Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Programme Name: B Tech (Aerospace Engineering with Spz. In Avionics **Semester : VIII**
Course Name : RADAR Technology **Time : 03 hrs**
Course Code : AVEG 4009P **Max. Marks: 100**
Nos. of page(s) : 02
Schematic diagrams are must in each answers

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Describe SNR in radar operations.	**4**	**CO1**
Q 2	What is Clutter and sub-clutter visibilities?	**4**	**CO2**
Q 3	Explain MTI radar and its limitations	**4**	**CO3**
Q 4	What is the difference between blind phase and blind speed?	**4**	**CO 4**
Q 5	How to estimate the gain of radar antennas?	**4**	**CO 4**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	Discuss the framework of the output response of MTI radars and what would be the effect, if we uses, Horn antennas instead of parabolic reflectors?	**10**	**CO4**
Q 7	How to determine the coordinates in radar systems, if the flying machine is at certain height "H".	**10**	**CO 3**
Q 8	MTI is operating at a PRF of 2KHz, find the lowest blind speed. If it is operating at 3cm wavelengths.	**10**	**CO 2**
Q 9	A radar operating at 8 GHz with the peak power of 400kW, The power gain of antenna is 4.5k and MDS is 10^{-15} W. Calculate the maximum range of radar if the effective area is 15 square meters and RCS of 6 square meters.	**10**	**CO 1**
SECTION-C **(2Qx20M=40 Marks)**			
Q 10	What is the peak power of a radar whose average power is 200w, pulse width of 1 microsec and has PRF of 1Khz? Also calculate the range of this ground-based air surveillance radar if it has to detect a target with a RCS of 2 square meters when it operates at a frequency of 2.9 GHz with	**20**	**CO2**

	a shaped antenna that is 5m wide, 2.7 m height, antenna aperture efficiency of 0.6 and MDS is 1Pw.		
Q 11	Derive the range obtained at a particular frequency of operation. Also, modify the equation with the implementation of SNR and Noise figure in to the range equation. How could you conclude the equation for the obtained result? What is the role of Boltzmann's constants?	**20**	**CO 4**