

TE | ETAX | VI (R.) 23/11/12  
MDC

ws Sept, 2012 (Is) 103  
Con. 8255-12.

KR-8666

(3 Hours)

[ Total Marks : 100

- N. B. : (1) Question No. 1 is **compulsory**.  
(2) Solve any **four** questions from remaining questions.  
(3) Assume **suitable** data wherever **required**.  
(4) **Figures** to the **right** indicate **full** marks.

1. (a) List and explain the advantage and disadvantage of microwave along with applications. 20  
(b) Differentiate between TWTA and Klystron.  
(c) Why  $TM_{01}$  or  $TM_{10}$  mode is not possible in rectangular waveguide.  
(d) Describe the importance of the 'S' parameter use in microwave.
2. (a) Obtain an expression for the modulated velocity of the electron beam in Klystron amplifier in terms of the beam coupling coefficient  $\beta_i$  and the average transit angle  $\theta_0$ . 12  
(b) A Reflex Klystron operates at the peak mode of  $n = 2$  having the beam voltage and beam current of 350 V and 15 mA resp. If the signal voltage is 45 V. Calculate 8  
(i) Input power  
(ii) Output power  
(iii) Efficiency.
3. (a) Can TEM mode exist in hollow waveguide? Justify your answer. 5  
(b) Starting with Maxwell's equation. Derive the expression of  $TE_{mn}$  waves propagating in rectangular waveguide. 10  
(c) An air-filled rectangular waveguide of inside dimension  $7 \times 3.5$  cm operates in the dominant  $TE_{10}$  mode. 5  
Find :  
(i) Cutoff frequency  
(ii) Phase velocity of the wave at frequency 3.5 GHz.  
(iii) Guided wavelength at same frequency.
4. (a) Obtain the S-matrix of Magic Tee and with the help of it explain the working of Magic Tee. 5  
(b) Explain microwave propagation in ferrite devices. 5  
(c) Explain with neat diagram working of Gyrator. 5  
(d) Explain the working of Two-hole directional coupler. 5
5. (a) Explain in brief construction, principle and working of two valley model of Gunn Oscillator. 10  
(b) How TRAPATT generates Oscillations. 5  
(c) Describe the types of strip line in details. 5

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6. (a) What are slow wave structures ? Explain any one device that uses slow wave structure in detail. **10**
- (b) Describe the measurement of Low and High VSWR. **6**
- (c) Define :- **4**
- (i) Cutoff wavelength
  - (ii) Dominant mode
  - (iii) Phase velocity
  - (iv) Wave Impedance.
7. Write short notes on (any **four**) :- **20**
- (a) Magnetron
  - (b) Cavity Resonator
  - (c) Microwave Transistor
  - (d) Microwave Passive Devices
  - (e) Measurement of Microwave Power.
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**N.B.** (1) Question No. **1** is **compulsory**.

(2) Attempt any **four** questions from remaining **six** questions.

1. (a) Design a 8086 based system with following specifications :-- 12
  - CPU at 10 MHz in minimum mode operation
  - 32 KB SRAM using 8 KB devices
  - 64 KB EPROM using 16 KB devices

Design system with exhaustive decoding. Clearly show memory map with address ranges and draw a neat schematic for chip selection logic.
- (b) What is pipelining ? For PIC18F explain the concept of pipelining instruction, advantages and disadvantages. 8
2. (a) Write a program for performing a 64 bit/16 bit division using 8086 instruction set. The operand and the result is to be stored in the memory. 10
- (b) Write all addressing modes of 8086 with one example each and also state type of instructions. 10
3. (a) Explain different modes of operations of 8237 DMA controller. 10
- (b) Explain different functional blocks of programmable Interrupt Controller IC 8259. 10
4. (a) Explain modes of operations of 8255 in PPI in detail. 10
- (b) Explain in brief functional block diagram of DMA 8237. 10
5. (a) Explain block diagram of PIC18F architecture in brief with a neat diagram. 10
- (b) Explain PIC18F programming model. What is difference between W register and data registers ? Specify the size of program counter and its function. 10
6. (a) Write a program to divide the unsigned 16 bit number OFOF stored in data register REG1 and REG2 (MSB in REG2) by 8 using PIC18F. 10
- (b) Write note on PIC18F reset. 10
7. (a) Explain working and interface of numeric data coprocessor 8087 and 8086. 10
- (b) What are exceptions, hardware interrupts and software interrupts of 8086 ? Explain their priority structure and interrupt vector table. 10

04/12/12

Electronics - III / Electronic Instrumentation

VT-S.II.Exam. Nov -12- 63

Con. 8196-12.

KR-8945

( 3 Hours )

[ Total Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.  
(2) Attempt any **four** questions out of the remaining **six** questions.  
(3) Assume any **suitable** data whenever **required** but justify the **same**.

1. Attempt any **four** :- 20
- (a) Differentiate reproducibility and repeatability of an instrument.
  - (b) Differentiate sensors and transducers. Give two suitable examples of each.
  - (c) What is feedforward controller ? Discuss with suitable industrial example.
  - (d) Differentiate between HMI and SCADA.
  - (e) Give one application of logarithmic amplifier. Draw its circuit diagram also.
2. (a) Derive the expression for ramp response of first order instrumentation system. 10  
Draw its response and comment.
- (b) Discuss any one of the techniques of measurement of high and low pressure 10  
measurement each.
3. (a) Explain in detail digitally programmable gain Instrumentation Amplifier. 10
- (b) Draw and explain the block diagram of multichannel data acquisition system 10  
for Temperature, pressure and force measurement.
4. (a) Explain in detail cascade controller with block diagram and suitable example. 10
- (b) What are the needs of instrument calibration ? Explain any one of the methods 10  
in detail.
5. (a) Explain in detail ON-OFF controller. Describe the importance of dead zone 10  
also.
- (b) Draw the block diagram of Data logger. Differentiate between data logger 10  
and data acquisition system.
6. (a) Design a low pass active filter for cut-off frequency of 1KHz. 10
- (b) Explain any one of the techniques of analog to digital conversion. 10
7. Write short notes on (any two) :- 20
- (a) Types of errors in instruments
  - (b) pH and Viscosity measurement
  - (c) Composite controller.

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T.E. sem VI (Rev) 14 Dec. 2012.  
ETRX sub - PE.

VT-S.H.Exam. Oct.-12- 179

Con. 8174-12.

KR-9218

( 3 Hours )

[ Total Marks : 100

**N.B. :** (1) Question No. 1 is **compulsory**.

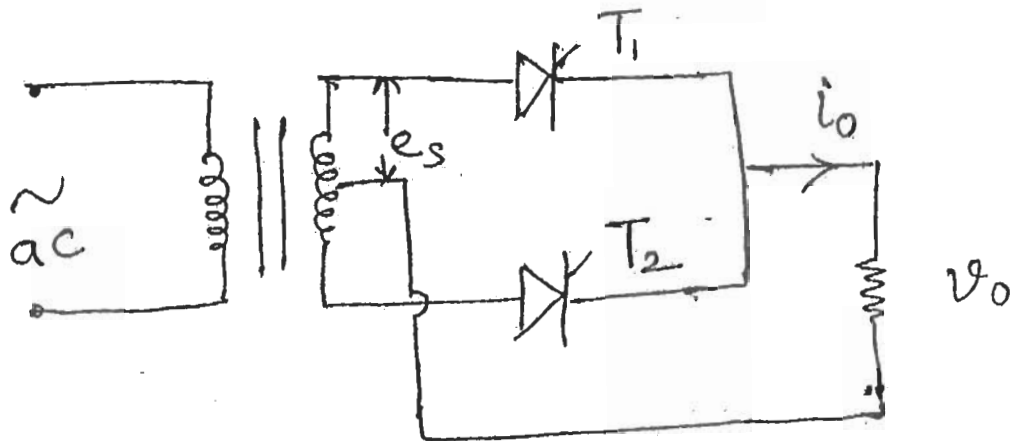
(2) Attempt any **four** questions out of remaining **six** questions.

(3) **Figures** to the **right** indicate **full** marks.

1. (a) How protection is offered to an SCR against excessive  $\frac{di}{dt}$  and  $\frac{dv}{dt}$  20  
(b) Compare BJT, SCR and IGBT.  
(c) Explain briefly Need of Electrical Isolation between gate and driver circuit.  
(d) Compare natural commutation with forced commutation of SCRs.
2. (a) Explain inverse cosine triggering circuit for SCR. How triggering angle  $\alpha$  is changed. 10  
(b) Explain with the circuit diagram zero voltage switch. 10
3. (a) Explain with neat circuit diagram a single phase full wave half controlled bridge rectifier for a resistive load. Draw a load voltage waveform at  $\alpha = 120^\circ$ . 10  
(b) Draw and design UJT Triggering circuit. The parameter of the UJT are  $V_{BB} = 30V$ ,  $\eta = 0.51$ ,  $I_p = 10 \mu A$ ,  $V_V = 3.5V$  and  $I_V = 10 mA$ , the frequency of oscillations is  $f = 60 Hz$ , and width of the triggering pulse is  $t_g = 50 \mu s$ . Assume  $V_D = 0.5V$  and  $C = 0.5 \mu F$ . 10
4. (a) Draw and explain 3  $\phi$  fully controlled rectifier with R load, draw various waveforms when  $\alpha = 60^\circ$ . 10  
(b) Explain full wave ac control using Triac and Diac. Draw waveforms. 10

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5. (a) The rectifier show in **figure** has a pure resistive load and zero leakage reactance, determine :- **10**
- the efficiency
  - the form factor
  - the ripple factor
  - the transformer utilization factor for firing angle  $\alpha = 0$ .



- (b) What is an IGBT ? Sketch the equivalent circuit and transfer characteristics **10**  
of an IGBT.
6. (a) Explain the constructional details and working of an enhancement type **10**  
power MOSFET.
- (b) Explain class C commutation of SCR along with waveforms. **10**
7. Write short notes on :- **10**
- Soft start circuit
  - Effect of free wheeling diode
  - Cooling of Semiconductor devices
  - External pulse commutation.