 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 $2mm$ 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. 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/cm.
7. State and explain Brewster's law.

SECTION – C

ANSWER ANY TWO QUESTIONS: (2x20=40)

8. What is the meaning of mass-energy equivalence? Obtain Einstein's mass-energy relation. Show that $1U = 931 \text{ Mev}$.
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.
