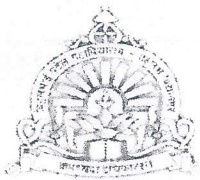


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A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester II) External Examination - 2025

Subject Code: US02MAPHY01: SUBJECT NAME: PHYSICS

Date: 08-04-2025

Day: Tuesday

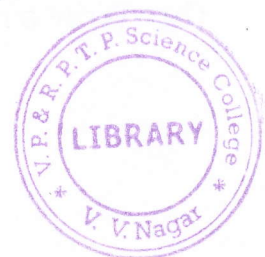
Time: 02:00 pm to 04:30 pm

Total Marks :50

Note: Figures to the right indicate marks of the question.

Q. 1. Write the most appropriate answer from the following multiple-choice questions. [10]

1. Which one is a vector quantity?
(a) temperature (b) force (c) mass (d) distance
2. Which theorem gives relation between volume integral and surface integral?
(a) Stock's (b) Green's (c) Gauss's (d) Poisson's
3. The magnitude of a unit vector is ____.
(a) infinite (b) unity (c) zero (d) >1
4. According to special theory of relativity, the speed of light in free space is ____.
(a) infinite (b) constant (c) zero (d) non predictable
5. A set of coordinate axes with respect to which measurements are made is called ____.
(a) frame of reference (b) inertial frame of reference
(c) non-inertial frame of reference (d) absolute frame of reference
6. Which is a closed path in a network?
(a) node (b) junction (c) branch (d) mesh
7. Which bridge is used to determine the unknown frequency of a source?
(a) Schering (b) Maxwell (c) Ampere (d) Wien
8. Which of these converts pulsating voltage from a rectifier into smooth dc voltage?
(a) filter (b) transformer (c) resistance (d) rectifier
9. Which diode is used in a rectifier circuit?
(a) signal (b) power (c) zener (d) LED
10. Which is the middle region in a transistor?
(a) collector (b) base (c) emitter (d) battery



(P.T.O.)

Q. 2 Define curl of a vector function. Discuss its physical interpretation and show that $\text{Curl } \vec{V} = \vec{\nabla} \times \vec{V}$. [10]

OR

- (a) Prove that the line integral around any closed path in a vector field is zero. [05]
(b) State and prove Stoke's' theorem. [05]

Q. 3 Explain selection of frame of reference and define (i) inertial and (ii) non-inertial frame of references. Derive Galilean transformation equations and prove that acceleration is invariant under Galilean transformations. [10]

OR

- (a) What is the phenomena of time dilation? Explain it. [05]
(b) Discuss Lorentz-Fitzgerald length contraction. [05]

Q. 4 With proper diagram explain (i) branch (ii) loop and (iii) mesh of a network. Explain mesh current analysis method for a two mesh network with suitable example. [10]

OR

- (a) Draw structure of a Maxwell bridge and explain its working principle. [05]
(b) With circuit diagram explain working principle of a Schering bridge. [05]

Q. 5 What is a rectifier? With proper diagram explain construction and working of a Half-Wave rectifier. Obtain expression for its output dc voltage. [10]

OR

- (a) Draw construction of a Centre-Tap rectifier and explain its working. [05]
(b) Write a note on light emitting diodes. [05]

