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1905E724

Candidate's Seat No :

B.Sc. (Sem.-V) Examination
302 CC Electronics

Time : 3 Hours}

May-2017

(Max. Marks : 70

- Instructions : (1) Figures to the right hand side indicate Full Marks.
(2) Symbols have their usual meaning
(3) All question carry equal marks.

Q:1 (a) Give brief account on 3×2 (mod-6) counter with necessary circuit diagram, Truth table and wave forms. (7)

OR

(a) Explain 3-bit synchronous counter giving circuit diagram, Truth table and wave forms. (7)

(b) Explain Moore and Mealy model giving their state transition diagram of sequence detector. (7)

OR

(b) Explain conversion between Moore and Mealy models (7)

Q:2 (a) Microprocessor 8085 has its signals classified into six groups, explain them briefly. (7)

OR

(a) Define (i) Instruction Cycle (ii) Machine Cycle and (iii) T-state (7)

If instruction $MVIA, 32H$ has 4 T-states for op-code fetch and 3 T-states for memory read cycle then find time of this instruction execution assuming 2 MHz clock frequency.

(b) Give schematic diagram for (i) Demultiplexing of Low-order address bus (ii) Generation of Read/Write control signals for memory and I/O. (7)

(b) Explain Flags given in Flag Register. (P.T.O) (7)

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Q:3(a) Draw neat and clean diagram for instruction (7)
2050 OUT 01H

OR

(a) Distinguish between memory mapped I/O and peripheral mapped I/O techniques of addressing (7)

(b)(i) Give status of S, Z and CY flags when contents of Register A = 93H and C = B7H added. (3)

(ii) What the difference in execution of instructions ADD 01H and INR A if Register A = FFH. (4)

OR

(b) Register B has 65H and A has 97H. Give status of flags S, Z and CY if instruction SUB B is executed. Also show the subtraction $97H - 65H$ using 2's complement method. (7)

Q:4(a) Assume accumulator contents are AAH and CY=0. Illustrate accumulator contents after execution of RLC instruction twice. (7)

OR

(a) Assume accumulator contents are AAH and CY=0. Illustrate accumulator contents after execution of RAL instruction twice. (7)

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(b) write program for transfer of 16 bytes of data stored in memory locations at xx50H to new memory locations starting at xx70H (7)

OR

(b) A set of three readings is stored in memory location starting at xx50H. Sort the readings in ascending order. Data(H) 87, 56, 42 (7)

Q:5 Answer following questions in one sentence. (14)

1. How many flip-flops can construct mod-1024 counter?
2. What is the difference between 5x2 and 2x5 decade counter?
3. What is called racing?
4. Why glitch occurs at the output of decoding gate?
5. Which signals are used in memory mapped I/O technique of addressing?
6. How many bytes does an IN instruction have?
7. How do STA and LDA instructions differ?
8. Which three instructions can make contents of register A zero?
9. Give illustration of RAL instruction.
10. Give illustration of LXI instruction.
11. How does serial counter differ from parallel counter?
12. What does instruction JMP do?
13. Why do we demultiplex $AD_7 - AD_0$?
14. Give illustration of CMA instruction.

Time : 3 Hours]

Instructions : (1) Figures to the right hand side indicate Full Marks.

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1.(a) Draw the circuit diagram of emitter coupled differential amplifier along with its small signal equivalent circuit using hybrid π model.

Derive the equations of A_{dm} , A_{cm} and CMRR for the same (8)

OR

Explain working of differential amplifier with the circuit for improving CMRR

(b) Explain transfer Characteristics of op-amp operation with related derivation (6)

OR

Explain the method of increasing input resistance of an op-amp.

2.(a) Mention the important features of an instrumentation amplifier.

Draw the circuit diagram of instrumentation amplifier being used with three op-amps. and derive the expression for output voltage (7)

OR

Discuss, with neat circuit diagram and necessary waveforms, the half wave and full wave rectifier using op-amp

(b) Explain following applications of an op-amp with circuit diagram

(I) Inverting AC amplifier

(II) Voltage to current converter with grounded load (7)

OR

(I) Non inverting summing amplifier

(II) Clipper (7)

3. (a) Draw the multiterminal functional block diagram of IC 723 positive voltage regulator and explain its function. (6)

OR

Explain the function of Positive voltage regulator using IC 723 with foldback current limiting circuit.

- (b) Draw the circuit diagram of three terminal adjustable voltage regulator and explain its working. Obtain expressions for stabilization factor S and output resistance R_o .

Calculate the value of adjustable resistor R_2 to provide output voltage 15 V using a three terminal adjustable voltage regulator having $V_{reg} = 5V$, $I_Q = 5mA$ and $R_1 = 100 \text{ ohms}$. (8)

OR

What are the basic features of current regulator? Draw the circuit diagram of open-loop current regulator along with its small signal equivalent circuit.

Explain its working and determine the output impedance.

4. (a) Draw the circuit diagram of basic switching buck regulator with its equivalent circuit and derive the important relation, which is useful in designing a buck switching regulator. (7)

OR

- (a) Discuss different methods of switching regulators

4(b) Mention the important characteristics of a free running type switching regulator and explain its working using the circuit diagram (7)

OR
Explain operation of positive switching regulator using IC LM 105

5. Answer, each of the following questions, in brief (14)

- (1) Mention the different configuration in which the differential amplifier can be used
- (2) Define CMRR
- (3) Why can current mirror be used as an active load
- (4) For, a given differential amplifier, if biasing current is $100\mu\text{A}$, then find the value of transconductance
- (5) Name the type of circuit used as a level shifter in differential amplifier
- (6) What do you mean by Voltage follower
- (7) What is the main advantage of Precision diode over the ordinary diode
- (8) Draw the input and output waveform of Clamper circuit
- (9) State two applications of $V \rightarrow I$ converter
- (10) An op-amp has Open loop differential gain 1,00,000 and Common mode gain 20. What is its CMR in decibels
- (11) Define load regulation
- (12) State two limitations of 3-terminal voltage regulator
- (13) What is function of series pass transistor?
- (14) What is the principle of SMPS?

Time : 3 Hours]

Q:1 (a) What is amplitude modulation? Derive the equation of amplitude modulated wave with necessary waveforms. (7)

OR

(a) Explain diagonal peak clipping in detail. (7)

(b) Derive the equation for Average power for sinusoidal AM. Also, derive the expression for effective voltage and current for sinusoidal AM. (7)

OR

(b) Explain the negative peak clipping in detail. (7)

Q:(2) What is frequency modulation ? Obtain an expression for the frequency modulated wave, when the modulating wave is a sine wave. Draw the necessary waveforms. Also, obtain expressions for the frequency spectrum and average power output in sinusoidal FM wave. (14)

OR

Q:2 Explain the phase modulation. Derive the expression for phase modulated wave. Give comparison among the AM, FM and PM . when the modulating signal is a step waveform. (14)

Q: 3 (a) explain the basic principle of antenna in detail. with necessary circuit diagram . (7)

OR

(a) Describe the resonance occurs in Half-wave dipole with appropriate diagram. Also, discuss the current and voltage distribution on a Half-wave dipole. (7)

(b) Write short note on Yagi antenna with necessary diagram. (7)

OR

(b) Define the following terms which are used in antenna theory. (7)

(i) Antenna pattern. (ii) Radiation resistance. (iii) Directive gain.

Q:4 Mention the different services rendered by Indian Domestic Satellite (INSAT) to the country. (14)

OR

Q:4 Explai the satellite communication system. Also, discuss about fixed satellite service.. (14)

Q:5 Ans in short. (14)

(i) How many types of modulations are there ?

(ii) What is the equation for modulation index in sinusoidal AM ?

(iii) What is geostationary satellite?

(iv) What is demodulation?

(v) In which type of modulation the modulated power remains equal to carrier power, AM or FM?

(P.T.O)

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- (vi) What is the maximum permissible value of modulation index in AM?
 - (vii) On what factors does the size and weight of spacecraft depend?
 - (viii) What is the folded dipole?
 - (ix) What is parasitic Elements in an antenna ?
 - (x) What is Beam width in antenna ?
 - (xi) Antenna rods are surrounded alternately by _____ and magnetic field.
 - (xii) The directive gain of an antenna is _____ as its length is increased.
 - (xiii) What is LNA in satellite earth station ?
 - (xiv) What is the main advantage of satellite communication for television?
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Q. 1(A) Write the principle of operation of Chopper type Voltmeter. Discuss the Chopper type DC amplifier in detail with necessary diagrams (10)

OR

- (i) Draw the block diagram of solid state voltmeter and explain
(ii) Draw the block diagram of true rms responding voltmeter and explain

(B) Write consideration in choosing an analog voltmeter. (04)

OR

Calculate the value of multiplier resistor for a 50Vrms ac range on the voltmeter - $I_{fsd} = 100 \mu A$, $R_m = 100 \Omega$ for full wave rectifier

Q. 2 (A) Draw the block diagram of Integrating type DVM and explain its working (10)

OR

(A) Draw the block diagram of Successive Approximation DVM and explain with suitable example

(B) Explain $3\frac{1}{2}$ digit. Define resolution (04)
Explain sensitivity of digital voltmeter

A $3\frac{1}{2}$ digit ^{OR} DVM is used for measuring

voltage - Determine Resolution. How would a voltage of 14.42 be displayed on 10V and 100V range

(Q 3)

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(A)

Describe the function of delay line. Explain distributed parameter delay line in detail. (08)

OR

Draw the diagram of postdeflection acceleration using meshless scan expansion (ans. Explain it)

(B) Draw neat and clean block diagram (06) of general purpose CRO. Explain its working of showing role of each block.

(OR)

(B) Write short note on Screens for CRTs.

Q 4 (A) Draw the block diagram of laboratory square wave and pulse generator. Explain with suitable diagrams.

OR

Draw the circuit of Astable Multivibrator. Explain its working with necessary diagrams.

(B) Write short note on piston attenuator. (06)

OR

(B) Write the characteristics of signal generator. Write the fundamental difference between pulse generator and square wave generator.

Q. 5 Answer in short

- (1) What is TVM
- (2) Write the difference between average responding voltmeter and peak responding voltmeter
- (3) Write full form of SAR
- (4) Write the formula for closed loop gain of feedback amplifier
- (5) Write two advantages of DVM.
- (6) Write an equation for multiplier resistor for built wave receiver
- (7) Write an equation for frequency for Hartley oscillator
- (8) Write function of signal generator
- (9) Write full form of ALC
- (10) What is Luminance
- (11) What is persistence
- (12) What are granules
- (13) Draw the effect of undercompensated probe.
- (14) Convert 13 dBm to volt

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