Subject Code: H1501/R13

M. Tech –II Semester Regular Examinations, September, 2014

OPTIMIZATION AND RELIABILITY

(Common to MD, ME and CAD/CAM)

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

Answer any FIVE questions

All questions carry EQUAL marks

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1. Maximize $f(x) = 1/2\ (x_1^2+x_2^2+x_3^2)$
   Subject to $g_1(x) = x_1-x_2=0$
   $g_2(x) = x_1+x_2+x_3-1=0$
   By Lagrange multiplier method.

2. (a) Maximize $f=8x_1+4x_2+x_1x_2-x_1^2-x_2^2$
   Subject to $2x_1+3x_2 \leq 24$
   $-5x_1+12x_2 \leq 24$
   $x_2 \leq 5$
   By applying Kuhn- Tucker conditions.
   (b) What is the significance of Lagrange multiplier method.

3. (a) Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ starting from the point $X_1 = [0 \quad 0]^T$
   (b) Show that the Newton's method finds the minimum of a quadratic function in one iteration.

4. (a) What is the reason for possible divergence of Newton's method.
   (b) What are types of penalty methods for handling constraints?

5. How do you perform i) crossover and ii) Mutation in GA? Explain with examples.

6. (a) Write the differences between GA and GP.
   (b) What is a genetic programming? What for it is used?

7. Discuss the procedural steps involved in NSGA.

8. Write the typical optimization model for a machining problem. Discuss the objective functions and the constraints involved.

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Subject Code: H6805/R13

M. Tech –II Semester Regular Examinations, September, 2014

DSP PROCESSORS AND ARCHITECTURES

(Common to VLSI&ES, ES&VLSI, VLSID&ES, ES&VLSID, VLSI, VLSID, VLSISD, VLSI&ME, SSP, DIP, CE&SP, IP, C&SP, SP&C, ES, DS&CE, DECS, E&CE, DECE and CS)

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

Answer any FIVE questions

All questions carry EQUAL marks

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1. a. Explain the necessity of FFT with respect to computational complexity.
   b. Find DFT of a sequence x(n) = { 0,1,2,4,,6,8,7,3} using DIFFFT algorithm.

2. a. What are the sources of error in DSP implementations?
   b. Explain about Hardware processing Unit

3. a. with neat sketch explain the computational building blocks of DSP
   b. Explain the features for external interfacing.

4. a. with suitable example explain the pipeline operation in TMS 320C54XX processor.
   b. Explain the interrupts of TMS 320C54XX processors.

5. a. Explain the base architecture of ADSP 2181
   b. How the shifters are useful in DSP? Explain the functionality of barrel shifter? Write short notes on the following

6. a. What is the significance of interfacing? Explain the procedure to interface memory and I/O peripherals to programmable DSP devices.
   b. Briefly explain parallel I/O interface

7. a. What are the characteristics of analog devices family of DSP devices?
   b. Explain FFT algorithm for round of errors.

8. Write short notes on the following
   a. Basic peripherals
   b. DMA

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Subject Code: H0407/R13

M. Tech –II Semester Regular Examinations, September, 2014

MATERIALS TECHNOLOGY

(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) Distinguish between solid solution strengthening and dispersion strengthening.
   b) Explain the deformation of non-crystalline material.

2. a) How aluminum alloys are strengthened? Explain the mechanism.
   b) Explain the methods by which the plastic deformation occurs in metals.

3. a) What is DBTT? Explain its significance.
   b) Define stress – intensity factor. Explain its significance.

4. a) Explain the structural features of fatigue?
   b) What is Paris law? Explain the crack initiation and propagation mechanism.

5. Write short notes on the following:
   a) Selection of materials on service requirements.
   b) Importance of fatigue and creep properties in aerospace applications

6. a) Discuss on the criterion for the selection of materials in corrosion and wear resistance applications.
   b) What are metallic foams? Explain their important characteristics and applications.

7. a) What are structural ceramics? Discuss about the processing of structural ceramics.
   b) Explain the properties and applications of maraging steels and intermetallics.

8. a) Discuss about polymeric materials and their molecular structures.
   b) Write down the applications of advanced structural ceramics.

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