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FE | Sem - II CBGS 27/11/13
APP. Physics - II

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13

Con. 5848-13. **GX-10130**

(REVISED)

(2 Hours) **[Total Marks : 60**

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **three** questions from Q.no. 2 to Q.no. 6.
(3) Assume **suitable** data and **symbol** if required.
(4) **Figures** to the right indicate full **marks.**

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1. Attempt any **five** : -
   (a) Explain why an extensive thin film appears black in reflected light ? **3**
   (b) How will you increase the resolving power of a diffraction grating ? **3**
   (c) Calculate the numerical aparture of a fiber with core index n_1 = 1.01 and cladding index ~~x_2 = 1.55~~ $n_2 = 1.55$ (1.61) **3**
   (d) What is the difference between spontaneous and stimulated emissions. **3**
   (e) An electron is bound by a potential which closely approaches an infinite sqaure well of width 2.5 x 10^{-10}m. Calculate first lowest permissible energy for electron. **3**
   (f) Write any two applications of CRO. **3**
   (g) What is MAGLEV ? **3**

2. (a) What do you understand by anti reflection coating ? Derive the conditions with proper diagram. **8**
   (b) What is N.A. ? Consider a multimode step under fibre with n_1 = 1.53 and n_2 = 1.50 and ~~x_2 = 1m~~ Lambda = 1 micrometer. If the core radius = 50pm micrometer than calculate the ~~realised~~ normalized frequency of the fibre (V) and the number of guided mode. **7**

Lambda = 1 mm mm

3. (a) What is the difference between holography and photography ? Discuss the construction and reconstruction of image in holography with neat diagram **8**
   (b) Derive the conditions for maxima and minima due to interference of light reflected from thin film of uniform thickness. **7**

4. (a) What is the highest order spectrum which can be seen with monochromatic light of wavelength 6000 A^0 by means of a diffraction grating with 5000 lines / cm. **5**
   (b) Explain the Hesenberg's uncertainity principle. **5**
   (c) What are Type I and Type II superreconductors ? **5**

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5. (a) A plane grating just resolve two lines in the second order. Calculate the grating element if d λ = 6A^0, λ = 6 x 10^{-5cm} and the width of the ruled surface is 2cm. **5**
   (b) Derive shrodingers time dependent wave equation. **5**
   (c) Explain the working of SEM with a neat diagram. **5**

6. (a) Find the energy of the neutron in units of electron volts where De-broglie wavelemgth is 1 $\overset{0}{A}$ **5**
   mass of neutron = 1.674 x 10^{-27}kg
   planck's constant = 6.620 x 10^{-34} J.sees
   (b) Write a short note on electrostatic forcussing. **5**
   (c) What are carbon tubes and what are their properties. **5**

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