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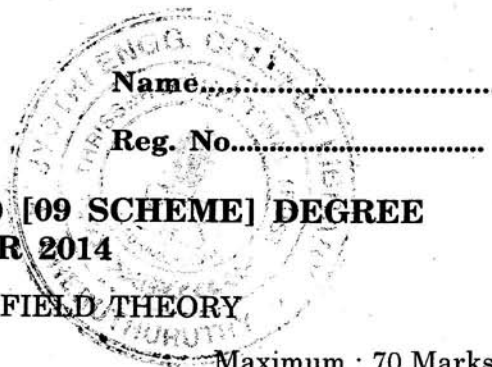
Name....................

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FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2014

EC/PTEC 09 503—ELECTROMAGNETIC FIELD THEORY

Time : Three Hours
Maximum : 70 Marks

Part A

*Answer **all** questions.*
Each question carries 2 marks.

1. Determine the gradient of the scalar $U = x^2y + xyz$.

2. What is Potential gradient ?

3. State Uniqueness theorem.

4. When a wave is said to be elliptically polarized ?

5. What is meant by stub matching ?

$(5 \times 2 = 10 \text{ marks})$

Part B

*Answer any **four** questions.*
Each question carries 5 marks.

1. Derive the expression for energy stored in an electric field.

2. Derive the boundary conditions at the interface separating conductor and free space in an electric field.

3. Derive the Maxwell's equation from the concept of non-existence of isolated magnetic charge.

4. Write the characteristics of transverse electric waves.

5. What is meant by reflection and refraction of plane waves ?

6. What are constant resistance circles and constant reactance curves in Smith chart ?

$(4 \times 5 = 20 \text{ marks})$

Part C

*Answer **all** questions.*
Each question carries 10 marks.

1. Derive the continuity equation in electrostatic field.

Or

2. Derive the expression for magnetic field intensity due to long solenoid.

Turn over

3. Derive the solution for free space conditions of plane electromagnetic waves.

Or

4. Derive the wave equation for a uniform plane waves in conducting medium.

5. Explain the reflection of plane wave at normal incidence.

Or

6. Explain the refraction of plane waves by conductor.

7. Explain with an example how to find the load impedance using Smith chart.

Or

8. Explain the TE wave propagation in circular, waveguides and their field distributions.

(4 × 10 = 40 marks)