

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 2010

BRANCH IV - CHEMISTRY

FIRST SEMESTER

REG. No. _____

COURSE : ALLIED – CORE

PAPER : PHYSICS FOR CHEMISTRY – I

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 ANSWER:

- Moment of inertia can be expressed as
a) Mr^2 b) Mr^3 c) M/r^2 d) Mr
- Radius of gyration can be written as
a) I/M b) $\sqrt{I/M}$ c) IM d) M/I
- The frequency of ultrasonic waves will be
a) $f < 20 \text{ Hz}$ b) $f = 20 - 20,000 \text{ Hz}$ c) $f > 20 \text{ KHz}$ d) $f < 20 \text{ KHz}$
- Young's modulus can be expressed in the following unit:
a) Nm b) Nm^2 c) m^2/N d) N/m^2
- Poisson ratio can be expressed as
a) N/m^2 b) m c) N/m d) a mere number
- If the volume of a wire remains constant during its extension, the Poisson ratio will be
a) 0.5 b) zero c) unity d) infinity
- For rigidity modulus, the strain will be
a) an extension b) extension per unit length
c) change in volume d) an angle
- Surface tension can be expressed in
a) J/m^2 b) N/m c) N d) m/N
- A good screw driver should be made of a material with
a) large Young's modulus b) large rigidity modulus
c) large Bulk modulus d) small rigidity modulus
- Constructive interferences occurs at points where the path difference is
a) $(2n + 1)\lambda/2$ b) $(2n - 1)\lambda/2$ c) $n\lambda$ d) $n\lambda/2$
- Fraunhofer diffraction corresponds to
a) spherical wave front b) cylindrical wave front
c) elliptical wave front d) plane wave front

12. According to Brewster's law
 a) $\tan i = \mu$ b) $\sin i = \mu$ c) $\cos i = \mu$ d) $\tan i(1/\mu)$
13. Let P represent polarizer and A represent analyser
 a) P and A work on different principles
 b) P and A can be interchanged
 c) P can work as A, but A cannot be used as P
 d) P is more efficient than A
14. For a grating at normal incidence, the angle of diffraction θ is related to wavelength λ as
 a) $\theta\alpha\lambda$ b) $\sin\theta\alpha\lambda$ c) $\tan\theta\alpha\lambda$ d) $\cos\theta\alpha\lambda$
15. For a grating, the maximum order possible will be
 a) $N\lambda$ b) N/λ c) λ/N d) $1/N\lambda$

II FILL IN THE BLANKS:

16. The time dilation equation can be written as $t = \dots\dots\dots$
17. The relativistic momentum is expressed as $p = \dots\dots\dots$
18. Loading the two ends of a bar corresponds to $\dots\dots\dots$ bending.
19. Surface tension of water $\dots\dots\dots$ with increase in temperature.
20. Plane of polarization can be defined as $\dots\dots\dots$

III STATE WHETHER TRUE OR FALSE:

21. In a compound pendulum, the point of suspension and oscillation are interchangeable.
22. Twin paradox is a consequence of time dilation.
23. Central loading of a beam results in non-uniform bending.
24. Stream lined motion is possible only when the fluid velocity is large.
25. The phenomenon of double refraction is due to the two values of refractive index of the crystal.

IV ANSWER BRIEFLY:

26. Write a note on minimum period of oscillation of a compound pendulum.
27. State the postulates of special theory of relativity.
28. Mention any two application of ultrasound.
29. What is a Polaroid?
30. Mention any two uses of Polaroid.

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

SECTION – B

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

1. Write down Lorentz transformation equations and explain length contraction.
2. Calculate the energy corresponding to a mass of 10^{-4} kg.
3. Explain the principle of Piezo electric oscillator to produce ultrasonic waves.
4. Derive Euler's equation of continuity and explain its importance.
5. With theory, explain the drop weight method to determine surface tension of water.
6. When a grating is set at normal incidence, the first order image is observed at an angle of 20° . If the grating has 6×10^5 lines/m, calculate the wavelength of the source.
7. With a diagram, explain the working of a Nicol prism.

SECTION – C

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

8. Give the theory of compound pendulum and obtain the expression for its period of oscillation.
9. Determine the Young's modulus of the beam by subjecting it to non-uniform bending.
10. With theory explain how rigidity modulus is determined by subjecting it to dynamic oscillation.
11. Explain with theory, how Newton's rings can be used to determine the wavelength of a mono chromatic source.

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