Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1101**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Wireless and Mobile Communications)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Write the classification of Switching Systems and explain the elements of Switching System with a neat diagram.	6M
	b)	Explain the principles of Crossbar Switching.	6M
2.	a)	Explain in detail about distributed SPC (Stored Program Control).	8M
	b)	List the enhanced services made available to the subscribers because of the introduction of stored program control.	4M
3.	a)	With neat block diagram explain Time Multiplexed Space Switching.	6M
	b)	Explain 2-Stage Combination Switching.	6M
4.	a)	Explain three signaling forms involved in a telecommunication network and bring out the differences between inchannel and common channel signaling.	6M
	b)	Explain the working principle of cellular mobile telephones.	6M
5.	a)	State the principles in Common Channel Signaling and Explain.	6M
	b)	Explain the CCITT Signaling System no.7 with necessary diagrams.	6M
6.	a)	Explain Ring network and compare ring and bus networks.	6M
	b)	What is ATM? Mention the features of ATM.	6M
7.	a)	Explain the lost call systems in the aspect of telecommunications traffic.	8M
	b)	A group of 20 servers carry traffic of 10 erlangs. If the average duration of a call is 3 minutes, calculate the number of calls put through by a single server and the group as a whole in a one hour period and the traffic intensity.	4M
8.	a)	How the services of Integrated Services Digital Networks are used in Teletex.	6M
	b)	Write short notes on Broadband Integrated Services Digital Networks.	6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1201**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

DATA STRUCTURES AND ALGORITHMS

(Common to Computer Science and Engineering & Software Engineering)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) Consider the following infix expression 8M
$(a+b\times(c+d)\times e+(f/g)-h)$
Convert the above given infix expression to prefix and postfix form.
b) Write a 'C' program to convert an infix to prefix expression 4M

2. a) What does the following recurrence relation evaluates to? 6M
T(0)=1, T(n)= T(n-1)+3n
b) Which of the given options provides the increasing order of asymptotic complexity of the functions? f_1, f_2, f_3 and f_4? 6M
$f_1(n)=2^n$, $f_2(n)=n^{1/2}$, $f_3(n)=n\log_2 n$, $f_4(n)=n\log_2 n^2$

3. a) Given the preorder write the in order and post order. Also draw the corresponding tree for the same 8M
Pre order : 12 41 68 91 72 43 11 64 75 90
b) Differentiate between Binary tree and Binary search tree. 4M

4. a) Consider the following tree. Write the inorder, preorder and postorder traversal techniques. 7M

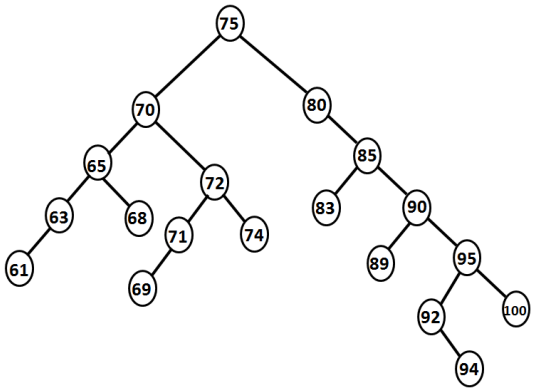

Fig.1

b) In the above given tree as shown in Fig.1, find the following: 5M
i. Height of tree
ii. Depth of tree
iii. Number of leaf nodes
iv. Number of nodes
v. Number of sub trees

Cont...2

5. Explain in detail the operation and application of following 12M
   i. Splay tree
   ii. AVL tree

6. a) With relevant steps, sort the following elements using a merge sort technique: 8M
   61, 45, 49, 68, 79, 61, 39, 11, 90, 55, 39, 22
   b) Write a 'C' program to search for a given element using a binary search technique. 4M

7. a) Write a note on the travelling sales person problem. 6M
   b) Consider the following instances of the 0/1 Knapsack problem $n = 3, m = 20,$ 6M
   $(p1, p2, p3) = (25, 24, 15)$ and $(w1, w2, w3) = (18, 20, 25)$. Find optimal solution.

8. a) What is 8 queen's problem? Give the solution space for the same. 8M
   b) Define the term 'bound and branch'. 4M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1202**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

DISCRETE STRUCTURES AND AUTOMATA THEORY

(Computer Science and Engineering)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Show that: 6M
   $(P \rightarrow Q) \wedge (R \rightarrow Q) \Leftrightarrow (P \vee R) \rightarrow Q$
   $\neg (P \leftrightarrows Q) \Leftrightarrow (P \wedge \neg Q) \vee (\neg P \wedge Q)$
   b) Show that $(x)(P(x) \vee Q(x)) \Rightarrow (x)P(x) \vee (\exists x)Q(x)$ 6M

2 a) If $A = \{1,2,3,4\}$ and $B = \{a,b,c,d\}$, determine whether the following functions are one-to-one or onto. 6M
   $f = \{(1,a),(2,a),(3,b),(4,d)\}$
   $g = \{(1,d),(2,b),(3,a),(4,c)\}$
   b) Prove by pigeon hole principal that in a group of 61 people, at least 6 people were born in the same month. 6M

3. a) Five persons entered the lift cabin on the ground floor of an 8 floor house. Suppose each of them can leave the cabin independently at any floor beginning with the first. Find the total number of ways in which each of the five persons can leave the cabin 6M
      i. At any one of the 7 floors
      ii. At different floors
   b) Prove that the number of different permutations of n distinct objects Taken r at a time, $r \leq \eta$ is given by 6M
   $$^{n}\mathrm{P}_{\mathrm{r}} = \frac{n!}{(n-r)!} = n(n-1)(n-2)\ldots(n-r+1).$$

4. a) Solve the recurrence relation: 6M
   $S(k) - 10.S(k-1) + 9.S(k-2) = 0, S(0) = 3, S(1) = 11.$
   b) Solve the recurrence relation: 6M
   $b_n + 3b_{n-1} + 2b_{n-2} = 0$ with $b_1 = -2$ and $b_2 = 4$.

5. a) Define the following terms with an example for each. 6M
      i. Alphabet
      ii. String
      iii. Language
   b) Construct an NFA that accepts all strings such that the fifth symbol from the left end is zero over the alphabet $\{0,1\}$. 6M

6 a) Construct FA to accept the regular expression (0+1)*(00+11)(0+1)* 6M
   b) Show that the language $L = \{a^{i^2} / i \geq 1\}$ is not regular. 6M

Cont...2

7. a) Eliminate the left recursion from the following grammar: 6M

$E \to E + T \mid T$

$T \to T * F \mid F$

$F \to (E) \mid id$

b) What does each of the following transitions represent in PDA? 6M

i. $\delta(p, a, Z) = (q, aZ)$.

ii. $\delta(p, a, Z) = (q, \varepsilon)$.

iii. $\delta(p, a, Z) = (q, \mathrm{r})$.

8 a) Design a Turing Machine that accepts the set of all even palindromes over $\{0,1\}$. 6M

b) What is decidability? Explain any two undecidable problems. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1203

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

COMPUTER ARCHITECTURE AND ORGANIZATION

(Computer Science and Engineering)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Design a 4-bit binary subtractor and explain its functions.	6M
	b)	Simplify the function F(A,B,C,D)=Σ(1,5,7,9) with don't cares d(A,B,C,D)= Σ(4,6,8,10).	6M
2.	a)	What are the basic functional units present in the computer and explain each of them?	4M
	b)	By using the required parity generator/checker circuit, explain how parity checking can be used for the error detection.	8M
3.	a)	Design a 4-bit common bus to transfer the contents of one register to other.	6M
	b)	Define 3-address, 2-address, 1-address, 0 -address instruction with an example.	6M
4.	a)	Explain the Booth Algorithm for multiplication of Signed two's Complement number.	6M
	b)	Discuss the various hazards that might arise in a pipeline. What are the remedies commonly adopted to overcome/minimize these hazards.	6M
5.	a)	"Hard wired control is advantageous over micro programmed controller". Justify your answer with valid reasons.	6M
	b)	What is pipelining and what are the advantages of pipelining? Explain with suitable example.	6M
6.	a)	Discuss the address translation mechanism and the different page replacement policies used in a virtual memory system.	8M
	b)	Explain the operation of Associative cache memories.	4M
7.	a)	What is the importance of I/O interface? Explain the features of PCI Interfaces.	6M
	b)	Explain why is priority handling desired in interrupt controllers? How does the priority scheme work?	6M
8.	a)	Explain any two interconnection topologies? Compare the factors determining the performance and the cost of both the networks.	6M
	b)	What do you mean by inter process arbitration? Explain how it is implemented in multiprocessor architecture.	6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1204

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

SOFTWARE ENGINEERING

(Computer Science and Engineering)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Explain the software engineering layers in detail. 6M
   b) Briefly explain the process flow model. 6M

2. a) Explain why programs that are developed using evolutionary development are likely to be difficult to maintain. 4M
   b) Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: 8M
      i. A system to control anti-lock braking in a car
      ii. A virtual reality system to support software maintenance
      iii. A university accounting system that replaces an existing system
      iv. An interactive system that allows railway passengers to find train times from terminals installed in stations

3. a) Identify functional and non functional requirements for automation of ATM. 6M
   b) Explain briefly Class Responsibility Collaborator model with an example. 6M

4. a) Explain why it may be necessary to design the system architecture before the specifications are written. 6M
   b) Explain the Object Oriented Architecture Model and its advantages. 6M

5. a) Assume that you have been asked to develop an online movie ticket booking system. Identify and explain briefly the user interface design issues involved with the given system. 6M
   b) Explain the design heuristics for effective modularity. 6M

6. a) What do you mean by system testing? Explain the distinct phases of system testing. 6M
   b) What do you mean by test case design? Explain the various approach of test case design. 6M

7. a) Explain the concept of path testing with suitable example. 6M
   b) Explain the concept of black box testing. 6M

8. a) Describe three types of software process metric that may be collected as part of a process improvement process. 6M
   b) Explain why a high-quality software process should lead to high-quality software products. Discuss possible problems with this system of quality management. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1207

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION

(Common to Computer Science and Engineering & Software Engineering)

Date: 25 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Image of size 512 x 512 pixels / frames are encoded to 8 bits / pixel and are transmitted after compression at a ratio of 4. Transmission is at 25 frames / second. Find the bit rate of transmission. 6M
   b) Explain uniform / non-uniform type of: 6M
      i. Sampling
      ii. Quantization

2. a) Prove the following property: 6M
      i. Imaginary part of Fourier transform of even function is zero
      ii. Convolution
   b) Write short notes on orthogonal transforms. 6M

3. a) Define smoothing. Prove that order statistic filtering commutes with any linear monotonically increasing transformation. 6M
   b) Gray level histogram of output image obtained is given below: 6M

Gray Level	0	1	2	3	4	5	6	7
Frequency	400	700	1350	2500	3000	2500	550	0

   Compute grey level histogram of output image obtained by enhancing the input by histograms equalization techniques.

4. a) Explain briefly how an iterative non linear restoration functions using Lucy- Richardson algorithm with an example. 6M
   b) Name and comment on simplest approach followed to restore a degraded image to its form back. 6M

5. a) Give the relation to choose threshold generally. Elaborate on terms global, local and dynamic threshold. 6M
   b) Give the algorithmic steps for contour based boundary detection with a neat diagram. 6M

6. a) Find Huffman coding for the following to get the minimum average length. 7M

Symbol	Probability
a2	0.4
a3	0.3
a1	0.15
a4	0.15

   b) Explain vector quantization compression. 5M

Cont...2

7. a) Compute the value of a Gaussian PDF, $N(m, s)$ at $x_1 = [0.2, 1.3]^T$ and $x_2 = [2.2, -1.3]^T$ where $m = [0, 1]^T$, $S = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. 4M

b) Consider a 2 class classification task in 3 dimension space where 2 classes w1 and w2 are modeled by Gaussian distributions with means $m_1 = [0, 0, 0]^T$ and $m_2 = [0.5, 0.5, 0.5]^T$ respectively. Assume the two classes to be equi-probable. The covariance matrix for both distributions S is given below: 8M

$$S = \begin{bmatrix} 0.8 & 0.01 & 0.01 \\ 0.01 & 0.2 & 0.01 \\ 0.01 & 0.01 & 0.2 \end{bmatrix}$$

Given a point $x = [0.1, 0.5, 0.1]^T$ classify x according to:

i. Euclidian distance
ii. Manhattan distance classifier

8. a) Explain maximum likelihood parameter estimation method and its properties. 6M
b) Explain working of Naïve Bayesian classifier with an example. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1210

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

C# AND .NET FRAMEWORK

(Common to Computer Science and Engineering & Software Engineering)

Date: 26 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	What are the various forms of the Main() method that are permissible in a C# executable application?	6M
	b)	Bring out the core distinctions between value type and reference type in C# with examples.	6M
2.	a)	Discuss with an example how encapsulation is enforced in C# with the help of properties.	6M
	b)	Illustrate with an example how polymorphism is supported in C#.	6M
3.	a)	With the help of code snippets demonstrate the following exceptions: i. ArgumentOutofRange ii. IndexOutofRange	6M
	b)	Write a C# program to implement the core members of the System.Exception type.	6M
4.	a)	Illustrate the use of delegates in C# events.	6M
	b)	With an example explain the use of callback interfaces.	6M
5.	a)	Illustrate how a multifile assembly can be built and consumed.	7M
	b)	Briefly explain the process/AppDomain/Context/Thread relationship.	5M
6.	a)	With an example explain how asynchronous remoting can be performed?	6M
	b)	What are the different ways in which remote objects can be hosted? Explain briefly?	6M
7.	a)	Demonstrate with the help of C# code snippets how mouse events and keyboard events can be handled.	6M
	b)	Illustrate with an example how to work with some basic controls on the forms.	6M
8.	a)	Discuss the disconnected layer of ADO.Net.	5M
	b)	Demonstrate how a data relation object can be used to a relationship between two tables for an order placement application and also show how data can be fetched in the master-detail format.	7M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1215**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

OBJECT ORIENTED ANALYSIS AND DESIGN
(Software Engineering)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1.	a)	Describe object identity, encapsulation and polymorphism.	6M
	b)	List the common mechanisms that can be applied for Unified Modeling Language (UML). Explain any two.	6M
2.	a)	Compare association, aggregation and composition with example.	6M
	b)	Categorize the following relationships into generalizations, aggregation or association and draw the diagram i. A country has a capital city ii. Modems and keyboards are input/output devices iii. A student takes a course from a professor	6M
3.	a)	Illustrate with an example, how to model a flow of control by time ordering using sequence diagram.	6M
	b)	Explain the following with regard to interaction diagrams: i. Object Life Line ii. <<create>> and <<destroy>> messages iii. focus of control	6M
4.	a)	Explain the relationships between the use cases with an example.	5M
	b)	Describe time and change event. Draw a chart diagram for a phone line.	7M
5.	a)	Discuss the differences between classes and components.	6M
	b)	With an example show how to model distribution of components.	6M
6.	a)	Explain the different ways that a use case can be realized during analysis phase.	6M
	b)	Discuss the need to have architecture for software systems.	6M
7.	a)	Explain the core work flows will be carried out during the inception phase.	8M
	b)	Explain the activities involved during the initial stage of elaboration phase.	4M
8.	a)	Explain the activities that to be carried out during transition phase.	8M
	b)	Describe the archetypal construction iteration workflow.	4M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1301

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

POWER SEMICONDUCTOR DEVICES
(Power Electronics and Electric Drives)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1.	a)	Draw the V-I characteristics of the following devices under ideal conditions and practical conditions. Also, explain why the two characteristics (under ideal and practical conditions) differ from each other. i. BJT ii. Thyristor	8M
	b)	Mention the characteristics which are desired in a power switching device.	4M
2.	a)	Define: i. Avalanche breakdown, ii. Punch through voltage, iii. Zener breakdown.	6M
	b)	Briefly explain about Fast Recovery Diodes.	6M
3.	a)	Explain the structure of a power BJT with a neat diagram.	8M
	b)	Briefly explain secondary breakdown in relation to a power transistor.	4M
4.	a)	What kind of effect do the parasitic capacitances in a power MOSFET have on the normal operation of the device? Show, in the form diagram, how the structure of power MOSFET differs from that of the signal level MOSFET.	8M
	b)	A circuit employing MOSFETs consist of resistive load. Suggest a simple drive circuit to drive the power MOSFET and briefly explain the drive circuit operation.	4M
5.	a)	With a neat diagram explain the structure of an IGBT.	6M
	b)	What are the causes of latch-up in an IGBT? How it can be avoided?	6M
6.	a)	Explain the uniqueness of a thyristor using its VI characteristics.	6M
	b)	Discuss the methods used for improving the *di/dt* ratings of a thyristor.	6M
7.	a)	Explain how the conduction and transition losses can be computed in thermal management.	6M
	b)	Draw the electrical equivalent circuit of the thermal model related to a power semiconducting device and explain.	6M
8.	a)	Write short notes on the following ferromagnetic materials: i. Steel ii. Soft Ferrite	6M
	b)	An air core inductance of 50 µH is made as wound strip of copper 40mm wide and 1.5mm thick. For cooling purpose, ½ mm spacing is used between each turn with an inner diameter of 60 mm and an outer diameter of 160mm as physical constraints. Is it possible to attain required inductance.	6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1302**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

PRINCIPLES OF MACHINE MODELING ANALYSIS
(Power Electronics and Electric Drives)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Explain the principle of rotating magnetic field. 6M
   b) Explain the power angle characteristics of non salient pole synchronous motor with neat sketch. 6M

2. Discuss briefly the primitive forms of various machines. 12M

3. A separately excited d.c motor is at rest, with its field winding carrying a steady state current I_f. The motor and load has a total inertia of J kg m^2. Load torque, damping and armature inductances are negligible. If voltage V_t is suddenly impressed across the armature, find the total heat energy dissipated in the armature resistance as the motor accelerates from rest to final steady speed W_r. Does this energy loss depend upon acceleration time or final no load speed W_r. 12M

4. a) Explain Linear Transformation with examples. 6M
   b) Explain the phase transformation technique a,b,c to $\alpha,\beta,0$. 6M

5. For a three phase induction motor write the voltage and current equations in stator reference frame. 12M

6. Draw the generalized mathematical model of a polyphase induction machine and write down the voltage equations for this model and hence obtain the equivalent circuit of a poly phase induction motor. 12M

7. Derive the dynamical equation of induction machine during normal operation and thereby explain motor dynamics for: 12M
   i. Change in K with constant load torque
   ii. Change in load torque with constant K

8. a) Derive the torque equation of a 3 phase synchronous motor. 6M
   b) Develop the state space voltage- current equation of synchronous machine. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1303

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONVERTERS-I

(Power Electronics and Electric Drives)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. With neat circuit diagrams and relevant waveforms, discuss about the ON-OFF control and phase angle control methods of 1-phase AC voltage controllers . 12M

2. With a neat circuit diagram, explain the operation of 3-phase bidirectional delta connected (R-load) AC voltage controller operating at $\alpha=120^0$. Obtain any two phase currents and any one line current waveforms. 12M

3. a) What is Matrix converter? Explain in detail. 6M
   b) Explain the operation of three-phase to three-phase cycloconverter (6-pulse) with relevant circuit diagram and wave forms? 6M

4. a) Explain the operation of single phase controlled converter with its neat wave forms. 8M
   b) What are the applications of single phase converters? 4M

5. With relevant voltage and current waveforms, explain the operation of three-phase half-converter feeding R-L load for $\alpha=60^0$. Assume continuous current in load. Derive an expression for average and rms values of output voltage. 12M

6. a) Explain the operation of a boost regulator assuming continuous conduction mode. 6M
   b) With a neat equivalent circuits and relevant waveforms, explain the operation of Cuk regulator converter. 6M

7. a) Discuss in brief about the Delta modulation technique of voltage control of 1-phase inverter. 6M
   b) Explain the operation of a 1-phase full bridge inverter with neat waveforms. 6M

8. Explain 180^0 conduction mode operation of 3-phase inverter and draw the relevant waveforms. 12M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1304**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONTROL OF DC DRIVES
(Power Electronics and Electric Drives)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) With a neat circuit diagram and relevant waveforms, explain the operation of single phase semi converter fed separately excited DC drive system. Derive an expression for average value of output voltage. Assume continuous current in load. Also draw input current waveform. 8M
   b) An ideal single-phase supply 230 V, 50 Hz, provides power for a fully controlled bridge converter supplying a separately excited DC motor rated at 1 kW, 200 V, 800 RPM. The motor has armature resistance and inductance 0.4 Ω and 5 mH respectively. If the motor delivers rated power at rated speed with $\alpha=0^0$, calculate the power factor of the converter. 4M

2. a) When do you prefer three-phase rectifier fed DC drive system? With neat sketch and waveforms, explain the operation of three-phase full-wave converter operating with 30^0 firing angle. Assume continuous current operation. 8M
   b) The speed of a 20 HP, 300 V, 1800 RPM separately excited DC motor is controlled by a three-phase full-converter drive. The field current is also controlled by a three-phase full converter and is set to the maximum possible value. The Ac input is a three-phase, star-connected, 208 V, 60 Hz supply. The armature and field resistances are 0.25 Ω and 245 Ω respectively, and the motor voltage constant is K_v = 1.2 V/A rad/s. The armature and field currents can be assumed to be continuous and ripple free. Determine delay angle of the armature converter, if motor supplies a rated power at rated speed. 4M

3. a) Power is transferred from a 300 V battery to a three-phase, 230 V, 50 Hz, AC bus via a controlled SCR inverter. The inverter switches may be considered lossless and a large filter inductor with resistance of 10 Ω is included on the DC side. Calculate the power transferred for the power factor of (a) $\alpha=90^0$, (b) $\alpha=120^0$. 6M
   b) Write a short note on three phase controlled bridge rectifier feeding passive load impedance. 6M

4. Explain the Speed torque Characteristics of a dc series motor connected to a three phase fully controlled converter. 12M

5. a) Discuss in brief about the first-order approximation of inner current loop control of DC motor. 8M
   b) Discuss in brief about the filter in the speed feedback loop of DC motor drive. 4M

Cont...2

6. a) Explain the principle of speed control of a dc motor and show how it can be achieved by a chopper. 6M

   b) A 230V, 1200rpm, 15A separately excited motor has an armature resistance of 1.2Ω. Motor is operated under dynamic braking with chopper control. Braking resistance has a value of 20 Ω. 6M

      i. Calculate duty ratio of chopper for motor speed of 1000rpm and braking torque equal to 1.5times rated motor torque.

      ii. What will be the motor speed for duty ratio of 0.5 and motor torque equal to its rated torque?

7. Draw and explain the power circuit diagram of semi-converter feeding a separately excited D.C motor. Explain with typical voltage and current waveforms, the operation in continuous armature current Mode. 12M

8. Determine the speed-controller gain and time constant for the following separately excited chopper-controlled DC motor drive. 12M

   250 HP, 500 V, 1250 RPM, 92% efficiency, R_a = 0.052 Ω, L_a=1 mH, K_b=3.65 V/rad/sec, J = 5 kg.m2, B_1 = 0.2 N.m/rad/sec, V_s =648 V. The current controller has a PWM strategy with a carrier frequency of 2 kHz. Calculate also the speed response for a speed command of 0 to 0.8 pu, when the load torque is maintained at 0.5 pu.

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1305**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED MICRO PROCESSOR AND MICRO CONTROLLERS

(Power Electronics and Electric Drives)

Date: 25 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Explain the function of following Assembler directives: 6M
   DB
   .CODE
   ORG
   b) Explain the function of the following flag bits of 8086: 6M
      i. The auxiliary carry flag (AF)
      ii. Interrupt flag (IF)

2. a) Explain the functions of the following pins of 8086: 6M
      i. RESET
      ii. $\overline{BHE}$ /S7
      iii. $\overline{LOCK}$
      iv. ALE
   b) Explain the minimum mode of 8086 with block diagram. 6M

3. a) Explain the operation performed by 8086 when the following instructions are executed: 6M
      i. DAS
      ii. LOOPNZ
      iii. PUSH & POP
   b) Differentiate between MACRO and a PROCEDURE. 6M

4. a) What do you mean by paging? Discuss the paging mechanism of 80386 processor. 8M
   b) Differentiate between RISC and CISC processors. 4M

5. a) Explain how 8255 is programmed, showing the internal command register content. 6M
   b) Describe how ADC and DAC are interfaced to Microprocessor. 6M

6. a) For what purpose, 8259 PIC is connected to microprocessors? With neat circuit diagram explain the interfacing of 8259 with 8086. 6M
   b) What is the necessity of serial communication interface? Explain command and status register formats in 8251. 6M

7. a) With a neat diagram, write the programming model of 8051. Also give the 128 bytes RAM allocation. 6M
   b) Explain the function of a Program Status Word (PSW) SFR, giving the content of the register. 6M

Cont...2

8. a) Explain the following instructions of 8051 with example. 6M
   i. SWAP A
   ii. DA A
   iii. MOVC A, @A+PC
   iv. XCHD A, @Ri
   b) Explain the function of IE and IP registers with their bit pattern. 6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1309**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ENERGY CONVERSION SYSTEMS
(Power Electronics and Electric Drives)

Date: 26 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Describe the principle of photo-voltaic energy conversion.	6M
	b)	What is superconductivity? Briefly explain the three important physical properties which govern the superconductivity of materials.	6M
2.	a)	Explain the basic principle involved in MHD Power Generation.	5M
	b)	The internal resistance of an MHD duct is R_d= 2.5 m-Ohm. At a performance factor of K=0.5, what is the value of load resistance? If the generated voltage is 1500 V, what are the current and load power delivered? Calculate the efficiency of the generator.	7M
3.	a)	Explain the advantage of providing twisted blades in a wind turbine.	6M
	b)	Using suitable figures, explain power output variation of a wind power generator with wind speed variation.	6M
4.	a)	Briefly explain different modes of generating electricity through tidal power.	6M
	b)	What are the major problems associated with the generating systems used in tidal power plants? Explain them briefly.	6M
5.	a)	Explain the principle of ocean thermal energy conversion system.	6M
	b)	With relevant block diagrams explain the open cycle and closed cycle OTEC system.	6M
6.	a)	Draw the block diagram for generation of substitute natural gas from coal.	6M
	b)	Explain the principle of geothermal energy and its various applications.	6M
7.	a)	Explain various methods of energy storage in different energy conversion systems and compare them.	6M
	b)	With neat block Diagram, Explain the concept of combined cycle cogeneration.	6M
8.	a)	What are the advantages of fuel cells over other energy conversion systems?	6M
	b)	What are the measures taken to limit the effect of pollution of water bodies by the acidic effluents of coal based power plants?	6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1401**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED DATA COMMUNICATIONS
(Digital Electronics and Communications Systems)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) For BPSK Modulator with a carrier frequency of 60 MHz and an input bit rate of 10Mbps, determine the maximum and minimum lower side frequency. Draw the output spectrum, determine the minimum Nyquist bandwidth and calculate the baud. 6M
   b) Determine: 6M
      i. Peak frequency
      ii. Minimum bandwidth
      iii. Baud
      For a binary FSK signal with a mark frequency of 49KHz, a space frequency of 51KHz and an input bit rate of 2kbps.

2. a) Find the DPSK (Differential Phase Shift Keying) Modulated signal for the input bit stream 101110001101. Using DPSK demodulator, reconstruct the signal from the modulated signal. 6M
   b) Consider 8-QAM transmitter for modulation, give the bandwidth considerations, truth table phasor diagram and constellation diagram for the above mentioned modulation concept. 6M

3. a) Discuss the advantages and disadvantages of bus, star and mesh topologies. 6M
   b) Explain about the network interface Protocols Standards of data communication networks. 6M

4. a) Describe two types of wide area networks. 6M
   b) Explain the significance of DTE and DCE in data transmission. 6M

5. a) Draw the NRZ-Unipolar, RZ- unipolar, NRZ-polar, RZ-polar and Manchester Line codes for the given bit stream 101110011. 5M
   b) Explain about statistical time division multiplexing. 7M

6. a) Determine the transmitted data stream for the following data stream 6M
      $G(x)$ and CRC generating polynomial $P(x)$
      $G(x) = x^7 + x^5 + x^4 + x^2 + x^1 + x^0$
      $P(x) = x^5 + x^4 + x^2 + x^0$
   b) Briefly describe the sliding window method of flow control. 6M

7. a) Explain IBM's Bisync Protocol. 6M
   b) Draw structure of SDLC frame format. Explain in detail about SDLC control field. 6M

Cont...2

8.	a)	Explain the three phases required for circuit switched network.	6M
	b)	Discuss about message switching and packet switching.	6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1402

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED DIGITAL SIGNAL PROCESSING

(Common to Digital Electronics and Communications Systems & Wireless and Mobile Communications)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) A digital low pass filter is required to meet the following specifications: 7M
   i. Monotonic stop band and pass band
   ii. -3.01dB at cutoff frequency of 0.5π rad/sec
   iii. Stop band attenuation of atleast 15dB at 0.75π rad/sec
   b) Design a FIR low pass filter with the following desired frequency specification: 5M

$$Hd\left(e^{jw}\right)=\begin{cases} e^{-j2w}; & |w|<\frac{\pi}{4} \\ 0; & \frac{\pi}{4}<|w|<\pi \end{cases}$$

   Determine the filter coefficients h(n) if rectangular window is used.

2. a) Explain the technique for sampling rate conversion by a ratio factor I/D. 6M
   b) Explain the process of decimation and derive the equation for spectrum of decimated sequence. 6M

3. a) With a block diagram explain FDM to TDM transmultiplexer. 6M
   b) Discuss with block diagram oversampling of A/D converter and D/A converter. 6M

4. a) With necessary equation explain Levinson-durbin algorithm. 6M
   b) Discuss any two properties of linear prediction filter. 6M

5. a) Write the relationships between the autocorrelation and the model parameters. 6M
   b) Discuss Yule-Walker method for the AR model parameters. 6M

6. Explain the following models for power spectrum estimation: 12M
   i. MA model
   ii. ARMA model

7. a) Derive the solution of the weiner-hopf equation for linear transversal filter. 6M
   b) Discuss multiple linear regression model. 6M

8. With signal flow graph and relevant mathematical equations discuss the statement of the Kalmann filtering problem. 12M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1403**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

DIGITAL SYSTEMS DESIGN

(Digital Electronics and Communications Systems)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Using karnaugh maps, find a minimal sum-of –products expression for each of the following logic functions. Indicate the distinguished 1-Cells in each map. $F = \sum w,x,y,z\ (0,1,2,3,7,8,10,11,15)$ $F = \sum w,x,y,z\ (1,2,4,7,8,11,13,14)$	8M
	b)	Explain how timing and static hazards are minimized.	4M
2.	a)	Discuss the need of timing analysis of a combinational logic circuit and explain important timing constraints in designing a digital circuit.	6M
	b)	For a combinational circuit, explain following with the help of timing diagram. i. Propagation delay ii. Minimum delay iii. Maximum delay iv. Maximum operating frequency	6M
3.	a)	Design 8-bit priority encoder using PAL20L8 PLD device.	6M
	b)	With the help of neat block diagram, explain working of iterative n-bit comparator.	6M
4.	a)	With necessary timing diagram of state machine and state table, explain steps for analyzing clocked synchronous state machines.	6M
	b)	Explain various timing issues in digital system design with the help of neat diagrams.	6M
5.	a)	Explain setup time, hold time and clock skew in digital system design with the help of neat diagrams.	6M
	b)	What are the components of State machine chart? Explain with an example.	6M
6.	a)	What is state machine chart? Write the state machine chart for dice controller.	6M
	b)	Explain how state assignments are used for FPGA's.	6M
7.	a)	Discuss in detail about single stuck at fault model with example.	6M
	b)	With an example, explain fault detection and redundancy.	6M
8.	a)	Describe the algorithmic steps involved in D-algorithm.	6M
	b)	With an example, explain about the random testing method.	6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1404**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

CMOS VLSI DESIGN

(Digital Electronics and Communications Systems)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Define threshold voltage? Explain the dependence of V_T on other parameters. 6M
   b) Draw the neat schematic diagram of small signal model for MOS Transistor in the active region and show that 6M

$$V_{eff} = \sqrt{\frac{2ID}{\mu_n c_{ox}\left(\frac{W}{L}\right)}} \text{ and } g_m = \frac{2I_D}{V_{eff}}$$

2. a) Explain and derive the necessary DC region equations of CMOS inverter. 8M
   b) Explain: 4M
      i. Propagation Delay
      ii. RC Model

3. a) With neat circuit diagram, explain the operation of PFET based 2:1 MUX. 6M
   b) Explain the differences between pass transistor logic and transmission gate logic. 6M

4. a) Design and explain the operation of CMOS 2 input NOR gate. 6M
   b) Design a CMOS 1 bit full adder circuit. 6M

5. a) With neat circuit diagram, explain the operation of NFET based Latching circuit. 6M
   b) Design EX-OR gate using transmission gates. 6M

6. a) Explain: 6M
      i. Junction Reverse Leakage currents
      ii. Sub threshold leakage
   b) Draw the circuit diagram of C^2MOS latch circuit and Explain its operation. 6M

7. a) Write short notes on the following: 6M
      i. Fan-in/Fan-out
      ii. Power Dissipation
   b) With a circuit diagram, explain the operation of AND-OR Domino logic gate. 6M

8. a) What is a dual Rail Logic network and explain in detail? 6M
   b) With a neat circuit diagram, explain the operation of dynamic CVSL Circuit with Charge keeper. 6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1407**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Digital Electronics and Communication Systems)

Date: 26 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Explain advantages, history of FPGA and also discuss FPGA based system design briefly. 6M
   b) With neat flowchart, explain design abstraction ladder for FPGAs. 6M

2. a) With a neat block diagram, explain the operation of ALTERA APEX II logic element. 8M
   b) Explain permanently programmed FPGA's. 4M

3. a) Discuss the different logic elements to design FPGAs fabrics. 6M
   b) How will you connect two logic elements in FPGA? Illustrate Rents rule. 6M

4. Explain the following: 12M
   i. Gate and wire delay
   ii. Static timing analysis
   iii. Critical path

5. a) Explain: 8M
      i. Technology independent logic optimization
      ii. Technology dependent logic optimization
   b) Draw the schematics that represent the results of syntax directed translation of these statements: 4M
      i. if (e) then x<=a|b;
         else x<=a&~b;
      ii. if (e) then x<=a;
         else x<=a&~b;

6. Design a mealy FSM for a sequence detector which detects "001".The FSM output is '1' if the sequence is detected otherwise '0'. Write the verilog code for the same. 12M

7. a) Design a BCD Counter using appropriate programmable logic element or device. 6M
   b) Explain in detail about programmable sum -of -products array. 6M

8. a) Draw the simplified block diagram of Xilinx XC4000 series CLB and explain the function briefly. 6M
   b) Compare & list out the advantages of ALTERAs logic8000 with Xilinx XC4000. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1414

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

DSP PROCESSORS AND ARCHITECTURES
(Embedded Systems)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Compare Direct DFT & FFT in terms complex multiplications, additions and speed improvement factor for N=8. 6M
   b) Compute DFT for x(n) = {1,1,1,1} using radix-2 FFT algorithm. 6M

2. a) Show that for a A/D converter with 14 bits for signal representation SNR=83.04db. 6M
   b) Calculate the dynamic range and precision of each of the following number Representation formats 6M
   64-bit ,Single –Precision, fixed –point format
   128-bit, double –precision, fixed point format

3. a) Explain the purpose of Program sequencer. 6M
   b) Draw the schematic diagram of saturation logic and explain the same. 6M

4. a) Explain pipelined implementation of FIR filter 6M
   b) Explain how interrupt is handled in DSP Processor 6M

5. a) Identify the addressing mode of the source operand in each of the following instructions: 6M
      i. ADD *AR2, A
      ii. ADD *AR2+,A
      iii. ADD *AR@+%,A
      iv. ADD#OFFh, A
      v. ADD ABCDh, A
      vi. ADD *AR@+OB,A
   b) A DSP has a circular buffer with the start and end addresses as 0200h and 020Fh respectively .What would be the new values of the address pointer of the buffer if, in the course of address computation , it gets updated to i) 0212h ii) 01FCh. 6M

6. a) Determine the value of each of the following 16-bit numbers represented using the given Q-notation: 6M
      i. 4400h as a Q0 number
      ii. 4400h as Q15 number
      iii. 4400h as a Q7 number
   b) Explain how a digital decimation filter can be implemented for a given decimation factor. 6M

Cont...2

7.	a)	Explain overflow and scaling.	4M
	b)	Implement an 8-point DIT – FFT on the TMS320C54XX with the help of program.	8M
8.	a)	Design a data memory system with address range 000800h-000FFFh for C5416 Processor use 2kx8 SRAM memory chips. Give the schematic of interface.	6M
	b)	How does DMA help in increasing the Processing speed of a DSP PROCESSOR?	6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1501**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

SOFTWAE REQUIREMENT AND ESTIMATION
(Software Engineering)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) An Automatic Teller Machine (ATM) is a computer based machine, connected to a network, that offers, as basic functions to users, access to bank account (balance, bank transfers) and retrieval of money. Assume that you are designing software for deploying on this machine. Identify any three functional and non-functional requirements for the same. 6M
   b) What is risk management? List any two common mistakes in risk management and requirements for successful risk management. 6M

2. a) Using an elicitation method can help in producing a consistent and complete set of software requirements. However, there are numerous software requirement elicitation techniques available like Questionnaires, Task Analysis, Scenarios and Use cases. Suggest few evaluation criteria that may be useful in selecting an elicitation method. 5M
   b) Web applications have very high requirements for numerous quality attributes. Identify any four critical software quality attributes that should be considered when developing such web apps. 4M
   c) The scholar John von Neumann once said. “There’s no sense being exact about something if you don’t even know what you’re talking about.” In a world that is growing increasingly dependent on highly complex, computer-based systems, the importance of defining what your customer wants you to make before making it. In this direction suggest a method for exploring requirements quality before design. 3M

3. a) Explain briefly state transition diagram with an example. 6M
   b) Consider a retail store called “XYZ COMPANY”. It takes orders from its customers. The customers may be located at different parts of the country. Once the customer orders for product(s), they are checked against the inventory present in their warehouse. If present, an invoice is generated through a set of transactions. Finally, the products are packed and kept ready for delivery through shipment. The company provides free shipment for its customers. 6M
   Suppose XYZ COMPANY is interested in automating the complete ordering process, identify the classes required along with suitable members and represent them using class diagram.

4. a) List any six roles of a Requirements Analyst (RA). 6M
   b) The most common way to represent the links between requirements and other system elements is in a requirements traceability matrix, also called a requirements trace matrix or a traceability table. Design a requirements traceability matrix for online examination and grading system. 6M

Cont...2

5.	a)	Describe the features, advantages and drawbacks of Caliber RM tool.	6M
	b)	Assume that you are designing a requirements management tool, what aspects would you like to incorporate into your tool? Justify.	6M
6.	a)	What is software estimation? Bring out its significance.	8M
	b)	List any four software estimation methods.	4M
7.	a)	What is software size estimation? List any six metrics for the same.	5M
	b)	Let's imagine a company which sells goods on the phone – if agents call the customers, customers call the agents, and so on – business operates successfully, but there comes a time for putting the whole in order. There occurs a need for developing a system able to control the whole stock, from orders to payments. The question of interset is to estimate how complex such system can be and try to predict how long it would take to develop it using Functional Points (FP).	7M
8.	a)	Describe Putnam estimation model.	6M
	b)	Write a brief note on University of Southern California's Constructive Cost Model estimation tool.	6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1502

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

SOFTWARE PROCESS AND PROJECT MANAGEMENT

(Software Engineering)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Illustrate the different factors that makes software management is different from other engineering fields.	6 M
	b)	Explain the basic principles of software process change.	6 M
2.	a)	What are the different process reference models? Write the significance of TSP.	6 M
	b)	Give the differences between CMM and PCMM.	6 M
3.	a)	Based on what parameters software cost can be estimated? Explain.	6 M
	b)	What are the long standing debates among developers and vendors of software cost estimation tools. Explain in detail.	6 M
4.	a)	Explain the term 'artifacts'. Discuss in detail about Management Artifacts.	6 M
	b)	Which phase of the four phases of software life cycle is the most critical? Justify your statement.	6 M
5.	a)	How the concurrency among the stakeholders will be achieved using major milestones of the software process?	6 M
	b)	Give the fundamental flaws in conventional work breakdown structures. Write the solution to overcome these flaws.	6 M
6.	a)	What is meant by "line of business organizations"? Write the role and responsibilities of these organization people.	6 M
	b)	List the software development team activities and responsibilities.	6 M
7.	a)	How management indicators and quality indicators helps in achieving the project goals and the quality of software products?	6 M
	b)	Discuss the role of degree of cooperation and coordination among stakeholders for defining a process. Support your views with clear explanation.	6 M
8.	a)	Discuss in detail about CSCI productivities and Quality factors involved in CCPDS-R.	6 M
	b)	List and explain the critical approaches of modern process framework for resolving top ten risks.	6 M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1601

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED DATA STRUCTURES AND ALGORITHMS
(Embedded Systems)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) Assume that a linked list has Add(x) and Delete Odds() operations defined as: 8M
Add(x): Adds the element x to the end of the list.
Delete Odds(): Delete the first ,third, fifth etc., elements of the list.
Write the algorithm to implement the above operations.
b) What do you mean by linear data structure? List the various techniques of implementing a linear data structure. 4M

2. a) Discuss the asymptotic notations. How does one measure the efficiency of the algorithm? 6M
b) The time complexity of an algorithm can be measured using Aprioiri analysis or posteriori testing. Discuss these algorithms in detail? 6M

3. a) Explain how we can identify connected component of a graph by using: 8M
i. Depth First Search
ii. Breadth First Search
b) What is threaded binary tree? Explain its advantages and applications. 4M

4. a) Start with an empty AVL tree and perform insert operations using the following sequence of keys: 1, 3, 7, 6, 4, 5 and 2. 6M
b) Write a pseudo code for deleting a node from binary search tree. Consider all the possible cases. 6M

5. a) For the following red-black trees (double links are red links) as shown in figure.1 8M

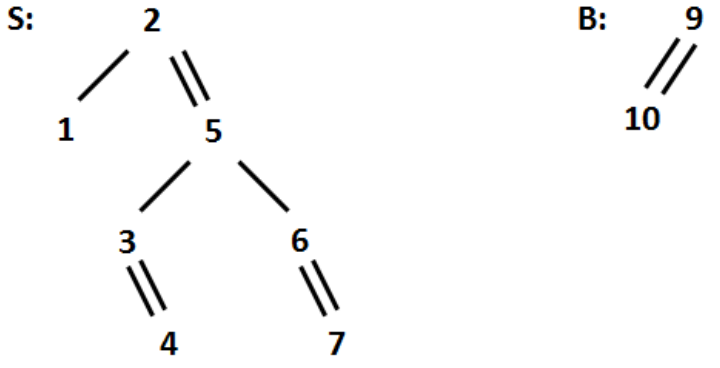

Fig.1

i. Perform Join(S; 8; B)
ii. Split the tree S with respect to 3
b) Write short notes on Hash function application and implementation techniques. 4M

Cont...2

6. a) Find a minimum-cost spanning tree using Kruskal's algorithm for the given graph in figure.2. 6M

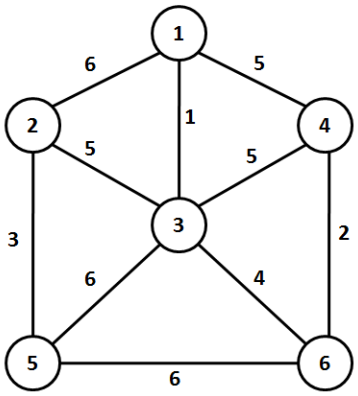

Fig.2

b) Write the pseudo code for sorting the elements of array in descending order using divide and conquer technique. 6M

7. a) What do you mean by dynamic programming? Explain the various steps of dynamic programming in detail. 6M

b) Given a set of cities and distance between every pair of cities as shown in figure.3, find the shortest possible route that visits every city exactly once and returns to the starting point. 6M

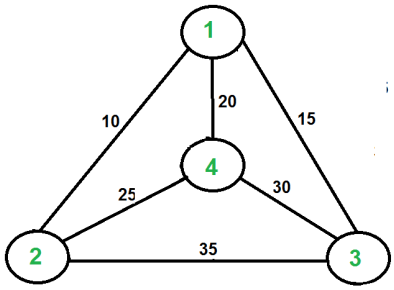

Fig.3

8. a) Present a backtracking algorithm for solving the N-Queen's problem. Draw the portion of state space tree for the N-Queen's problem. 6M

b) Explain the branch and bound techniques and its applications. 6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1602**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

MICROCONTROLLERS FOR EMBEDDED SYSTEM DESIGN
(Embedded Systems)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1.	a)	Explain the register banks available in 8051. Also explain the working of stack for PUSH, POP and CALL instructions.	8M
	b)	Explain the data types and directive of 8051.	4M
2.	a)	Write an ALP to toggle all the bits of Port-1 by sending to it the values 55h and 0AAh. Put a time delay in between each issuing of data to Port-1.	8M
	b)	Write a program to generate a square wave of 25% duty cycle on pin P2.3.	4M
3.	a)	Describe 8051 memory structure and map internal memory structure with different addressing modes.	6M
	b)	Write a program for the 8052 to put 55h into the upper RAM locations of 90 to 99h.	6M
4.	a)	Write an 8051 ALP to multiply the unsigned number in register R2 by the unsigned number in port-2 and put the result in external RAM location 20h and 21h.	9M
	b)	Find the content the content of the register A after the following code in each case: i. MOV A, #37h ANL A, #0CAh ii. MOV A, #37h ORL A, #0CAh iii. MOV A, #37h XRL A, #0CAh	3M
5.	a)	Explain the following design metric: i. Time to Market ii. NRE and Unit Cost iii. Performance	9M
	b)	Briefly explain about application specific processors.	3M
6.	a)	Illustrate how program and data memory fetches can be overlapped in Harvard architecture.	4M
	b)	Explain the various software design tools used for embedded system design.	8M
7.	a)	Explain the control of a DC motor using a PWM technique.	8M
	b)	Explain briefly the various functions of UART.	4M
8.	a)	Explain memory hierarchy used in embedded system and what are the different types of memories used in embedded system design.	6M
	b)	Explain RAM internals and Memory cell internals for i. SRAM ii. DRAM	6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1701

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

APPLIED MATHEMATICS

(Engineering Design)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) Explain absolute and relative errors with example. Evaluate the sum $S = \sqrt{3} + \sqrt{5} + \sqrt{7}$ to four significant digits and find its absolute and relative errors. 6M
   b) State conservation laws employed in any two major areas of engineering with examples. 6M

2. a) Use bisection method to find a real root of the equation $x \log_{10} x = 1.2$ between 2 and 3 (correct up to 3 decimal places) 6M
   b) Use Regula – Falsi method to find a non-zero real root of the equation $\sin x - \cosh x + 1 = 0$ (correct to 3 decimal places). 6M

3. a) Find the root of the equation $x^3 - 5x + 1 = 0$ which lies between 0 and 1 using Muller's method. 6M
   b) Perform two iterations of the Bairstow method to extract a quadratic factor $x^2 + px + q$ from the polynomial $P_3(x) = x^3 + x^2 - x + 2 = 0$. Use the initial approximation $p_0 = -0.9, q_0 = 0.9$. 6M

4. a) The velocity v (km/min) of a moped which starts from rest, is given at fixed intervals of time t (min) as follows. Estimate the distance covered in 18 minutes using Simpson's rule. 6M

t	2	4	6	8	10	12	14	16	18
v	10	18	25	29	32	20	11	5	2

   b) Calculate the first and second derivatives of the function tabulated below at the point x=1.0 6M

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

Cont...2

5. a) Find the inverse of the matrix using Gauss-Jordan method: 6M

$$A=\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

b) Solve the following system of linear equations by using cholesky method. 6M

$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 8 & 22 \\ 3 & 22 & 82 \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix}=\begin{pmatrix} 5 \\ 6 \\ -10 \end{pmatrix}$$

6. a) Find all the eigenvalues of the matrix $A=\begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$ using the Rutishauser method. 6M

b) Transform the matrix $A=\begin{bmatrix} 1 & 2 & 4 \\ 2 & 1 & 2 \\ 4 & 2 & 1 \end{bmatrix}$ to tridiagonal from by Givens method. 6M

7. a) The following table gives three ingredients in the diet together with the amount of certain nutrients supplied by 100 mg of each ingredient. If possible find some combination of fruits to provide the exact amount of Vitamin C, Calcium and Magnesium supplied by the diet in one day. 6M

Nutrient	**Amount (mg) of nutrients per unit of food**			**Total nutrients required (mg)**
	Banana	**Apple**	**Orange**	
Vitamin C	10	20	20	100
Calcium	50	40	10	300
Magnesium	30	10	40	200

b) Define Linear transformation. Obtain the matrix T that transforms (2,5) to (1,1) and (1,3) to (0,2). 6M

8. a) Find the best line b = C + Dt to fit b = 4, 2, – 1, 0, 0 at times t = –2, –1, 0, 1, 2. 6M

b) Apply Gram – Schmidt process to a = (1, 2, -2), b = (1, -1, 4) and c = (-2, 2, 1) and write the result in the form A=QR. 6M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : B1702

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED MACHANICS OF SOLIDS

(Engineering Design)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. Define the term shear center and enumerate the procedure for calculating the shear center for Unsymmetrical sections. 12M

2. Plates are welded together to form the 120mm by 80mm by 10mm angle section beam as shown in the Fig.1. The beam is subjected to concentrated load of 4Kn(P) as shown. The load P lies in the plane making an angle $\Phi = 2\pi/3$ with the x-z plane. Load P passes through shear center C which is located at the intersection of the two legs of the angle section. Determine the max tensile and compressive bending stresses at the section of the beam where the load is applied. Solve the problem using the load- stress relations derived for non symmetrical bending. 12M

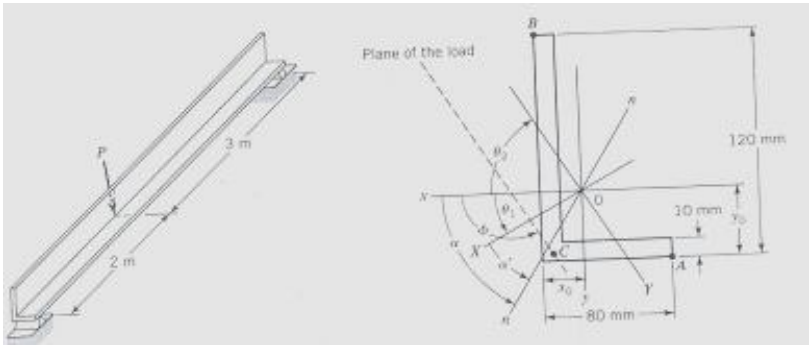

Fig.1

3. A glued laminated beam is used in a roof system. The beam has a simple span of 15m and the middle half of the beam is curved with a mean radius of 10m. The beam depth and width are both constant: d = 0.800m and b = 0.130m. Dead load is 2400N/m and snow load is 4800N/m. The geometry of the beam and the assumed loading are shown in Fig.2. Determine the max circumferential stress and radial stress in the beam. Compare the maximum circumferential stress to that obtained from the straight beam flexure formula. 12M

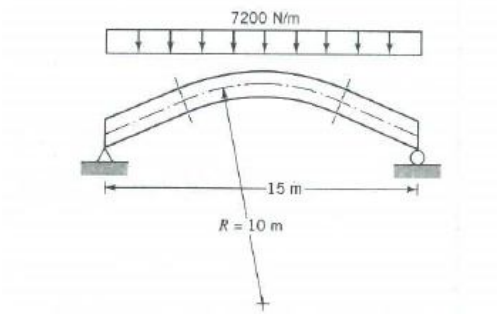

Fig.2

Cont...2

4. A hollow thin wall torsion member has two compartments with cross sectional dimensions as shown. The material is an aluminum alloy for which G = 26GPa. Determine the torque and the unit angle of twist if the max shear stress at locations away from the stress concentration is 40 MPa. 12M

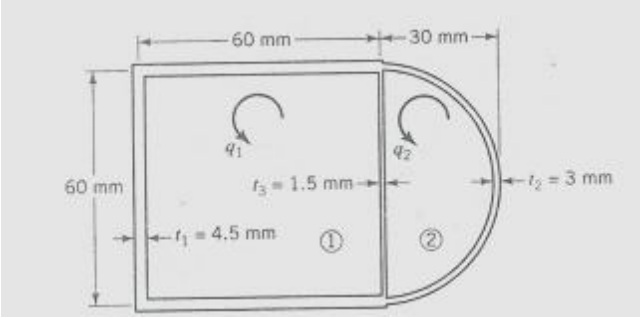

Fig.3

5. Derive an equation for bending of a beam by uniform loading. 12M

6. Derive an equation for stress distribution in a rotating circular disc. 12M

7. An Aluminum alloy I beam (depth = 100mm, $I_x = 2.45 \times 10^6 mm^4$ and E = 72 GPa) has a length L = 6.8m and is supported by seven identical springs (K = 110N/mm) spaced at a distance l = 1.10m center to center along the beam. A load of P = 12kN is applied at the center of the beam over one of the springs. Determine the load carried by each spring, the deflection of the beam under the load, the max bending moment and the max bending stress in the beam. 12M

8. a) State the assumptions on which solution for contact stresses is based 6M
   b) Derive an equation for deflection of bodies in point contact 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1703

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED MECHANISMS

(Engineering Design)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) Differentiate between spherical mechanisms and spatial mechanisms with example. 6M
   b) Give the symbolic illustration of revolute and prismatic joints of a Robot. 6M

2. a) Define the terms inflection points and inflection circle related to kinematics of motion. 4M
   b) Show the Bobillier Construction for finding the inflection point J_A when I, A and O_A are known on the ray IA. Assume the dimensions suitably where ever needed. 8M

3. a) State and prove Freudenstein's collineation axis theorem. 6M
   b) Discuss about polode curvature in the four bar mechanism. 6M

4. a) Explain two-position synthesis of centered slider crank – mechanism. 3M
   b) Explain in detail how Burmester's curve will be drawn for a 4-bar mechanism. 9M

5. Synthesize a function generator to solve the equation $y = x^{0.6}$, in the interval $1 \le x \le 3$, with the range is divided into six intervals. Use Overlay method. 12M

6. Design and draw a four link mechanism to coordinate 3 positions of input and output links as follows: 12M
   i. $\theta_1 = 20^0, \theta_2 = 35^0, \theta_3 = 50^0$
   ii. $\phi_1 = 35^0, \phi_2 = 45^0, \phi_3 = 60^0$
   Take d=1. Use Freudenstein's equation.

7. a) Assign coordinate frames based on D-H representation for the SCARA type robot. 4M
   b) Established link co-ordinates system for a PUMA robot with neat sketch. 8M

8. a) Explain similarity analysis in manipulator kinematics. 6M
   b) Explain the formulation of Jacobian for planar manipulator. 6M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : B1704

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

FINITE ELEMENT METHODS

(Engineering Design)

Date: 24 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. a) What are the advantages of variational formulation over differential equations formulation? Compare Variational Methods and Weighted residual methods for carrying out engineering analysis. 6M
   b) Determine the maximum deflection of a simply supported beam subjected to UDL using an approximate analytical method which uses the principle of minimum potential energy. 6M

2. a) A Tapered bar of circular cross section from 100 mm to 85 mm is subjected to a tensile load of 1KN. E= $2.1X10^5$ MPa. If the length of the member is 950 mm, determine the change in length and stress in this member using a minimum of two elements. Use penalty method. 8M
   b) Derive interpolation functions for a 2^{nd} order bar element and plot their variation over its length. 4M

3. a) A planar truss is in the form of a right angled triangle with one corner on the origin of X-Y Cartesian coordinate system. One member located on the X axis measures 4 m and another member located on the Y axis measures 3 m. The left end of the member which is on the x axis is fixed. The right end of this member has a roller support to constrain the displacement in the y direction and a load of M KN is applied in the positive X direction at this node. If this node experiences a displacement of 0.1 mm along the positive X axis, determine "M" and the stresses in the members. Area of each member = 2026.83 mm^2 and E= $2.1X10^5$ MPa. Find the support reactions 10M
   b) Derive the Transformation matrix for a truss element having 2 dof at each node. 2M

4. a) Derive Hermite shape functions for a 1-D beam element and plot their variation over its length. 8M
   b) What are C^0, C^1 and C^2 continuous shape functions? What are the differences between truss elements and beam elements? 4M

Cont...2

5. Determine the strains experienced by a CST element (Assume Plane strain condition). There is a node at each corner of the element. Edge 23 is fixed. A force of 10KN is applied at node 1 in the +ve X direction. Poisson's ratio is 0.3. E= $2.1X10^5$, thickness=0.3. All dimensions are in mm. 12M

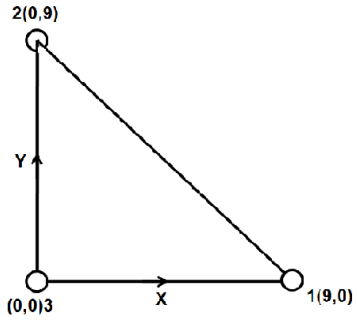

Fig.1

6. a) Integrate the following function numerically using Gaussian quadrature technique. 6M

$$I = \left[\frac{x^2}{y^{-1}} + 23x \right] 2 \le x \le 3; 0 \le y \le 1$$

b) With examples explain iso, sub and super parametric elements, clearly indicate their applications. 6M

7. a) Evaluate the lowest Eigen value and the corresponding Eigen mode for the cantilever beam of length 600 mm, area 240 mm^2, density 7.84g/cc and modulus of elasticity 200 GPa. 7M

b) What are the 3 basic categories of Eigen value Eigen vector evaluation procedure? 5M

8. a) "The assumed displacement function in the FEM need not satisfy the BC's. But they must satisfy the requirements for convergence" Say Yes or No. Justify your answer 6M

b) Differentiate between h – refinement and p – refinement of FE meshes. Clearly indicating their differences while meshing curved surfaces. 6M

Hall Ticket No: | | | | | | | | | | |

Question Paper Code : B1801

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

ADVANCED ENGINEERING MATHEMATICS
(Structural Engineering)

Date: 28 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) Solve the following system of linear equations by LU decomposition method. 6M

$$x_1 + x_2 - x_3 = 2$$
$$3x_1 + 3x_2 + 5x_3 = -3$$
$$3x_1 + 2x_2 - 3x_3 = 6$$

b) Determine the inverse of the matrix $\begin{bmatrix} 1 & -1 & 2 \\ -1 & 4 & 6 \\ 2 & 6 & 29 \end{bmatrix}$ by Gauss-Jordan method. 6M

2. a) Transform the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ to tridiagonal from by Givens method. 6M

b) Using the Jacobi method find all the eigen values and the corresponding eigenvectors of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ 6M

3. a) Construct Lagrange's interpolation polynomial for the following data and hence find f(9) 6M

x	4	6	8
y	1	3	8

b) Given the data 6M

x	0	1	2	3
$f(x)$	1	2	33	244

Fit quadratic splines with $M = f''(0) = 0$. Hence, find an estimate of f(2.5).

Cont...2

4. a) The displacement of an instrument subjected to a random vibration test at different instants of time, is found to be as follows: 6M

Station(i)	1	2	3	4	5	6
Time $t_i(\sec)$	0.05	0.10	0.20	0.25	0.30	0.35
Displacement $y_i(inch)$	0.144	0.172	0.213	0.296	0.076	0.085

Find the velocity $\left(\frac{dy}{dt}\right)$, acceleration $\left(\frac{d^2y}{dt^2}\right)$ and jerk $\left(\frac{d^3y}{dt^3}\right)$ at $t=0.05$ and 0.20, using the suitable finite difference formulas, with a step size $\Delta t = 0.05\sec$.

b) Compute $f'(3)$ from the following table using the formula $f'(x_1)=\frac{f(x_2)-f(x_0)}{2h}$ and perform the Richardson extrapolation. 6M

x	-1	1	2	3	4	5	7
$f(x)$	1	1	16	81	256	625	2401

5. a) Find the Jacobian matrix for the system of equations 6M

$f_1(x,y)=x^2-y^2+2x=0$

$f_2(x,y)=x^2+y^2+y=0$ at the point $(1,1)$

b) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=1.9$ from the following table: 6M

x :	1	1.2	1.4	1.6	1.8	2.0
y :	0.00	0.128	0.544	1.296	2.432	4.00

6. a) A differentiation rule of the form 6M

$$hf'(x)=\alpha_0 f(x_0)+\alpha_1 f(x_1)+\alpha_2 f(x_2)+\alpha_3 f(x_3),\quad (x_k=x_0+\mathrm{kh})$$

is given. Determine the values of $\alpha_0,\alpha_1,\alpha_2$ and α_3 so that the rule is exact for a polynomial of degree 4.

b) Evaluate the mixed partial derivatives $\frac{\partial^3 f}{\partial x \partial y^2}$ of the function $f(x,y)=x^3y^3$ using central differences at $x=1$ and $y=1$ with a step size $\Delta x=\Delta y=0.1$ 6M

7. a) The velocity v (km/min) of a moped which starts from rest, is given at fixed intervals of time t (min) as follows. Estimate the distance covered in 18 minutes using Simpson's rule. 6M

t	2	4	6	8	10	12	14	16	18
v	10	18	25	29	32	20	11	5	2

b) Evaluate the integral $I=\int_{y=1}^{2}\int_{x=1}^{2}\frac{dxdy}{x+y}$ using the trapezoidal rule with h=k=0.5. 6M

Improve the estimate using Romberg integration.

8. a) Find by Taylor's series method the value of y at x = 0.1 and x = 0.2 to five places of decimals from $\frac{dy}{dx}=x^2y-1,\ y(0)=1$. Consider up to 4th degree terms. 6M

b) By using the Modified Euler's method, solve the problem $y'=x^2+y,\ y(0)=1$ at x = 0.02. 6M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : B1802**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

THEORY OF ELASTICITY AND PLASTICITY

(Structural Engineering)

Date: 22 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carries equal marks.
All parts of the question must be answered in one place only.

1. a) The state of stress in MPa at a point is given by $\sigma_x = -120$, $\sigma_y = 140$, $\sigma_z = 66$, $\tau_{yz} = -65$, $\tau_{zx} = 25$. Determine three principle stresses and direction associated with the three principle stresses. 6M

   b) Find the components of linear strain and component of rotation for the given displacement components : $Ux = C_x(y + z)^2$, $Uy = C_y(z + x)^2$, $Uz = C_z(x + y)^2$ where C is a constant. 6M

2. a) Prove that the following are Airy's stress function and examine the stress distribution represented by them. 6M
   $\Phi = Ax^2 + By^2$
   $\Phi = A(x^4 - 3x^2y^2)$
   $\Phi = Ax^3$

   b) The state of stress at a particular point relative to the xyz coordinates system is given by the stress matrix given below. Determine the normal stress, magnitude and direction of shear stress on a surface intersecting a point and parallel to the plane given by the equation $2x - y + 3x = 9$ 6M

$$\begin{bmatrix} 15 & 10 & 10 \\ 19 & 10 & 10 \\ -10 & 0 & 40 \end{bmatrix}$$

3. a) Determine the stress components from the following stress functions and calculate their values when $\alpha = 20^0$ and $\alpha = 30^0$. 6M
   $\Phi = Cr^2(\alpha - \theta) + r^2\sin\theta\cos\theta - r^2\cos^2\theta\tan\theta$.

   b) Write basic equation of equilibrium of plane stress and plane strain in polar coordinates. 6M

4. Determine the normal stress, circumferential stress and shear stress for a stress function 12M
   $\Phi = A \log r + Br^2 \log r + Cr^2 + D$.

5. a) Explain and illustrate the principle of superposition and uniqueness theorem. 6M

   b) Write and explain equations of equilibrium in terms of displacements. 6M

6. Prove that $\nabla^2 = -2G\theta$, Poisson's equation for torsion of prismatic bar of non circular cross section. 12M

Cont...2

7.	a)	Derive the equation of shear stress τ_{xy} =4/3(P/A) along with the horizontal dia. of the cross section of the bar subjected to bending using elementary beam theory.	6M
	b)	Determine the max. stress in the cantilever beam of 5 m span subjected to a load of 1 kN at the free end of a cross section of (80 x 100) mm at an angle of 30^0 to the vertical.	6M
8.	a)	Explain Elastic- Perfectly plastic material	6M
	b)	Explain Elastic linear strain hardening material with the stress – strain diagram for the material.	6M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : B1803

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations July - 2014

(Regulations: VCE-R11)

FINITE ELEMENT ANALYSIS
(Structural Engineering)

Date: 23 July, 2014 **Time: 3 hours** **Max Marks: 60**

Answer any Five Questions. All Questions carry equal marks.
All parts of the question must be answered in one place only.

1. A simply supported beam carries a point load P at the two quarter span points. Calculate the bending moment and shear force which shall be the maximum by Raleigh-Ritz method and hence compare the exact solution. 12M

2. A displacement field $U = 4 + 6x^3 + 2xy^2$, $V = xy^2 - 2y^3$ is imposed on a triangular element whose nodes are (1, 1), (6, 1), (4, 8). 12M
   i. Write the expressions for $\varepsilon_x, \varepsilon_y$
   ii. If E = 200 GPA, find σ_x, σ_y and ξ_{xy} assuming plane strain condition

3. A bar of uniform cross section is shown in Fig 1. Determine the elongation and reaction at the fixed end for the given loading condition. 12M

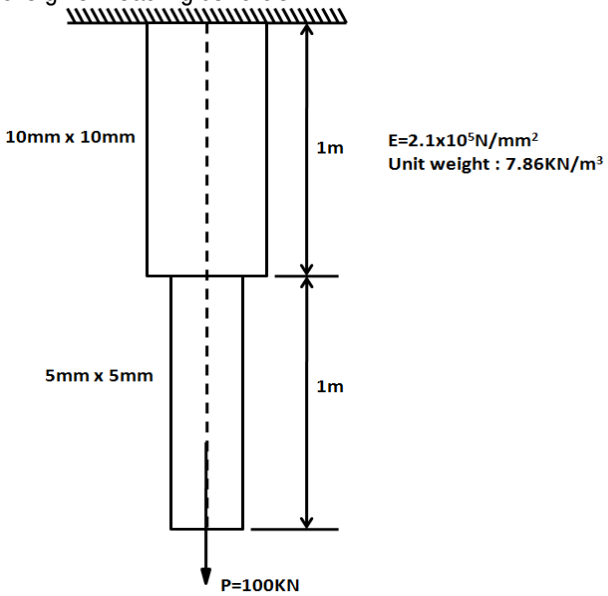

Fig.1

Cont...2

4. For the four sided element shown in Fig.2, determine the Jacobian matrix and the strain displacement matrix. 12M

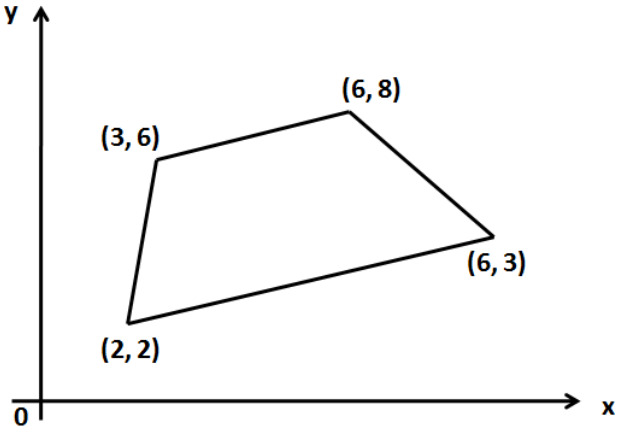

Fig.2

5. Derive the stiffness matrix for a four noded square element. 12M

6. Derive the shape function for a six noded polygon element in natural coordinates. 12M

7. An open ended cone of height 200 mm, slant height 300mm and outer diameter 200mm and wall thickness 10mm is subjected to an internal pressure of 2Mpa. Identify the problem and explain in detail how the problem can be solved by finite element method. 12M

8. Using 2x2 rule, evaluate $\int\int_A \left(3x + 2x^2 + xy\right) dxdy$ over the given area shown in Fig.3 by Gaussian Quadrature method. 12M

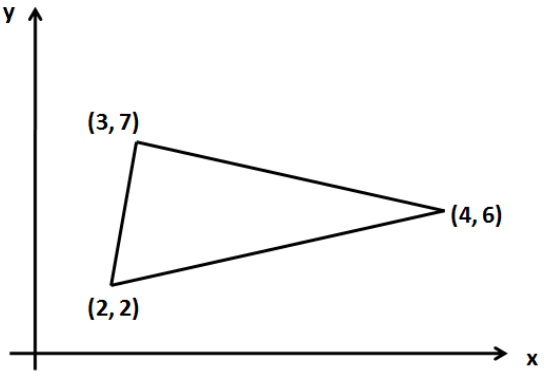

Fig.3