Subject Code: G0403/R13

M. Tech – I Semester Regular/Supplementary Examinations, April, 2015

SPECIAL MANUFACTURING PROCESSES

(Common to CAD/CAM and AMS)

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

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Define a Coating and explain about electro forming on the components?
   b) What is the purpose of ion implantation? Explain it with neat sketch?

2. Explain the working principle, and the effect of process variables on MRR in the capabilities of WEDM with a neat sketch?

3. Explain in detailed the ECM process with a neat sketch and write the advantages and limitations of it?

4. a) Name the different methods of processing of ceramics and explain in brief any one method?
   b) Briefly explain the applications of ceramics?

5. a) Explain the process of manufacture of fiber reinforced composites?
   b) What are the characteristics and applications of the metal matrix composites?

6. a) Explain the steps involved in selective laser sintering? What are its advantages and disadvantages over Steriolithiography ?
   b) Expand the role of fusion deposition modeling in rapid prototyping?

7. a) What is lithography? Explain X-ray lithography with neat diagram?
   b) Discuss the various bonding and packaging techniques applied to MEMS industries?

8. Write a brief note on :
   a) Thermal Spraying
   b) MMC, CMC and polymer matrix composites

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Subject Code: G0502/R13

M. Tech – I Semester Regular/Supplementary Examinations, April, 2015

COMPUTER ORGANIZATION/
COMPUTER ORGANIZATION AND ARCHITECTURE
(Common to CS and CS&E)

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

Answer any FIVE questions
All questions carry EQUAL marks

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1. a) Explain the Floating point representation of a number
   b) Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend
      i) 11010-10000 ii) 11010-1101
   c) Simplify the following Boolean function using k map and draw the circuit using logic gates $F(A,B,C,D) = \sum(0,1,2,3,7,8,10) + d(5,6,11,15)$ (4+4+4)

2. a) What is a decoder? Explain 3-to-8-line decoder with diagram
   b) What is a shift register? Explain the operation of bi-directional shift register with parallel load (6+6)

3. a) Explain the operation of half adder and Full adder with diagrams
   b) What is a Flip-Flop? Explain the operation of RS and JK Flip-Flops (6+6)

4. a) Explain the memory hierarchy in a computer system with block diagram
   b) Explain the basic components of memory management unit (6+6)

5. what is arithmetic instruction? What is arithmetic processor? Explain Hardware implementation of addition and subtraction with Signed-Magnitude Data (12)

6. a) Explain the Booth Multiplication algorithm
   b) Explain the BCD adder (6+6)

7. Explain the following data transfers in detail
   a) Priority Interrupt
   b) Daisy-Chaining Priority
   c) Priority Encoding (4+4+4)

8. a) Describe I/O peripherals of a computer
   b) Explain Input-Output Processor with neat block diagram (6+6)

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Subject Code: G4303/R13

M. Tech – I Semester Regular/Supplementary Examinations, April, 2015

ELECTRIC DRIVES - I

(Common to PE, P&ID, PE&ED, PE&D and EM&D)

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

Answer any FIVE questions

All questions carry EQUAL marks

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1 a). Develop criteria for evaluating the steady state stability of an electric drive?

b). A 220V, 1200 rpm, 10A separately, excited dc motor is fed from a single-phase full converter with ac source voltage of 230V, 50Hz. Armature circuit resistance is 1Ω. Armature current is continuous. Calculate firing angle for

i) rated motor torque at 600 rpm

ii) half the rated motor torque at (-600) rpm.

2 Draw the block diagram and explain the operation of four quadrant control using dual converter in dc motor drive?

3 A 220V, 750 rpm, 200A separately-excited dc motor has an armature resistance of 0.05 ohm. Armature is fed from a three-phase circulating current type dual converter, which consists of full converter-A (providing motoring operation in forward direction) and full converter-B (providing motoring operation in reverse direction). Line voltage of ac source is three-phase 400V. Calculate firing angles of converters for the following conditions (assuming continuous conduction)

i) Motoring operation at rated torque and 600 rpm.

ii) Regenerative braking operation at rated torque and 600 rpm.

4 Give step-by-step derivation for the transfer functions of a separately-excited dc motor drive, giving:

a) Transfer function of motor speed in terms of armature current.

b) Transfer function of armature current in terms of armature voltage.

5 a) Briefly explain the design of current regulator and speed controller in the feedback system?

b) Briefly describe about the dynamic simulation of the DC motor drive?

6 Explain the principle of operation of the chopper for the first, second, third, fourth quadrant operations with all relevant diagrams?

7 a) Explain closed loop control of one-quadrant chopper controlled separately excited DC motor drive for a step-command in speed reference in normalized form?

b) For the above drive, explain the principle of hysteresis current control with the help of waveform of current and block diagrams showing zero-current detectors and flip-flop?

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8 Briefly explain the following

a) Principle of closed loop control of dc drives
b) Necessity of freewheeling diode in three converters
c) Factors which limit the high frequency operation of chopper.

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Subject Code: G4503/R13

M. Tech – I Semester Regular/Supplementary Examinations, April, 2015

ADVANCED DIGITAL SIGNAL PROCESSING

(Common to S&SP, DIP, CE&SP, C&SP, SP&C, DE&CS, E&CE, CS, M&CE and DECE)

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

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) What is multi rate signal processing? Explain any two applications of multi rate signal processing?
   b) Derive the frequency domain transfer function of a decimator.

2. a) Give a brief account of poly phase filter structures.
   b) Discuss clearly the process of sampling rate conversion of band pass signals.

3. a) Discuss in brief about Bartlett method of power spectrum estimation.
   b) Determine the frequency resolution of Bartlett, Welch and Blackman-Tukey methods of power spectrum estimates for a quality factor Q=10. Assume that overlap in Welch method is 50% and length of sample sequence is 1024.

4. a) Derive the mean and variance of the power spectral estimate of the Blackman Tuckey method.
   b) Discuss the procedure for the design of IIR filters and what are the constraints in the design of IIR filters using analog structures.

5. a) Write a brief notes on lattice structures. Mention the advantages of lattice structures.
   b) Draw and explain the lattice ladder structure for realization of pole zero system.

6. a) What is the basic principle of parametric methods in power spectral estimation? Discuss various techniques in parametric method.
   b) Obtain the relation between model parameters and the Auto Correlation coefficients in AR model spectral estimation.

7. a) What are the quantization errors in FFT algorithm? Explain them.
   b) Explain about the errors result that from the truncation and rounding with an example.

8. Determine the mean and the auto correlation of the sequence x(n) generated by the MA(2) process described by the difference equation.
   $X(n) = w(n) - 2\,w(n-1) + w(n-2)$
   Where w(n) is the white noise process with variance σ^2_w

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