

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –
RAIGAD -402 103
Mid Semester Examination – October - 2017

Branch: M. Tech (CE/DC)

Sem.:- I

Subject with Subject Code:- Antenna Theory and Design (MTCEC102 / MTDCC102)

Model Solution

Instructions:-

1. Assume suitable data if necessary and state it clearly in the answer sheet.
2. Figures to the right, indicates full marks
3. Use of non-programmable calculator is allowed.

Q. No. 1. **Attempt any one of the following:** **Marks**

- a) Discuss the importance of impedance matching in antenna design. **08**

Design an impedance matching network for $Z_L = 90 - j25\Omega$ to a 50Ω line using a single shunt short circuit stub with the help of Smith chart.

Solution:

- Discussion on Impedance matching: 02 marks
- Smith chart: VSWR circle: 01 mark; Rotation of \bar{Y}_L : 01 mark; Calculation of stub distance: 02 marks; Calculation of stub length: 02 marks.

Evaluator must ensure that student had shown all the notation and calculations in detail.

- b) Explain following with respect to antenna: **08**

Solution:

Radiation pattern : 02 marks; Directivity: 01 mark; Gain: 01 marks; Radiation efficiency: 01 marks; Antenna polarization: 01 marks; Effective aperture: 02 marks

Q. No. 2. **Attempt any three of the following:**

- a) Discuss the different feeding techniques used in microstrip patch antenna design. **04**

Solution: 4 techniques with correct diagrams: 01 marks each

- b] Explain the concept of antenna array. Comment on the advantages and disadvantages of antenna array. 04
Solution: concept with diagram: 02 marks; advantages:01 marks; disadvantages:01 marks
- c] Discuss the role and utility of antenna in a communication system 04
Solution: correct description with suitable diagram: 02 marks each.
- d] Discuss the classification of antenna. 04
Solution: correct classification with diagram: 02 marks each
- e] Discuss the role of dielectric thickness of the material used in patch antenna design. 04
Solution: correct description with suitable diagram: 02 marks each.
