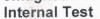# VP & RPTP Science College

Vallabh Vidyanagar-388120

B.Sc. (Semester - 4) Subject: Physics Course: US04CPHY01
Title of the paper: Electromagnetic Theory and Spectroscopy
Internal Test

Date: 07-3-2017, Tuesday   Time: 3.00 pm to 4.30 pm   Total Marks: 25

Q-1 MCQs: [3]

1. The equation $\nabla^2 V = 0$ is called _____.

    (a) Laplace's equation   (b) Poisson's equation
    (c) Ampere's equation   (d) none of these

2. In Biot-Savart law formula μ_0 is called_____.

    (a) Permeability of the given medium   (b) Permittivity of the given medium
    (c) Permeability of free space   (d) Permittivity of free space

3. The relation _____ is known as Wein's displacement law.

    (a) $\lambda_m + T = $ Constant   (b) $\lambda_m - T = $ Constant
    (c) $\lambda_m \times T = $ Constant   (d) $\lambda_m \div T = $ Constant

Q-2 Short Questions [Attempt any TWO]: [4]

[a] What is an electric potential? Give its units.
[b] Prove that magnetic forces do not work.
[c] Define and explain importance of wave number in spectroscopy.

Q-3 Write a note on: Electric field. [6]

<div align="center">OR</div>

Q-3 Obtain formula for the energy of a point charge distribution. [6]

Q-4 Compare: Magnetostatics and Electrostatics. [6]

<div align="center">OR</div>

Q-4 State Biot-Savart law. Using the Biot-Savart law, find the magnetic field a [6] distance *s* from a long straight wire carrying steady current I.

Q-5 Name various quantum numbers and explain their physical interpretation. [6]

<div align="center">OR</div>

Q-5 What is Zeeman effect? Describe experimental study of Zeeman effect [6] Explain classical interpretation of normal Zeeman effect.