

[Total No. of Questions: 09]
Uni. Roll No.

[Total No. of Pages: 1]

Program: B.Tech.
Semester: 1,2 (2018)
Name of Subject: Physics
Subject Code: BSC-101
Paper ID: 15925

Time Allowed: 02 Hours

Max. Marks: 60

NOTE:

1. Each question is of 10 marks.
2. Attempt any six questions out of nine
3. Any missing data may be assumed appropriately

06-07-21(M)

1. (i)What are Maxwell's equations? (2)
(ii)Write down Maxwell's equations and state physical significance of each equation. (8)
2. (i)What is active medium, population inversion and optical pumping? (5)
(ii)Give their importance in study of lasers. Why Helium is mixed with Neon in He-Ne laser? (5)
3. (i)Describe briefly the construction and working of an optical fibre. (5)
(ii)What are the various kinds of losses, a light suffers while propagating through a fibre? (5)
4. (i)Distinguish between intrinsic and extrinsic semiconductors. (5)
(ii)Discuss the location of Fermi levels under suitable limiting conditions with necessary theory. (5)
5. (i) Differentiate between group and phase velocities. Show that the group velocity of particle is equal to the velocity of the particle. (6)
(ii)Calculate the velocity and de Broglie wavelength of a proton energy 10^5 eV. Given that: mass of proton= 1.66×10^{-34} g; Planck's constant= 6.6×10^{-27} erg sec; and charge on electron= 4.8×10^{-10} e. s. u. (4)
6. Define a simple harmonic motion and derive a relation for velocity and acceleration of a particle executing S.H.M. (10)
7. Describe properties of diamagnetic, paramagnetic and ferromagnetic materials. (10)
8. Explain Meissner effect? Write some important applications of nanotechnology. (10)
9. (i)What do you understand by gradient of a scalar field? (4)
(ii)Show that curl of grad $\phi = 0$, where ϕ is any scalar function. (6)