Name: **Enrolment No:**	

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

Course: **Antenna & Wave Propagation** **Semester: VI**
Program: B.Tech(ECE) **Course Code: ECEG3041**
Time : 03 hrs. **Max. Marks: 100**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Design binomial array with 7 elements and find the array factor.	**4**	**CO3**
Q2.	Design yagi-uda antenna with 7 elements.	**4**	**CO4**
Q3.	Define radio horizon. Calculate the maximum LOS distance and power received between 2 antennas of gains 25 dB each are placed at a height of 16 m and 10 m above the ground if the communication link is to be established when power of 1W is transmitted	**4**	**CO5**
Q4.	Design rhombic antenna to produce the maximum beam at 17.5 deg.	**4**	**CO4**
Q5.	Find the directivity if $U = U_o \sin(\pi \sin\theta)$ for $\theta=0$ to $\pi/2$ and $Ø=0$ to 2π.	**4**	**CO1**

SECTION B
(4Qx10M= 40 Marks)

Q6	Derive Lorentz gauze condition and explain babinets and Love's principle.	**10**	**CO1**
Q7.	Deduce an expression for fmuf for actual and flat earth.	**10**	**CO5**
Q8.	Derive the fields radiated by conductor of finite length 'l' carrying the progressive current distribution along the z-axis.	**10**	**CO2**
Q9.	Calculate and plot the radiation pattern of linear end fire side array of 12 elements excited uniformly with spacing of $\lambda/4$ between the individual elements. Calculate the directivity.	**10**	**CO3**

SECTION-C
(2Qx20M=40 Marks)

Q 10	Derive the fields radiated by Microstrip patch antenna using the cavity model.	**20**	**CO4**
Q11a	Design Tchebyschev array with 5 elements to produce -40 dB down the main lobe maxima. Find the array factor and approximate directivity if the spacing between the elements is $3\lambda/8$.	**10**	**CO3**
Q11b.	Design a 10-turn helix to operate in the axial mode. For an optimum design,. Determine the. Circumference (in λ_o), pitch angle (*in degrees*), and separation between turns (in λ_o), Rr, HPBW and Directivity of the helix.	**10**	**CO2**