Subject Code:G0604/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

DIGITAL SYSTEM DESIGN

(Digital Systems & Computer Electronics)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Design a FSM that counts the following decimal sequence. 3,7,2,6,3,7,2,6,…. The count is to be represented directly by the contents of the D flip-flops. The counting starts when the control input C is asserted and stops whenever C is deasserted. Assume that the next state from all unused states is the state for the first count in the sequence.
   b) Write about the following:
   i) Races ii) Hazards

2. a) Draw the schematic for PLA and explain the principle. What are the advantages of PLD's?
   b) Implement a BCD to Excess-3 code converter by ROM. Calculate the cross point density of the implementation.

3. a) Draw the 3-bit parity checker circuit. Using path sensitization method, find the test vectors for the SA0 and SA1 faults on each line of the circuit?
   b) Define the terms 'failure' and 'fault'? Discuss the different fault models?

4. a) Determine complete test set of a given function using Boolean difference method that detect a SA0,SA1 faults at signal line x1, x4 and g(g=x1.x2) respectively.
   F= x1.x2+ x3.x4
   b) List out the comparisons between PALs, CPLDs, and FPGAs.

5. a) What are the basic elements of an ASM chart? Explain clearly with an example.
   b) Draw an ASM chart to design control logic of a binary multiplier. Realize the same using MUX, decoder and D-type flip flops.

6. a) Explain briefly about the circuit test approach with suitable example.
   b) Classify and briefly discuss about the fault detection experiments for the sequential circuits.

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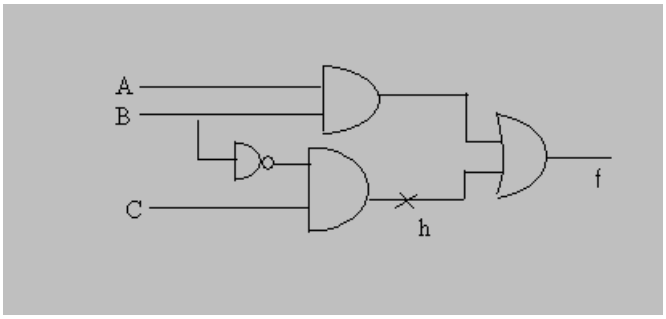
7. a) Differentiate between an ASM chart and a conventional flow chart?
   b) Apply signature analysis to the circuit shown below and generate the signatures using 4-bit LFSR with a feedback from 3rd flip flop.



8. Write short notes on the following.
   a) Capabilities and limitations of FSM
   b) Transition check approach in sequential circuits.

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Subject Code: G1504/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

MECHANICAL VIBRATIONS

(Common to MD, MED and CAD/CAM)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Define the following terms? (4M)
   - i) Periodic motion
   - ii) Fundamental mode of vibration
   - iii) Degree of freedom
   - iv) Simple harmonic motion

   b) Derive an expression for vibration response of a single degree of freedom system if the damping provided is under damped system. (8M)

2. a) Define logarithmic decrement (3M)

   b) For the spring, mass, damper system the charesteristic of the dash pot is such that when a constant force of 49N is applied to the piston its velocity is found to be constant at 0.12m/s. Given K=245N/m (9M)
   - i) Determine the value of C
   - ii) Would you expect the complete system to be periodic or aperiodic

3). Determine the natural frequencies and mode shapes of the system shown in the Fig.2.

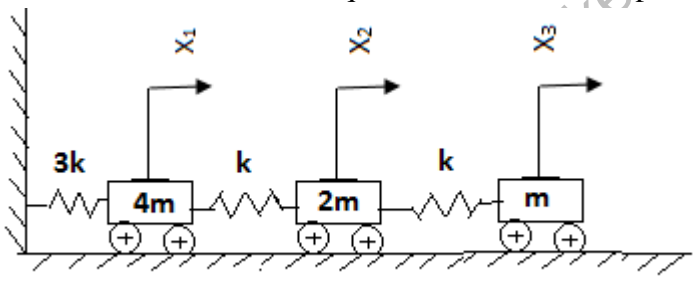

Fig.2

4). A three rotor system shown in Fig.3 as following physical constants. J_1=10kg-cm-s^2, J_2=7kg-cm-s^2, J_3=4kg-cm-s^2, k_{t1}=4X10^6 kg-cm/rad, k_{t2}=2X10^6 kg-cm/rad. Find the natural frequencies of the system. (12M)

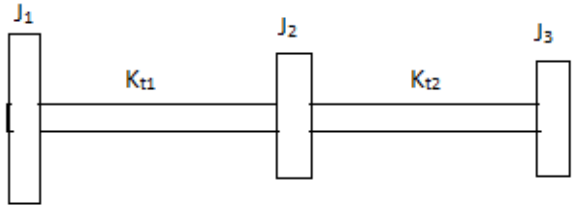

Fig.3

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5). Derive the wave equation of a transverse vibration of a beam and obtain its solution. (12M)

6). Using matrix iteration method, determine the natural frequencies of the system shown in Fig.4 (12M)

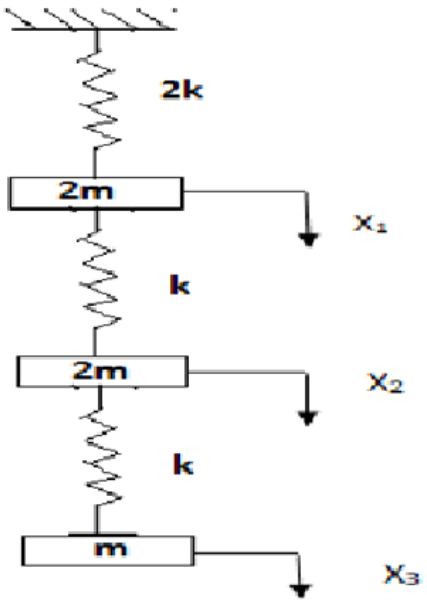

Fig.4

7. a) Calculate the whirling speed of the shaft supported by long bearings so as to give zero slope at both ends of the shaft (6M)

b) A rotor of mass 10 kg is mounted on a shaft of stiffness 500N/m at the rotor. The equivalent damping coefficient of the system is 200N-s/m. When the shaft rotates at 500rpm, the power dissipated in the damping is 8 watts. Determine the eccentricity of the rotor. (6M)

8. a) What are the principles on which a Vibrometer and an accelerometer are based ? Explain

b) Discuss Seismic instrument with help of a sketch? (6+6M)

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Subject Code: G5602/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

HVDC TRANSMISSION

(Common to HVE, HVPS, PS, PSC&A, EPE, EPS, PE, P&ID, PE&ED, PE&D, EM&D, PE&PS and APS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. Explain the types HVDC links.
2. Enumerate the special features of converter transformers.
3. With a neat sketch explain the working of 12pulse converter circuit.
4. What are the filters used for the elimination of harmonics.
5. Explain the terms constant extinction angle and constant ignition angle control.
6. Mention the importance of multi-terminal DC links.
7. Explain briefly about converter faults.
8. Describe the significance of surge arrester and state their application?

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Subject Code: G6806/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

DIGITAL SYSTEM DESIGN

(Common to VLSI & ES, ES & VLSI, VLSID & ES, ES & VLSID, VLSI, VLSID, VLSISD, VLSI&ME, ES, DE&CS, E&CE and DECE)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) With the help of a map for determining DAs and SSMs of minterms, find the CAMP printout of the function $f_1(a, b, c, d) = \sum (0, 2, 4, 5, 8, 9, 12, 14)$
   b) How is a selective prime cube detected in
      i) QM method
      ii) CAMP algorithm

2. a) Show the eight exit paths in ASM block emitting from the decision boxes that check the eight possible binary values for three control variables x, y and z.
   b) Design ASM chart for a binary multiplier and show the PLA control block diagram.

3. a) Explain the Boolean difference method with an example.
   b) A two level AND-OR circuit has four AND gates feeding one OR gate. The four AND gates realize the product terms $x_1x_3'x_4$, x_2x_4, $x_1'x_3'x_4'$ and $x_1x_2x_3$ respectively. Derive the a-test and b-test for detecting multiple stuck at faults.

4. a) Determine the distinguishing sequence for the following machine M by conducting Adaptive Distinguishing experiment.

Machine M

	NS,Z	
PS	X=0	X=1
A	C,0	A,1
B	D,0	C,1
C	B,1	D,1
D	C,1	A,0

   b) Define a diagnosable sequential machine and how it can be constructed.

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5. A PLA has the following SSR specifications. Find the maximum SCF for
   a) Only the input part
   b) Only the output part c) The entire PLA

   INPUT A= {1, 2, 6} B= {1, 5} C= {2, 3, 5, 6}
   D= {3, 4, 7, 9} E= {2, 3, 4, 8, 9} F= {7, 8, 9}
   OUTPUT Z_1= {2, 3, 6, 7, 8, 9} Z_2= {1, 4, 5}

6. a) Explain how to test a PLA circuits?
   b) Plot the following PLA on the map. Identify the undetectable faults. Determine a minimal test set for detectable faults.

x_1 x_2 x_3 x_4	Z_1 Z_2
0 2 2 1	1 0
2 1 1 2	1 1
0 1 2 1	0 1

7. Minimize the following function by the IISC algorithm
   f = 001210 + 001121 + 001001 + 001011 + 011122 + 011221 + 101000 +101010

8. a) Implement a BCD to Excess-3 code converter by ROM. Calculate the cross point density of the implementation.
   b) Write a short note on DFT schemes?

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