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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MID TERM (SUMMER SEMESTER EXAMINATION)- June-2018

COURSE CODE: **16B11WEC831** MAX. MARKS:**50**

COURSE NAME: **ANTENNA AND WAVE PROPOGATION**

COURSE CREDITS: 3 MAX. TIME: **2 Hrs**

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1. a) Describe the structure of the ionosphere and the part played by it in the long distance transmission of radio signals.

b) How a radio wave is reflected by the ionosphere? Explain Ionosphere anomalies **[6+4]**

Q2. a) Define, explain and hence bring out the difference between the characteristics, maximum power gain and maximum directive gain (directivity) of an antenna. **[6+4]**

b) An antenna has a loss resistance of 10 ohms, maximum power gain of 13.0103 dB and maximum directivity of 13.4242 dB. Calculate its radiation resistance.

Q3 Critically differentiate between **[15]**

a) Fresenal and Fauronhoffer zones

b) Antenna impedance and radiation resistance

c) Effective Aperture and physical aperture

d) Antenna Beam width and Bandwidth

e) Antenna impedance and radiation resistance

f) MUF and Critical frequency

Q4 a) What are various Radiation Patterns of Antennas Explain any two. **[6+4]**

b) What is the maximum power received at a distance of 0.5 km over free space 1 GHz circuit consisting of transmitting antenna with a 25 dB gain and receiving antenna with a 20 dB gain. The transmitting antenna input is 150 W.

Q5 Two aircrafts are flying at a altitude of 3000m and 5000m respectively. Calculate the maximum possible distance along the surface of the earth over which they can have effective communication by (i) accounting and (ii) not accounting the effect of curvature of earth. **[5]**

OR

Calculate the directivity of an antenna the power pattern of which is given by (4)

$$U(\theta, \varphi) = \begin{cases} \sin\theta \sin\varphi & 0 \le \theta \le \pi ; \ 0 \le \varphi \le \pi \\ 0 & 0 \le \theta \le \pi ; \ 0 \le \varphi \le 2\pi \end{cases}$$