Department of Physics, ranch ECE

University Institute of Engineering and Technology,
CSJM University, anpur

Subject: Physics (PHY- S102)

Semester.2022-23 (Even Semester) Year: 1st Year (2K22)

End Semester Examination, June 23

Time: 3 hrs Maximum marks 40

All questions are compulsory

Section - A

8 marks (8 question of 1 marks each)

1. The refractive index of core and cladding of an optical fiber are 1.50 and 1.45 respectively. Calculate the NA, the acceptance angle and the critical angle of optical fiber.
2. Define divergence.
3. Define diffraction.
4. Define polarization.
5. In a two slit interference pattern at a point we observe 10 th order maximum for L= 7000A^0. What order will be visible here? If the source of light is replaced by light of wavelength 5000A^0?
6. Make suitable figure of cross-sectional view of an optical fiber.
7. Define electric flux.
8. Define demagnetization and make suitable figure also.

Section-B

16 mark (8 questions of 2 marks each).

9. A step index fiber has a core index 1.52 diameter 29μm and fractional index difference 0.0007.If the operating wavelength is 1.3 μm, determine the V number and the number of modes supported by the fiber.
10. A parallel beam of light of wavelength 5460A^0 is incident at an angle of 30^0 on a plane transmission grating which has 6000 lines /cm. find the highest order spectrum that can be observed.
11. White light falls normally upon a film of soapy water whose thickness is 5×10^{-5}cm and refractive index is 1.33.What wavelength in the suitable region will be reflected more strongly?.
12. Derive deviation without dispersion in case of flint and crown glass.
13. Derive and find maximum and minimum intensities of interference due to reflected light in thin film.
14. Derive and explain plane transmission diffraction grating (N-Slit) and find principal maxima, minima and secondary maxima.
15. Explain and find electric field due to a charged spherical shell (i) When point lies outside the shell.(ii) When point lies on the surface of the shell.
16. Derive and explain construction and working of Nicol Prism with suitable figure.

Section - C

16 mark (4 questions of 4 marks each).

17. Derive and explain superposition of two plane polarized wave having perpendicular vibration and show four special cases also.
18. Explain and prove Langevin theory of paramagnetism and find $L(a)=\mu/\mu_s=\text{Cot } ha-1/a$.
19. Calculate the Div $\vec{A}=\vec{\Delta}.\vec{A}$ when $\vec{A}=ix/r + jy/r +kz/r$, Where $r^2=x^2+y^2+z^2$.
20. Explain and find acceptance angle and numerical aperture and write its physical significance also.

THE- END