Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Electromagnetic Waves & Antennas **Semester: VI**
Program: ASE+AVE **Time : 03 hrs.**
Course Code: ECEG 3014 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Write down the formulations for Gauss's Law, Faraday's Law and Ampere's Law	**4**	**CO1**
Q 2	Distinguish plane wave in free space and conductor	**4**	**CO2**
Q 3	Describe the power density formulations for wave propagation in space	**4**	**CO3**
Q 4	Discuss Isotropic antenna and the radiation pattern	**4**	**CO4**
Q 5	Write short notes on Ground Wave attenuation	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Find the electric field strength at operating wavelength of 300m, when transmitter and receiver antennas are of heights 10m and 8m respectively and are 15km apart. Assume that antenna current is 10mA.	**10**	**CO2**
Q 7	The power transmitted from a transmitter is 10kw, and antenna gain is 40dB. Find out the power density at any point that is located at the distance of 10km away from transmitter.	**10**	**CO3**
Q 8	If the power transmitted from a transmitter is 20kW and gains of transmitting and receiving antennas are 50dB and 20dB respectively then calculate the maximum power received at a distance of 10km over free space for 3GHz transmission frequency.	**10**	**CO 4**
Q 9	A sky wave of frequency 30MHz is incident on E-layer at an angle of 30 degrees. Find out the angle of refraction if the electron density in E-Layer is 500000 e/m^3.	**10**	**CO4**

SECTION-C
(2Qx20M=40 Marks)

Q 10	Deduce the relationship for Maxwell Equation and Helmholtz equation with the consideration of all boundary conditions and Poynting theorem	**20**	**CO1**
Q 11	Derive the refractive index for ionosphere. Deduce relationship for plasma frequency, critical frequency and MUF.	**20**	**CO 3**