Dec-2022

Paper / Subject Code: 29702 / Applied Physics - II.

F.E. (All Branches) (CBCGS) (Sem-I)

[Time: 2 Hours] **[Marks: 60]**

Please check whether you have got the right Question Paper

N.B. 1 Question No.1 is Compulsory
2 Attempt any three questions from the remaining questions Nos.2 to 6
3 Assume Suitable data wherever required.
4 Figures to the right indicate marks.

Q1 **Attempt any five from the following (3 marks each)** **15**

1(a) Explain why we see beautiful colors in thin film when is exposed to sun light.
(b) What is the difference between spontaneous and stimulated emission?
(c) Calculate V number for an optical fiber having numerical aperture 0.25 and core Diameter 20 μm if it is operated at 1.55 μm.
(d) Explain physical significance of divergence.
(e) Explain the measurement of frequency of AC signal using CRO.
(f) What are different techniques to synthesis nanomaterial?
(g) A grating has 620 rulings/mm and is 5.05mm wide. What is the smallest wavelength interval that can be resolved in the third order at λ=481nm?

Q2 A Derive the conditions for maxima and minima due to interference of light reflected from thin film of uniform thickness. **08**

B Derive the expression for numerical Aperture for a step index fiber. The N.A. of an optical fiber is 0.5 and core R.I. is 1.54. Find refractive index of cladding **07**

Q3 A With neat sketch explain principle, construction, energy diagram and specially of Nd : YAG laser **08**

B What is meant by diffraction & diffraction grating? How it is useful for determination of wavelength of monochromatic source? **07**

Q4 A Show that divergence of a curl is equal to zero **05**

B Explain the construction & working of CRT **05**

C Diameter of the 15th dark ring was 0.59 cm in a Newton's ring experiment. When a liquid is used in placed of air, the diameter of that ring is decreased by 0.09 cm. What is the refractive index of the liquid? **05**

Q5 A Explain the working of AFM with a neat diagram &its applications **05**

B Write integral form of all Maxwell's equations **05**

C An electron enters a uniform magnetic field (B) = 0.23 wb/m^2 at an angle 45 to B determine the radius and pitch of the helical path. Speed of electron is $3x10^7$m/s. **05**

Q6 A What is curl of a vector? Explain its significance. **05**

B What is holography? Differentiate between Holography and photography **05**

C What do you understand by anti-reflection coating? Derive the conditions with proper diagram **05**

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