

B.Sc. DEGREE EXAMINATION APRIL 2011  
BRANCH I – MATHEMATICS  
SECOND SEMESTER

REG. No. \_\_\_\_\_

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

- The law that governs the force between electric charges is called \_\_\_\_  
a) Coulomb's law      b) Gauss law      c) None
- Magnetic field is a \_\_\_\_\_ quantity.  
a) Vector      b) Scalar      c) Neither vector nor scalar
- Direction of charge, current and flux can be found using \_\_\_\_\_  
a) Fleming right hand rule      b) Fleming left hand rule      c) None
- A lens whose  $R_1/R_2 =$  \_\_\_\_\_ is called a crossed lens.  
a)  $1/6$       b)  $\pm 1/6$       c)  $-1/6$
- The final image in terrestrial telescope is formed at the \_\_\_\_\_  
a) Infinity      b) face of the objective      c) between objective and lens
- When white light is used in Newton's rings experiment, then all fringes are \_\_\_\_\_  
a) Black      b) White      c) Colored
- The resolving power of grating is given by \_\_\_\_\_  
a)  $Nn$       b)  $N/n$       c)  $n/N$
- Polarized glass is used in sun glasses because  
a) it reduces the light intensity to half, on account of polarization  
b) Fashionable  
c) good cooler
- The dark lines in the solar spectrum are called \_\_\_\_\_  
a) Fresnel lines      b) Fraunhofer lines      c) none
- An op-amp adder output is proportional to the algebraic sum of the input \_\_\_\_\_  
a) Voltage      b) Current      c) None

11. The binary multiplication  $111_2 \times 10_2$  gives \_\_\_\_\_  
 a) 1001    b) 0110    c) 1110
12. According to the Boolean algebra of logic  $(A + \bar{A})$  equals  
 a)  $A\bar{A}$     b) 1    c) 0
13. Reflecting telescope was invented by \_\_\_\_\_.  
 a) James Gregory                                  b) Herschel                                  c) Cassegrain
14. Which of the following is not an octal number?  
 a) 77    b) 19    c) 15
15. The bending of a beam of light around corners of an obstacle is called \_\_\_\_\_.  
 a) Interference                                  b) Diffraction                                  c) Polarization

**II. FILL IN THE BLANKS:**

16. Unit of Magnetic field is \_\_\_\_\_.
17. Elimination of chromatic aberration in a system of lenses is called\_\_\_\_\_.
18. The useful magnifying power of a telescope should be \_\_\_\_\_.
19. Spectra can be classified into two principal classes known as \_\_\_\_\_ and \_\_\_\_\_.
20. The radix of the binary number is \_\_\_\_\_.

**III. STATE WHETHER TRUE OR FLASE:**

21. The capacity of a parallel plate condenser does not depend upon a metal of the plates.
22. For a telescope, larger the diameter of the objective smaller is the resolving power.
23. Nicol prism is used as a polarizer and analyzer.
24. If only one input is applied to the inverting input terminal, then it is called non-inverting amplifier.
25. An operational amplifier is a high gain direct coupled amplifier with high input and low output impedance to which feedback is added to regulate overall response.

**IV. ANSWER BRIEFLY:**

- 26. Define Lorentz force?
  
  
  
  
  
  
  
  
  
  
- 27. What is the principle of a galvanometer?
  
  
  
  
  
  
  
  
  
  
- 28. What is spherical aberration?
  
  
  
  
  
  
  
  
  
  
- 29. Define double refraction?
  
  
  
  
  
  
  
  
  
  
- 30. What is CMRR?



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

**SUBJECT CODE : PH/AC/PM23**

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**BRANCH I – MATHEMATICS**

**SECOND SEMESTER**

**COURSE : ALLIED – CORE**

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**TIME : 2 HOURS**

**MAX. MARKS : 70**

**SECTION B**

**ANSWER ANY FIVE QUESTIONS:**

**(5 × 6 = 30)**

1. The current sensitivity of a ballistic galvanometer is  $2.2 \times 10^{-9}$  amp for a deflection of 1mm on a scale kept at a distance of 1m. Calculate the charge sensitivity of the galvanometer if time period of the coil is 6.2 seconds.
2. A telescope with an objective of focal length 50cm is used to bring into view an object 150cm distant. When the eyepiece is adjusted to form the image at infinity, the magnifying power is 5 a) Calculate the focal length of the eyepiece? B) Calculate the magnifying power of the telescope if the eye piece is adjusted to view objects at infinity?
3. A 20cm long tube containing sugar solution rotates the plane of polarization by  $11^\circ$ . If the specific rotation of sugar is  $66^\circ$ . Calculate the strength of the solution?
4. Draw the circuit diagram of summing, difference, differential and integral operational amplifier?
5. How far should be the two protons if electric force between them is equal to the weight of a proton?
6. In a Newton's rings experiments, the diameter of the 15<sup>th</sup> ring was 0.590cm and the diameter of the 5<sup>th</sup> ring was 0.336cm. If the radius of the Plano-convex lens is 100cm. Calculate the wavelength of light used?
7. Distinguish between emission and absorption spectra?

**SECTION – C**

**ANSWER ANY TWO QUESTIONS:**

**(2 × 20 = 40)**

8. Define capacity. Describe an expression for the capacity of a parallel plate condenser and discuss the effect of introducing a dielectric in it.
9. Give the theory of a plane transmission grating and describe how it is used to determine the wavelength of light.
10. What is meant by chromatic aberration? Deduce the condition for achromatic of two lenses separated by a distance.
11. Draw the logic diagram of OR-AND-NOT gates using diodes and transistors. Give its truth table.

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