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

SUBJECT CODE : PH/AC/PM13

B.Sc. DEGREE EXAMINATION NOVEMBER 2010
BRANCH I - MATHEMATICS
FIRST SEMESTER

REG. No._____

COURSE : ALLIED – CORE
PAPER : PHYSICS FOR MATHEMATICS – 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 ANSWERS:

1. The SI unit of force is

a) Newton b) Farad c) milli Newton d) Kg

2. The kinetic energy of the body is

a) ½ mv^2 b) ½ mv c) ½ m d) ½ v

3. The formula for length contraction is

a) $l = lo\sqrt{1-\frac{v^2}{c^2}}$ b) l = lo c) $l = \frac{lo}{2}$ d) $l = lo\left(1\frac{v^2}{c^2}\right)$

4. Einstein mass energy relation is

a) $E = mc^2$ b) $E = m_oc^2$ c) E = mc d) E = m/c

5. Unaccelerated reference frames in uniform motion are called

a) Inertial frames b) accelerated frames c) reference frames d) back frames

6. Momentum is

a) mv b) m/-v c) mv2 d)m^2v^2

7. 4kg of substance is fully converted into energy. The amount of energy produced is

a) 3.6 x 10^{17}J b) 3.6 x 10^{10}J c) 3.6 x 108 J d) 5.6 x 10^7 J

.2..

8. The SI unit of young's modulus of elasticity is

a) Nm^{-2} b) Nm^{2} c) Nm^{3} d) NM

9. The torque per unit trust is

a) $\frac{\pi na^4}{2L}$ b) πna^4 c) $\frac{\pi n}{4}$ d) $\frac{\pi n}{2L}$

10. Surface tension is defined as

a) $\frac{\text{force}}{\text{length}}$ b) force c) force X length d) force X mass

11. Dimension of viscosity is

a) $ML^{-1}T^{-1}$ b) ML^{-1} c) MT^{-1} d) MT^{-2}

12. Interfacial surface tension is given by

a) $\frac{mg}{3.8r}$ b) $\frac{mg}{3.8r}\left(1\frac{\rho_2}{\rho_1}\right)$ c) mg d) $\frac{3mg}{\pi}$

13. $d\theta = dw + dv$ is

a) first law b) second law c) fourth law d) third law

14. Unit of entropy

a) JK^{-1} b) JK c)JK d) J

15. Magnetostriction oscillator is used to produce

a) ultrasonic waves b) UV-waves c) IR-waves d) light-waves

II Fill in the blanks

16. Entropy is ……

17. Ultrasonics are ……sound waves

18. The angle of contact in case of water is ……..

19. The formula for variation of mass with velocity is ……..

20. The value for speed of light is …….m/s

III State whether True or false

21. Rigidity modulus $= \frac{Tangential \quad strass}{Tangential \quad strain}$

22. Beam supported at rods and located in middle is called Non uniform bending.

23. Surface tension by drop-Weight is $T = \frac{mg}{3.8r}$

24. Quartz crystal is pressurized to give elastic charges. This is called piezo electric effect.

25. The critical velocity specifies whether flow is streamline or turbulent.

IV. Answer briefly:

26. What is time dilation?

27. Define Viscosity

28. State third law of thermodynamics

29. What is a compound pendulum?

30. Define elasticity

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

SECTION – B

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

1. Explain time dilation in theory of relativity

2. Calculate rest mass energy of electron in joules and in Electron volt

3. At what speed a moving particle will have twice its rest mass?

4. A metal disc of 0.1m radius and mass 1 kg is suspended in a horizontal plane by a vertical wire attached to its centre. If the diameter is 10^{-3}m, its length 1m, and period of oscillation is 4 seconds, find rigidity modulus of the wire.

5. What will be the result of adding 52g of ice to 100 g of water at 40^{o}C

6. In a drop weight method for determination of S.T 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 2.8 gm find the S.T. of water in air.

7. Distinguish between streamline flow and turbulent flow.

SECTION – C

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

8. Derive the Lorentz-space transformation.

9. Explain production, detection and uses of ultrasonics.

10. Explain the term torsional oscillations. Obtain expression for the rigidity modulus by subjecting it to dynamic oscillation.

11. Describe the drop weight method to determine the surface tension of a liquid. Discuss the variation of surface tension with temperature.

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