2006-GURU GOBIND SING INDRAPRASTHA UNIVERSITY

VISEMESTER B.TECH SECOND TERM EXAMINATION

MICROWAVE AND RADAR ENGINEERING

TIME-11/2HOUR
MARKS-40

Note: Answer all questions. Each question carries 10 marks.

Q1 (a) What is velocity modulation? Explain how velocity modulation is utilized in O-type tube amplifier.

(b) What is the bunching process in Reflex Klystron tube. Discuss with Applegate diagram.

(c) Write down the performance characteristics a Traveling Wave Tube (TWT).

Q2 (a) Derive the expression for Hull's cutoff magnetic flux density of Cylindrical Cavity Magnetron.

(b)A Reflex-Klystron operates at the peak mode of n=2 with beam voltage Vo=300V, beam current I0=40mA, and RF signal voltage V1=50V. Determine the:

a) Input power

b) Output power

c) Efficiency

Given that bunching parameter = 2.408 and Bessel's function = 0.52

Q3(a)Discuss Power-frequency, current-frequency, and voltage-frequency limitations of microwave transistors.

(b) Explain the operation of a varactor diode. Discuss its figure of merits.

Q4(a)A helical TWT has a diameter of 5mm with 100 turns per cm. Calculate the axial phase velocity and the beam voltage at which the TWT can be operated.

(b) Write short notes on :

1) Frequency measurement

2) VSWR measurement

3) Phase shift measurement