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Printed Pages : 3 **TEC – 605**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3100 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VI) EXAMINATION, 2006-07

ANTENNA & WAVE PROPAGATION

Time : 3 Hours] *[Total Marks : 100*

Note : *(1) Attempt **all** the questions.*
*(2) Total no. of questions in this paper are **5**.*
*(3) Each question has **three** parts (questions).*
*(4) You have to attempt **two** parts from each question.*

1 Attempt any **two** questions of the following: **10×2=20**

(a) What is Antenna gain, Directivity, Antenna resistance and Antenna efficiency ?

(b) What is a horn antenna and how is it fed? What are its applications?

(c) Describe the behaviour of loop antenna, and show how they may be used for direction finding. What other applications do they have?

2 Attempt any of the **two** of the following: **10×2=20**

(a) Explain the End fire arrays and Broad side arrays.

(b) Explain the Non resonant antenna (Rhombic antenna) and show its radiation pattern. Why it is called broadband antenna?

(c) What do you understand by the term folded dipole. Explain the Yagi – Uda antenna with the help of driven element and parasitic elements.

3 Attempt any **two** of the following: **10×2=20**

(a) Explain the terms with the neat sketches :

(i) Virtual height

(ii) Space wave

(b) Explain maximum usable frequency and skip distance.

(c) Write down the differences between space wave and surface wave. Also write the Applications of Space wave and Surface wave.

4 Attempt any **two** of the following: **10×2=20**

(a) A Rectangular waveguide is filled by dielectric material $E_r = 9$ and has inside dimensions of 7×35 cm. It operates in the dominant TE_{10} mode. Determine (i) Cutoff frequency (ii) phase velocity at a frequency of 2 GHz and (iii) guided wavelength λ_g at the same frequency.

(b) Explain the excitation of modes of rectangular waveguides.

(c) Explain what is intrinsic wave impedance. Also derive the formula for intrinsic wave impedance in rectangular waveguide.

5 Attempt any **two** of the following : **10×2=20**

(a) Explain with the help of a schematic and simplified diagram the operation of a helix travelling wave tube (TWT).

(b) A two cavity klystron amplifier has the following parameters :

Beam voltage V_o = 900V, beam current I_o = 30 mA, frequency = f = 8 GHz, gap spacing in either cavity d = 1 mm, spacing between centres of cavity L = 4 cm, effective shunt impedance R_{sh} = 40 $k\Omega$. Determine :

(i) Electron velocity

(ii) DC transit time of electrons

(iii) Input voltage for maximum output voltage

(c) Explain the Magnetron with the help of its constructional diagram.