Reg. No. : .....

Name : .....

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D – 5365

Combined First and Second Semester B.Tech. Degree Examination, March 2018

(2008 Scheme)

08-102 : ENGINEERING PHYSICS (CMNPHETARUFBS)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What do you mean by 'Quality factor' of a damped harmonic oscillator ?
2. Show that electromagnetic waves in free space are transverse in nature.
3. Briefly explain BCS theory of superconductivity.
4. What is coherence ? Explain the terms 'spatial coherence' and 'temporal coherence'.
5. Define 'Resolving power' of a grating. Explain Rayleigh's criterion.
6. Describe the working of a Nicol prism.
7. Explain the terms 'proper length' and 'length contraction' in relativity. Obtain an expression for the contracted length.
8. What do you mean by 'eigen values' and 'eigen functions' ? Show that e^{2x} is an eigen function for the operator d^2/dx^2.
9. What is phase space ? Show that the volume of a unit cell in phase space in quantum statistics is h^f.
10. Briefly explain the recording and reconstruction processes in holography.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Assuming that a wave pulse is moving in the positive X-direction, deduce one dimensional wave equation. If the displacement of a three dimensional wave is $10 \cos(2x + 4y - \omega t)$, give the unit vector along the direction of propagation of the wave.

12. Starting from basic laws of electricity and magnetism, deduce Maxwell's equations.

13. Define 'Packing factor' and 'co-ordination number' for crystal lattices. Obtain the packing factor for SCC, BCC and FCC lattices. **(2×10=20 Marks)**

Module – II

14. With necessary theory, describe the method of determination of the wavelength of a monochromatic radiation using Newton's rings arrangement.

15. What is Fraunhofer diffraction ? Give the theory of formation of diffraction pattern using a single slit.

16. Describe Michelson-Morley experiment and discuss the results. **(2×10=20 Marks)**

Module – III

17. Deduce time-independent Schrödinger equation and discuss its importance in wave mechanics.

18. What are the important postulates of MB, BE and FD statistics ? Derive Planck's radiation formula assuming black body radiation as an ideal boson gas.

19. With necessary diagrams, explain the principle, working and construction of He-Ne Laser. **(2×10=20 Marks)**