



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 2) External Examination – 2025
 Subject Code: **US02MIPHY01**
 Subject Title: **Network Theory, AC Bridges and Basic Electronics**

Date: 09-04-2025, (Wednesday)

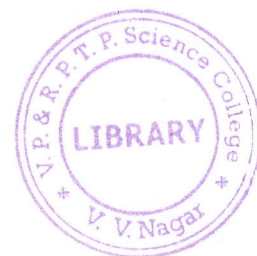
Time: 2:00 PM to 3:30 PM (1.5 HRS.)

Total marks: 25

Note: (i) The symbols have their usual meaning.
 (ii) The figure to the right side indicates marks.

Q-1 Write the most appropriate answer from the following multiple-choice [5] questions:

- (1) A point in a network where two or more circuit components are jointed together is called as _____.
 (A) Node (B) Junction (C) Branch (D) Tree
- (2) The Schering bridge is used to determine an unknown _____.
 (A) Reactance (B) Capacitance (C) Resistance (D) Frequency
- (3) The circuit that smooths out the pulsating DC is called a _____.
 (A) Transformer (B) Rectifier (C) Regulator (D) Filter
- (4) The rectification efficiency of a full-wave rectifier is _____.
 (A) 40.6 % (B) 48.2 % (C) 81.2 % (D) 100 %
- (5) PIV of a full-wave bridge rectifier circuit is _____.
 (A) V_m (B) $2 V_m$ (C) $\frac{V_m}{\pi}$ (D) $\frac{2 V_m}{\pi}$



- Q-2 (a) Explain mesh-current method of network analysis for a two-mesh network. [7]**
(b) State and explain voltage divider theorem. [3]

OR

- Q-2 (a) Explain the nodal method of network analysis for a one-node-pair network. [7]**
(b) Draw a labeled diagram of Maxwell's bridge. Explain its construction and [3] write an expression for the self-inductance of the coil using the bridge.

- Q-3 (a) Explain the construction and working of a half-wave rectifier. [7]**
(b) Define and explain: (i) ripple factor and (ii) rectification efficiency. [3]

OR

- Q-3 (a) Explain the construction and working of a centre-tap full-wave rectifier. [7]**
(b) Explain the construction of (i) PNP transistor and (ii) NPN transistor, and draw [3] their respective circuit symbols.

=====X=====