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

Question Paper Code : B1201

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

DATA STRUCTURES AND ALGORITHMS

(Common to Computer Science and Engineering & Software Engineering)

Date : 3 February, 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) 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. Find the best case, average case and worst case complexities for the following: 12M
   i. Binary search
   ii. Linear search
   iii. Bubble sort
   iv. Selection sort

3. a) Given the pre-order 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) Following numbers are inserted into a empty binary search tree in the given order one by one 15 30 45 20 9 3 25 11 42 12 1 13 8M
   i. Show the final binary search tree after insertion.
   ii. Draw a binary search tree after deleting 13 from it.

   b) What is the maximum height of an AVL tree with 7 nodes? Assume that the height of a tree with a single node is 0. 4M

5. a) What is a red black tree? Explain in detail about its operations and applications. 6M

   b) Keys 12, 18, 13, 2, 3, 25, 5, 15 are inserted into an initially empty hash table of length 10 using open addressing with hash $fuc^{n}h(k)=K$ mod 10 and linear probing. What is resultant hash table? 6M

6. a) Write short notes on 0/1 Knapsack Algorithm. 6M

   b) A complete, undirected, weighted graph G is given on the vertex set $\{0,1,2...n-1\}$ for any fixed 'n'. Draw minimum spanning tree of G if: 6M
   i. The weight of the edge u, v is u - v.
   ii. The weight of the edge u, v is u + v.

7. a) Write a note on the travelling sales man problem. 6M

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

8. a) Prove that if G is a connected undirected graph, with n vertices and n-1 edges, there is a tree. 6M

   b) Explain and describe 'n' queens problem. 6M

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Question Paper Code : B1202

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

DISCRETE STRUCTURES AND AUTOMATA THEORY

(Computer Science and Engineering)

Date : 05 February, 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

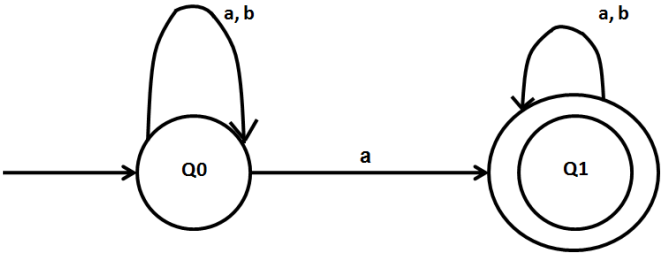
1. a) Prove or disprove the validity of the following argument using the rules of inference. 6M
   i. Every living thing is a plant or an animal.
   ii. David's Dog is alive and it is not a plant.
   iii. All animals have hearts
   iv. Hence, David's dog has a heart.
   b) Transform the following formula into CNF $\sim(p \to q) \vee (r \to p)$ 6M

2. a) Let $A=\{1,2,3,4\}, B=\{a,b,c,d\}$, $C=\{x,y,z\}$ and let $R=\{(1,a),(2,d),(3,a),(3,b),(3,d)\}$ and $S=\{(b,x),(b,z),(c,y),(d,z)\}$. Give Pictorial representation of the relation and find R^0S. 6M
   b) State whether or not each of the relations given below defines a function of $A=\{a,b,c\}$ into $B=\{1,2,3\}$ 6M
   i. $f=\{(a,2),(a,3),(b,3),(c,1)\}$
   ii. $f=\{(a,2),(\mathrm{b},3)\}$
   iii. $f=\{(a,1),(\mathrm{b},3),(c,1)\}$

3. a) How many ways can we select a software development group of 1 project leader, 5 programmers and 6 data entry operators from a group of 5 project leaders, 20 programmers and 25 data entry operators ? 6M
   b) How many permutations can be made out of the letter of word "COMPUTER" ? How many of these 6M
   i. begin with C ?
   ii. end with R ?
   iii. begin with C and end with R ?

4. a) Find the generating function for the sequence 1, a, a^2, … where 'a' is a fixed constant. 6M
   b) A box contains many identical blue, green and white marbles. Find the ordinary generating function corresponding to the problem of finding the number of ways of choosing r marble from the box such that the sample does not have more than 2 red, more than 3 blue, more than 4 white and more than 5 green. 6M

5. a) Convert the following NFA to DFA. 6M



b) Minimize the following DFA using table filling Algorithm. 6M

States	INPUT	
	0	1
→A	B	F
B	G	C
*C	A	C
D	C	G
E	H	F
F	C	G
G	G	E
H	G	C

6. a) Show that the regular languages are closed under union and intersection. 6M

b) Obtain the Regular Expression for the following DFA 6M

STATE	Input $\sum$	
q	0	1
$\rightarrow q_0$	q_1	q_3
q_1	q_0	q_3
q_2	q_1	q_4
$*q_3$	q_5	q_5
q_4	q_3	q_1
$*q_5$	q_5	q_5

7. a) Consider the following grammar 6M

S → 0A | 1B

A → 0AA | 1S | 1

B → 1BB | 0S | 0

Obtain the grammar in CNF.

b) Obtain a PDA to accept the language $L = \{a^n b^n \mid n \geq 1\}$ by final state. 6M

8. a) Design the Turing Machine for the language $L = \{0^n 1^n \mid n \geq 1\}$. 8M

b) Write short note on Chomsky hierarchy. 4M

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Question Paper Code : B1203

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

COMPUTER ARCHITECTURE AND ORGANIZATION

(Computer Science and Engineering)

Date : 07 February, 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) Draw the logic diagram of a 4-bit synchronous binary counter and explain its operation. 8M
   b) Design a Full Adder using Half Adder. Explain the operation with an example. 4M

2. a) Why data bus is bidirectional and address bus is unidirectional in most microprocessors? Explain in detail. 6M
   b) Explain the representation of floating point numbers in detail. 6M

3. a) What do you mean by addressing mode? Explain all the addressing modes with example. 6M
   b) Registers R1 and R2 of a computer contains the decimal values 1200 and 2400 respectively. What is the effective address of the memory operand in each of the following instructions? 6M
      i. Load 20(R1), R5
      ii. Add –(R2) , R5
      iii. Move #3000, R5
      iv. Sub (R1)+, R5

4. a) Design a 4-bit Carry-Look ahead Adder and explain its operation with an example. 6M
   b) Explain the function of a six segment pipeline showing the time it takes to process eight tasks. 6M

5. a) What do you mean by Superscalar Operation? Explain how it affects the performance. 6M
   b) State the difference between hardwired control and micro programmed control unit. 6M

6. a) Explain how the virtual address is converted into real address in a paged virtual memory system. 8M
   b) What is Translation Look aside Buffer? Explain how it affects the performance. 4M

7. a) Explain the DMA driven data transfer technique. Explain how DMA transfer is accomplished with a neat diagram. 6M
   b) Describe the serial communication protocol IEEE1394. 6M

8. a) Is the cache coherence problem an issue with processor registers? Given that registers are not kept consistent in hardware, how do current systems guarantee the desired semantics of a program? 6M
   b) What do you mean by inter processor communication and synchronization? Explain how mutual exclusion principles are implemented in multiprocessor architecture. 6M

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Question Paper Code : B1204

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

SOFTWARE ENGINEERING

(Computer Science and Engineering)

Date : 10 February, 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 unique nature of web applications and justify how it's different from normal software? 6M
   b) What do you mean by process assessment? Explain in detail. 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) Describe four types of non-functional requirements that may be placed on a system. Give examples of each of these types of requirement. 8M
   b) Suggest how an engineer responsible for drawing up a system requirements specification might keep track of the relationships between functional and non-functional requirements. 4M

4. a) Real-time systems usually use event-driven models of control. Under what circumstances would you recommend the use of a call–return control model for a real-time system? 6M
   b) Explain the software design quality guidelines and its attributes. 6M

5. a) What do you mean by software design pattern? Explain in detail. 6M
   b) What is framework and idiom? How do they differ from a pattern? 6M

6. a) What is validation testing? Explain why it is important? 6M
   b) Explain why interface testing is necessary even when individual components have been extensively validated through component testing and program inspections. 6M

7. a) Explain the difference between functional and non-functional testing. 6M
   b) What do you mean by equivalence partitioning and boundary value analysis? Explain in detail. 6M

. a) Explain why design metrics are, by themselves, an inadequate method of predicting design quality. 6M
   b) What are the essential conditions for software re-engineering to be successful? Explain in detail. 6M

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Question Paper Code : B1207

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION

(Common to Computer Science and Engineering & Software Engineering)

Date : 12 February, 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 sampling. Explain Shannon's sampling theorem for 2 dimensional modeling. 8M
   b) Explain with a neat diagram as to how a general purpose image processing system functions. 4M

2. a) Obtain DCT matrix for the order N=3. Mention the applications of the same. 6M
   b) Write short notes on: 6M
      i. Haar transform
      ii. Slant transform

3. a) Explain homomorphic filtering application for image enhancement. What are its advantages? 6M
   b) Explain the concept of linear spatial filtering. 6M

4. a) Obtain the degradation model for continuous functions. 6M
   b) Explain constrained least square error method for image restoration. 6M

5. a) With the help of a suitable example, explain about edge linking and boundary detection using graph theoretic techniques. 6M
   b) Explain basic formulation to perform region based segmentation. 6M

6. a) Design an efficient algorithm to assign binary words of unequal length to gray level. 8M
   b) Explain vector quantization compression. 4M

7. a) Define discriminant function. Write a note on Mixture models. 4M
   b) Generate a set x of N=500 two dimensional points that stem from following PDF. 8M

$$p(x) = \sum_{j=1}^{3} p_j \, p(x/j)$$

Where $p(x/j)$'s , j=1, 2, 3 with mean values $m_1 = [1,1]^T$, $m_2 = [3,3]^T$, $m_3 = [2,6]^T$ and covariance matrices $s_1 = 0.1\mathrm{I}$, $s_2 = 0.2\mathrm{I}$ and $s_3 = 0.3\mathrm{I}$ respectively. In addition $p_1 = 0.4$, $p_2 = 0.4$ and $p_3 = 0.2$.

8. a) Explain working of Naïve Bayesian classifier with an example. 8M
   b) Give the Euclidian and Manhatton distance formulae. 4M

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Question Paper Code : B1210

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

C# AND .NET FRAMEWORK

(Common to Computer Science and Engineering & Software Engineering)

Date : 14 February, 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) Discuss the following: 5M
   i. Verbatim strings
   ii. Boxing and unboxing operations
   b) With the help of a C# program demonstrate the use of the Parms modifier. Also, explain with examples any four characters that can be used to format Console output. 7M

2. a) What is the use of the partial types in C#? Explain the use of the sealed keyword. 6M
   b) With examples bring out the differences between Overriding and Hiding in C#. 6M

3. a) What is the use of the following members of the System.Exception object: 4M
   i. TargetSize
   ii. StackTrace
   iii. Data
   iv. HelpLink
   b) Demonstrate with code snippets how the GC.Collect() method can be used for programmatically force garbage collection. 8M

4. a) Write a C# program to demonstrate how the multicasting of delegates can be done for performing the following operations on a string: 8M
   i. Removing blank spaces from a string
   ii. Counting the number of characters of a specific type in a string
   b) Discuss what are callback interfaces. 4M

5. a) Explain what is meant by cross language inheritance? 4M
   b) Explain what is object context boundary? What are the differences between context.agile and context bound objects. 8M

6. a) Explain the terms object serialization and object marshalling. 6M
   b) What are the steps in building a distributed application? Briefly explain. 6M

7. a) Demonstrate how an MDI Application can be built. 6M
   b) Write a note on: 6M
   i. Groupboxes
   ii. Trackbar controls

8. a) List out the various data providers in the ADO.Net Framework? 5M
   b) Explain how a record can be inserted into the table using a data reader? 7M

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Question Paper Code : B1301

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

POWER SEMICONDUCTOR DEVICES

(Power Electronics and Electric Drives)

Date : 3 February, 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. 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. 12M
   i. PN junction diode
   ii. IGBT
   iii. MOSFET

2. a) Sketch the switching characteristics of a power diode and explain. 6M
   b) Write short notes on Schottky diode giving emphasis to the ohmic contacts present in it. 6M

3. a) Describe the turn-on process of a BJT with a suitable example. 7M
   b) Draw the Eber-Moll's transistor model and write short notes on the elements used in the model. 5M

4. a) Elaborately explain the turn-on and turn-off process of a power MOSFET with necessary diagrams. 8M
   b) What considerations should be kept in mind while paralleling MOSFETs? 4M

5. a) Draw the V-I characteristics of an IGBT and write short notes on it. 6M
   b) Discuss about isolated and non-isolated gate drive circuits for IGBT's. 6M

6. a) Explain the turn-on and turn-off process of a thyristor. 6M
   b) Describe the structure of a thyristor with a neat diagram. 6M

7. a) How can the switching losses in a power semiconductor switch be computed? Explain. 6M
   b) Write short notes on the necessity of heat sinks and its sizing considerations. 6M

8. Discuss the design procedure of the following magnetic components:
   a) line frequency inductors 6M
   b) high frequency inductors 6M

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Question Paper Code : B1709

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

DESIGN FOR MANUFACTURING

(Engineering Design)

Date : 14 February, 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)	Briefly explain the effect of material and manufacturing process on design.	8M
	b)	Briefly explain material selection in detail with suitable example encountering a stack overflow.	4M
2.	a)	Discuss the cumulative effect of tolerance sure fit law and truncated normal law.	8M
	b)	Differentiate geometries tolerances and geometric tolerances.	4M
3.	a)	Compare interchangeable assembly and selective assembly with suitable examples.	8M
	b)	What is laminated shim? List the applications of laminated shims.	4M
4.	a)	Briefly explain DFF (Datums For Function) and sometimes DFM (Datums For Manufacturing) principles and practices.	8M
	b)	Briefly explain with an example the concept of changing the datum.	4M
5.	a)	Explain briefly principles of casting design to obtain sound castings.	8M
	b)	Briefly explain identification of possible and probable parting line.	4M
6.	a)	What are producibility requirements in the design of machine components?	4M
	b)	Briefly explain Merchant's circle diagram and utility of Merchant's analysis.	8M
7.	a)	What is paper layout gauging? Briefly explain the procedure to make paper gauges.	4M
	b)	With neat sketch, explain floating and fixed fasteners.	8M
8.	a)	What are the essential consideration in selection of material for gauges and what are the common material used for gauges? Explain the various process of manufacturing gauges.	8M
	b)	What is a limit gauge? What are advantages of limit gauges in inspection process?	4M

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Question Paper Code : B1804

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADVANCED STRUCTURAL ANALYSIS

(Structural Engineering)-

Date : 10 February, 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) Distinguish between externally indeterminate and internally indeterminate structures with suitable example. 3M
   b) Prove that flexibility matrix is inverse of stiffness matrix for the same coordinates. 6M
   c) State the minimum potential energy theorem. 3M

2. a) Solve the following set of linear equations by Gauss elimination method. 6M
   2.63x+5.21y-1.694z+0.938t = 4.23
   3.16x-2.95y+0.813z-4.21t=-0.716
   5.36x+1.88y-2.15z-4.95t =1.28
   1.34x-2.98y-0.432z-1.208t=0.893
   b) Solve the given equations using Cholesky's Method. 6M
   $3x_1 + x_2 + x_3 = 2$
   $x_1 + 4x_2 + x_3 = 12$
   $2x_1 + x_2 + 2x_3 = 10$

3. Develop the transformation matrix and global flexibility matrix for the rigid plane frame shown in Fig. 1. Take EI = constant 12M

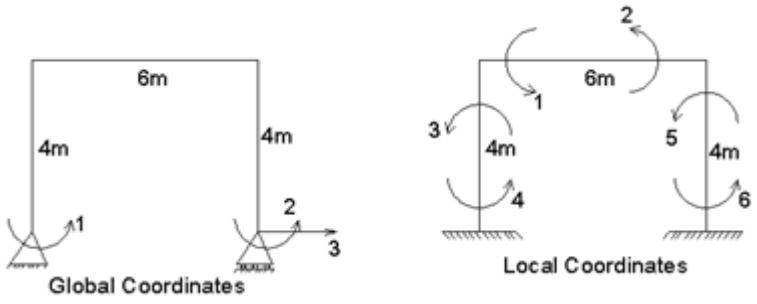

Fig. 1

4. a) Solve the following simultaneous equations by Gaussian elimination method. 6M
   5x + 6y + 3z =14
   8y + 4z = 12
   x +2y +10z =13
   b) Solve the following simultaneous equations by using Cholesky's Method. 6M
   $3x_1 + 2x_2 + 8x_3 = 18$
   $10x_1 + 5x_2 + x_3 = 7$
   $2x_1 + 8x_2 + x_3 = 10$

Cont…2

5. Analyse the frame shown in Fig. 2 by stiffness method. Adopt system approach. Draw BMD and sketch the elastic curve. 12M

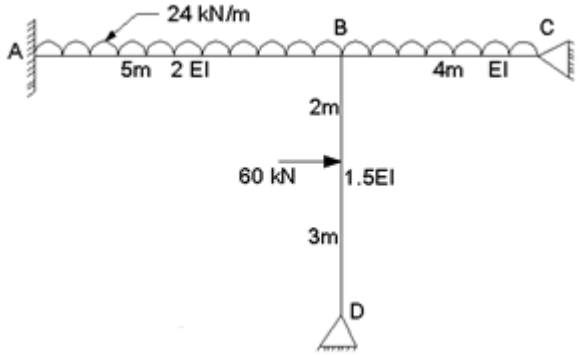

Fig. 2

6. Analyze the plane truss shown in Fig. 3 by stiffness method using element approach. 12M

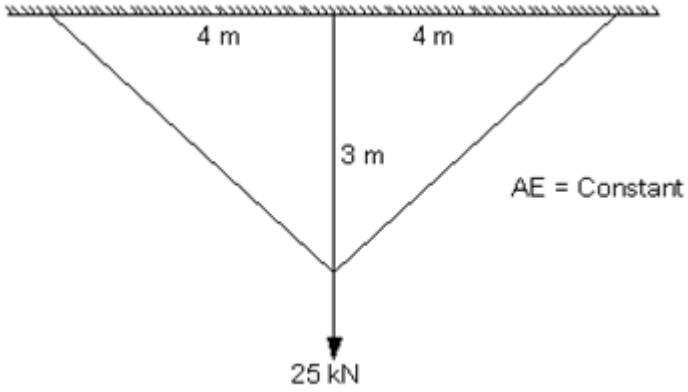

Fig. 3

7. Analyze the continuous beam shown in Fig. 4 by flexibility method. Take EI is constant. 12M

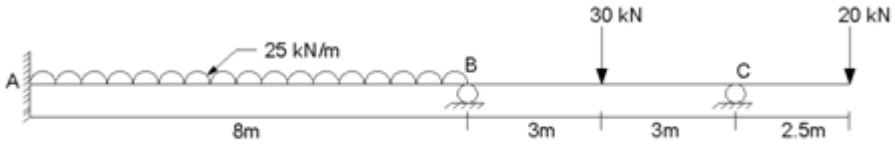

Fig. 4

8. Find the required value of plastic moment capacity in the continuous beam shown in Fig. 5 The given loads are collapse loads. 12M

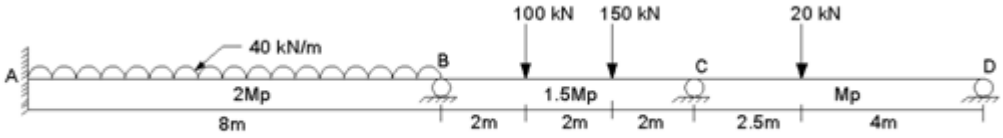

Fig. 5

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Question Paper Code : B1808

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

EARTH QUAKE RESISTANT DESIGN OF BUILDINGS

(Structural Engineering)

Date : 14 February, 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 magnitude and intensity of earthquake with an illustration of local magnitude. Also mention different scales available with the range of its capacity. 4M
   b) Differentiate focus and epicentre of earthquake and its location with a neat sketch. Also explain Love wave and Rayleigh wave with a neat sketch. 8M

2. a) Explain the importance of structural modelling while analysing any structure. 6M
   b) Write a note on Lumped mass model and soil structure interaction model. 6M

3. a) Explain soft storey and storey drift. 6M
   b) A three storey structure (Fig. 1) is subjected to the El-Centro earthquake (1940-05-18, comp S00E). Estimate the probable maximum base shear using CQC combination, suppose a damping of 2% critical for each mode of vibrations. Take $k_1=k_2=$ 2000kN/m, k_3 = 3000 kN/m, $m_1=m_2=m_3=$ 10 x 10^3 kg. 6M

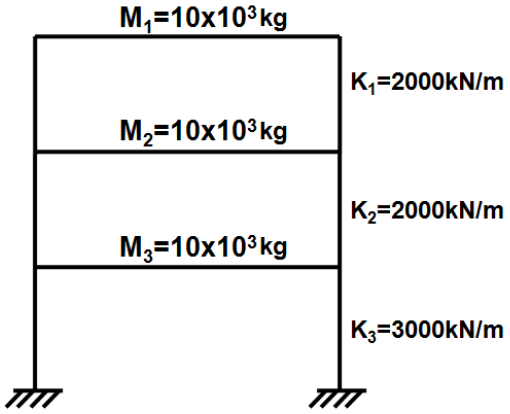

Fig. 1

4. a) Design the bracing to carry a lateral force of 150kN, resisted by a tensile member (75x 75 x 8)mm with a gross area of 1138 mm^2 using LRFD format $0.75f_y$ x $A_{net} \geq 1.2S$. Use SRSS combination. 6M
   b) Which type of connectors is recommended for moment frames in earthquake prone areas? 6M

5. a) State the reasons for poor performance of masonry buildings in seismic area? 4M
   b) Describe the various earthquake resistant features that can be introduced in a masonry buildings to make it earthquake resistant. Explain the step by step procedure of analysis of low rise 2 storey masonry building. 8M

Cont…2

6. a) Explain briefly with example passive and active control system. 6M
   b) The probability on non-occurrence is given by $p_o = 1 - e^{-t/T}$. Compute the probability of non-occurrence for a design life t=50 years and the return period T=70 years. 6M

7. Write the detailed specifications as per BIS code for ductility detailing of longitudinal and transverse reinforcement of column subjected to bending and axial load. Sketch the detailing. 12M

8. a) How do you establish strong column and weak beam mechanism in capacity based design, explain it in detail? 6M
   b) Why is bracing of building frame needed in earthquake prone areas? Is there any alternative to this system? 6M

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Question Paper Code : B1103

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

MOBILE SATELLITE COMMUNICATIONS

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

Date : 12 February, 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 block diagram explain modern mobile satellite system.	8M
	b)	Give the comparison of main characteristics of mobile services through terrestrial and satellite media.	4M
2.	a)	Describe the effect of eclipse on satellites.	8M
	b)	Write a short note on orbital debris.	4M
3.	a)	With relevant diagram, explain about polar constellation.	8M
	b)	What are the assumptions made in the performance analysis of a few LEO and MEO systems in a hypothetical urban environment.	4M
4.		List and define the components that are used in the simulation model for interference analysis.	12M
5.	a)	With a block diagram explain the entities of a large earth station.	8M
	b)	Briefly describe the various antennas used for MSS terminal and tracking system.	4M
6.	a)	What are the advantages and disadvantages of regenerative transponders?	6M
	b)	Explain inter satellite links.	6M
7.	a)	With a block diagram explain American mobile satellite corporation system.	8M
	b)	Write a short note on Big LEO system.	4M
8.		With a block diagram of MSAT, describe how an MSAT network operates at both L-band and Ku-band.	12M

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

Question Paper Code : B1215

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

OBJECT ORIENTED ANALYSIS AND DESIGN

(Software Engineering)

Date : 05 February, 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 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)	Describe dependency and generalization with an example.	6M
	b)	Prepare a class diagram for a graphical document editor that supports grouping. Assume that a document consists of several sheets. Each sheet contains drawing objects, including text, geometrical objects and groups. A group is simply a set of drawing objects, possibly including other groups. A group must contain at least two drawing objects. A drawing object can be a direct member of at most one group. Geometrical objects include circles, ellipses, rectangles, lines and squares.	6M
3.	a)	Explain sequence diagram and collaboration diagram with an example. Discuss the situations when to use each of them.	8M
	b)	Give a visual representation to show the different types of messages in a sequence diagram.	4M
4.	a)	Define action state and activity state. Illustrate with an example the object flow in an activity diagram	7M
	b)	Consider software for a Library System. In addition to the normal activities, it supports to reserve a book in an external library, if it is not available in the local library. Draw a use case diagram.	5M
5.	a)	Explain the ways in which the relationship between components and its interfaces can be established.	6M
	b)	Give the guidelines to model a client server system. Illustrate with an example.	6M
6.	a)	Define the 4 Ps in software development.	4M
	b)	Explain the steps that are to be followed while creating software architecture.	8M
7.	a)	Explain how the core work flows will be carried out during the construction phase.	8M
	b)	Explain the activities involved during the initial stage of elaboration phase.	4M
8.	a)	Explain the activities that are to be carried out during transition phase.	8M
	b)	Describe the archetypal construction iteration workflow.	4M

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

Question Paper Code : B1401

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADAVANCED DATA COMMUNICATIONS

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

Date : 3 February, 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 coherent demodulation of Frequency shift keying (FSK)	6M
	b)	What is the purpose of a clock recovery circuit? When it is used? Give an example.	6M
2.	a)	With the help of constellation diagram, explain Eight PSK (8PSK)?	6M
	b)	Differentiate between noise power and carrier power. The binary sequence 1100100010 is applied to the DPSK transmitter; sketch the resulting waveform at the transmitter output.	6M
3.	a)	Discuss the advantages and disadvantages of star and mesh topologies.	6M
	b)	Explain half Duplex and Full Duplex communication with Examples.	6M
4.	a)	List the standards organization for the data telecommunication. Explain EIA interface standard.	4M
	b)	Describe the operation of UART transmitter.	8M
5.	a)	Explain five methods commonly used for frame synchronization in TDM.	6M
	b)	Explain the following framing techniques: i. Added-digit framing. ii. Unique-line code framing.	6M
6.	a)	For a 12 bit data string of 101100010010 determine the number of hamming bits required, arbitrarily place the hamming bits into the data string, determine the condition of each hamming bit assuming the error occurring at bit positions 14. Prove that hamming code will detect the error.	6M
	b)	Explain the stop and wait protocol.	6M
7.	a)	Discuss the High Level Data Link Protocol (HDLC) in detail.	6M
	b)	Explain the BSC's polling sequences and selection sequences?	6M
8.	a)	Compare the performance of circuit switching and Packet switching.	6M
	b)	Explain the packet switching by using following approaches: i. Virtual Circuits ii. Datagram Approach	6M

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

Question Paper Code : B1407

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Digital Electronics and Communication Systems)

Date : 14 February, 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 flow chart, explain the design abstractions for FPGA's.	6M
	b)	Explain the following with respect to FPGA based system design: i. Performance ii. Power iii. Design time	6M
2.	a)	With a neat block diagram, explain the generic structure of FPGA Fabric.	6M
	b)	With a neat block diagram, explain the XILINX SPARTAN II combinational logic block.	6M
3.	a)	With a neat block diagram, explain the ALTERA APEX II I/O Pin.	8M
	b)	Explain the logic element cluster.	4M
4.	a)	With a neat block diagram, explain the operation of carry select adder.	8M
	b)	Explain how unnecessary glitch propagation can be eliminated in FPGA base systems.	4M
5.		Explain the following: i. Syntax directed translation ii. Logic synthesis iii. Logic implementation by macro	12M
6.	a)	Write the verilog code to detect the sequence "110".	8M
	b)	Explain the Register Transfer Structure.	4M
7.	a)	Explain PAL output with programmable polarity.	6M
	b)	Explain the generic block diagram of complex PLD.	6M
8.	a)	Explain programmable routing matrix of xilinx 4000 series.	6M
	b)	How sequential circuit is implemented in ALTERA'S FLEX 8000 series?	6M

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

Question Paper Code : B1501

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

SOFTWARE REQUIREMENTS AND ESTIMATION

(Software Engineering)

Date : 07 February, 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)	Discuss how prototyping helps in risk reduction.	6M
	b)	Bob, driving down main street in his patrol car notices smoke coming out of a warehouse. His partner, Alice, reports the emergency from her car. Alice enters the address of the building into her wearable computer, a brief description of its location (i.e., north west corner) and an emergency level. She confirms her input and waits for an acknowledgement. John, the dispatcher, is alerted to the emergency by a beep of his workstation. He reviews the information submitted by Alice and acknowledges the report. He allocates a fire unit and sends the estimated arrival time (ETA) to Alice. Alice received the acknowledgement and the ETA. The aforementioned is a scenario example of Warehouse on Fire. Explain how can such scenarios help in software requirement engineering?	6M
3.	a)	Assume that you have been selected for summer internship at “Inmobi” and you have been assigned for an “Easy Recharge” project which aims at providing an ease environment for recharging mobile through SMS. Identify actors and design a use case diagram.	6M
	b)	Design a state transition diagram to model a data transfer protocol with three states data available, data not available and data lost.	6M
4.	a)	Describe the concept of Change Management Process in detail.	6M
	b)	Green Computing is a study of practice on developing or designing applications or system which can bring zero impact to the environment. Green computing can helps on preventing global warming that cause of improper function in the natural atmosphere. Research covers several areas like disposal of electronic waste and recycling, telecommuting, virtualization of server resources, use open source software, development of new software to address green computing for internal use and potential sale to other organizations. Design a Requirements Traceability Matrix for the aforementioned problem.	6M
5.	a)	List any four benefits of using Requirements Management Tool.	4M
	b)	IBM Rational Requisite Pro is an easy to use requirements management tool that is widely being used in industry. Explain some of the significant features of this tool.	8M

6. a) Explain what are the key project factors that influences software estimation? 6M
   b) Identify any six problems that are associated with software estimation. 6M

7. a) Explain briefly about Full Function Points estimation techniques. 6M
   b) Consider the following two snippets of C code: 6M

Snippet 1:

```
For (I = 0, I < 100; i+=1) printf("hello"); /*Hello End of this Code */
```

Snippet 2:

```
Fir (I = 0; i<100, i+=1)
{
        printf("hello")
}/* End of the code?*/
```

What is the value of SLOC/LOC and LLOC in each of the cases? What is the inference that you draw from this estimation?

8. a) Describe Putnam estimation model in detail. 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 Regular Examinations, February – 2014

(Regulations: VCE-R11)

SOFTWARE PROCESS AND PROJECT MANAGEMENT

(Software Engineering)

Date : 10 February, 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)	Discuss some of the common software process misconceptions.	5 M
	b)	Describe the steps involved for the improvement of software development organizations.	7 M
2.	a)	Give the differences between PSP and TSP.	6 M
	b)	Explain briefly the different levels of capability maturity model.	6 M
3.	a)	Explain the process of optimizing the software cost parameters to increase the software 'ROI'.	6 M
	b)	Write a note on Evolution of Software Economics.	6 M
4.	a)	Write a note on 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)	What are the activities involved in the software process work flows?	6 M
	b)	Explain the iteration emphasis on the software life cycle. How the iteration process planning will be done for various phases.	6 M
6.	a)	What is meant by "line of business organizations"? Write the role and responsibilities of the people in these organizations.	6 M
	b)	Describe in brief the cost and schedule estimating process.68	6 M
7.	a)	Give the purpose and its perspectives of seven core metrics used in a software project management.	7 M
	b)	Measuring is useful, but it doesn't do any thinking for the decision makers. It only provides data to help them ask the right questions, understand the context and make objective decisions. Comment on the statement by considering the characteristics of a good metric.	5 M
8.	a)	The real indicator of process maturity is the level of predictability in project performance. Elaborate the software project performance expectations for CMM maturity levels.	6 M
	b)	CCPDS-R was one of the pioneering projects that practiced many modern management approaches. Explain briefly some of the approaches followed in CCPDS-R.	6 M

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Question Paper Code : B1701

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

APPLIED MATHEMATICS

(Engineering Design)

Date : 3 February, 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) Find the binary form of the number 193. 6M
   b) Explain absolute and relative errors with example. 6M

2. a) Find the root of the equation $\tan x + \tanh x = 0$ correct to three significant figures, using an iterative formula given that the root lies between 2 and 3. 6M
   b) Using Newton-Raphson method, find the iterative formula for finding the value of $\frac{1}{N}$. Hence find the value of $\frac{1}{18}$. 6M

3. a) Perform two iterations of the Bairstow's 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
   b) Find the root of the equation $x^3 - 5x + 1 = 0$ which lies between 0 and 1 using Muller's method. 6M

4. a) A rocket is launched from the ground. Its acceleration f is registered during the first 80 seconds and is tabulated below. Using the Simpson's rule, find the velocity of the rocket at t = 80 seconds. 6M

t (sec)	0	10	20	30	40	50	60	70	80
f (cm/sec^2)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

   b) Evaluate the Integral $I = \int_1^2 \frac{2x}{1+x^4} dx,$ using the Gauss-Legendre 1-point, 2-point and 3-point quadrature rules. 6M

5. a) Solve the following system of linear equations by the method of Gaussian elimination. 6M

$$20x_1 + x_2 - 2x_3 = 17$$
$$3x_1 + 20x_2 - x_3 = -18$$
$$2x_1 - 3x_2 + 20x_3 = 25$$

   b) Determine the inverse of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix}$ using the partition method. 6M

Cont…2

6. a) Using the Jacobi method, find all the eigen values and the corresponding eigenvectors of the matrix $A=\begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$ 6M

b) Determine the largest eigen value and corresponding eigen vector by using power method 6M

$$\begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

7. a) Suppose a linear transformation T transforms (1, 1) to (2, 2) and (2, 0) to (0, 0). 6M
Find T(v) for
i. v = (2, 2)
ii. v = (3, 1)
iii. v = (– 1, 1)
iv. v = (a, b)

b) From the cubic's P_3 to fourth-degree polynomials P_4, what matrix represents multiplication by $2+3t$? Construct the 5 X 4 matrix from the standard basis $1, t, t^2, t^3$. 6M

8. a) Find a projection matrix P_1 onto a line through **a** = (1, 3) and also the matrix P_2 that projects onto the line perpendicular to **a**. Compute P_1+P_2 and P_1P_2 6M

b) Fit a straight line for the given system: $Ax=\begin{bmatrix} 1 & -2 \\ 1 & -1 \\ 1 & 0 \\ 1 & 2 \end{bmatrix}\begin{bmatrix} C \\ D \end{bmatrix}=\begin{bmatrix} 4 \\ 3 \\ 1 \\ 0 \end{bmatrix}=b$. What is projection of b onto column space of A? 6M

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

Question Paper Code : B1105

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

OPTICAL COMMUNICATIONS TECHNOLOGY

(Wireless and Mobile Communications)

Date : 14 February, 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 a note on Chriped Gaussian Pulses. 6M
   b) Define the following terms: 6M
      i. Total internal reflection
      ii. Acceptance angle
      iii. Critical angle

2. a) Briefly explain the different types of non-linear effects in an optical communication system. 7M
   b) Briefly explain the stimulated Brillouin scattering. 5M

3. a) Explain the principle of operation of Circulators and Isolators. 6M
   b) Explain the principle of operation of Fabry-Perot filters. 6M

4. Explain in detail the methods used to realize OOK modulated signals. 12M

5. a) Explain optical single sideband modulation used for increasing spectral efficiency. 6M
   b) Write a note on error detection and correction schemes used in optical communication system. 6M

6. Briefly explain erbium-doped fiber amplifier. Discuss gain saturation and gain equalization in EDFA amplifiers. 12M

7. Write a short note on: 12M
      i. Stimulated Raman scattering
      ii. Four wave mixing

8. Briefly discuss the following system parameters considered in the design of optical communication system: 12M
      i. Fiber type
      ii. Transmit power and amplifier spacing
      iii. Chromatic dispersion compensation

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

Question Paper Code : B1402

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

ADVANCED DIGITAL SIGNAL PROCESSING

(Common to Digital Electronics and Communication Systems, Wireless and Mobile Communications)

Date : 05 February, 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. Design a high pass filter H(Z) to meet the following specifications. The sampling rate is fixed at 1000 samples per sec. 12M
   i. Pass band edge frequency of 927.3 rad/sec and pass band tolerance of -3dB.
   ii. Stop band edge frequency 200 rad/sec and stop band attenuation of -20dB.

2. With a block diagram explain polyphase structure for implementation of sampling rate converters. 12M

3. a) With a block diagram explain FDM to TDM transmultiplexer. 6M
   b) With a block diagram and relevant equations explain the block diagram of a basic two channel QMF. 6M

4. Explain with relevant equations forward and backward prediction. 12M

5. a) Explain the Bartlett method for power spectrum estimation. 8M
   b) Explain the use of DFT method in power spectrum estimation. 4M

6. Explain the power spectrum estimation by ARMA model. 12M

7. a) With block diagram, explain linear optimum filtering. 6M
   b) Explain the principle of orthogonality. 6M

8. Write the statement of Kalman filtering problem and derive the related expression. 12M

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

Question Paper Code : B1403

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

DIGITAL SYSTEM DESIGN

(Digital Electronics and Communication Systems)

Date : 07 February, 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. 6M
   $F = \sum x,y,z (1,3,5,6,7)$
   $F = \sum w,x,y,z (0,1,6,7,8,9,14,15)$
   b) With logic and timing diagram, explain the circuit with static- 0 hazards. 6M

2. a) Design a seven – segment decoder using verilog. 6M
   b) Write data-flow VHDL program to implement 3-to-8 binary decoder. 6M

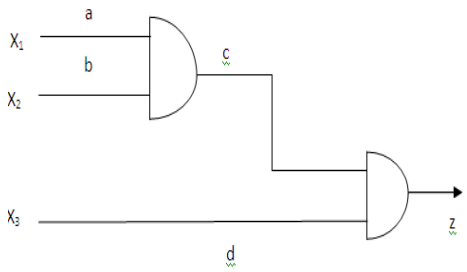
3. a) Design 74 X 148-like 8- input priority encoder using behavioral VHDL program. 6M
   b) With a neat diagram explain the carry-look ahead adder. 6M

4. a) Discuss in detail about Edge – Triggered D Flip-Flop with neat sketches. 6M
   b) Explain the clocked synchronous state-machine general structure for Mealy and Moore machines. 6M

5. a) With an example, explain race condition in sequential circuit design and how to overcome this issue? 6M
   b) With an example, explain the feedback sequential-circuit analysis. 6M

6. a) Discuss in detail about State Machine (SM) charts with example. 6M
   b) Construct an SM block that has three input variables (D,E,F), four output variables (P,Q,R,S), and two exit paths. For this block, output P is always 1, and Q is 1 if D=1 and F are 1 or if D and E are 0, R = 1 and exit path 2 is taken. If (D=0 and E=1) or (D=1 and F=0), S=1 and exit path 1 is taken. 6M

7. a) Discuss in detail about bridging fault model with examples. 6M
   b) Draw the table giving the set of all possible single struck faults and the faulty and fault-free responses and also construct the fault cover table for the circuit shown in below. 6M



8. a) Explain path sensitization technique for a combinational circuit example. 6M
   b) With the help of flow chart, explain PODEM algorithm. 6M

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

Question Paper Code : B1404

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

CMOS VLSI DESIGN

(Digital Electronics and Communication Systems)

Date : 10 February, 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 current-voltage characteristics of MOSFET based on square law model.	6M
	b)	Explain i. Threshold Voltage ii. MOSFET Capacitance	6M
2.	a)	Derive the expression for propagation delay times of a CMOS Inverter for low to high and high to low transitions.	6M
	b)	Explain: i. Maximum switching frequency ii. RC Model	6M
3.	a)	Bring out the differences between pass transistor logic and transmission gate logic	6M
	b)	With neat circuit diagram, explain the operation of PFET based 2:1 MUX.	6M
4.	a)	Design and explain the operation of CMOS 2 input NAND gate.	6M
	b)	Design a CMOS logic gate that gives the function f=[A.(B+C)+BD]'.	6M
5.	a)	Design EX-OR gate using transmission gates.	6M
	b)	With neat circuit diagram, explain the operation of NFET based latching circuit.	6M
6.		Explain: i. Charge sharing. ii. Charge leakage. iii. Clock skew.	12M
7.	a)	Design a dynamic 3 input NAND gate and explain its operation.	6M
	b)	With a circuit diagram, explain the operation of domino logic 3- input OR gate.	6M
8.	a)	Draw the circuit of 2 input OR/NOR gate using basic CVSL logic and explain it.	6M
	b)	What are the advantages and disadvantages of using Dual-Rail logic networks.	6M

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

Question Paper Code : B1601

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADVANCED DATA STRUCTURES AND ALGORITHMS

(Embedded Systems)

Date : 3 February, 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) Assume that there are two circular linked list L1 and L2. Write a pseudo code to create a third linked list L3 merging the L1 linked list's odd positioned nodes and L2 linked list's even positioned nodes. 8M
   b) Explain various advantages and disadvantages of linked list implementations. 4M

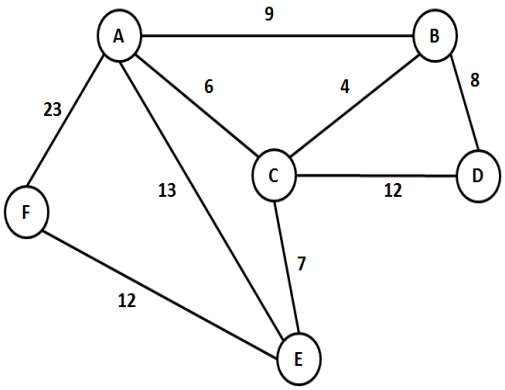
2. a) Explain the difference between performance analysis and performance measurement of an algorithm. 4M
   b) What do you mean by time complexity analysis? Explain the different type of time complexity analysis with a suitable example. 8M

3. a) With the help of pseudo code, explain the different types of binary tree traversals algorithm. 6M
   b) Write a pseudo code to count the number of nodes in a given graph. 6M

4. a) Insert the following numbers into a binary search tree in the order that they are given and draw the resulting tree. 6M
   87, 36, 22, 15, 56, 85, 48, 90, 72, 6
   Delete 48 and draw the resulting tree. Delete 15 and draw the resulting tree.
   b) Write a pseudo code for deleting a node from AVL tree. 6M

5. a) What is Splay tree? Explain the operations of Splay tree with an example. 8M
   b) Explain the properties of red black tree. 4M

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



   b) Explain Strassen's matrix multiplication technique with suitable example. 6M

7. a) What do you mean by single source shortest path? Explain Floyd's algorithm. 6M
   b) Using 0/1 Knapsack technique find the optimal solution for the given problem 6M
   Knapsack Capacity = 30

Item	A	B	C
Price	50	140	60
Size	5	20	10

8. a) What is backtracking algorithm? Write a backtracking algorithm for solving the N-Queen's problem. 8M
   b) Write short notes on following: 4M
      i. LC Search
      ii. Bounding 0/1 knapsack problem

.Hall Ticket No | | | | | | | | | | |

Question Paper Code : B1604

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

EMBEDDED LINUX

(Embedded Systems)

Date : 12 February, 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 different types of hosts most commonly used to develop embedded Linux systems.	6M
	b)	With neat diagram of Physical and virtual memory maps for the compaq iPAQ, explain system memory layout.	6M
2.	a)	Mention the steps involved in Linux boot process.	6M
	b)	Explain the steps involved to install and configure a TFTP server on tbdev1.	6M
3.	a)	Describe the steps involved in local debugging computer configuration.	6M
	b)	Explain configuration of NFS Server.	6M
4.	a)	Explain measurement of interrupt latency on the Media Engine.	6M
	b)	Write about functional features of race timer, racer controller state map and operational race scenario.	6M
5.	a)	Explain the software registers, their bit definitions and the hardware connections to the DB-25 parallel port with a neat diagram.	6M
	b)	Explain parallel port control using ppdev.	6M
6.	a)	Explain different phases involved in hardware design process.	6M
	b)	Explain configuration of memory controller and I/O port controller for the Media Engine.	6M
7.	a)	Write a neat diagram of project trailblazer asynchronous serial hardware development environment and explain target EIA/TIA – 232 - E Compliance.	6M
	b)	Write short notes on I2C communication with Philips semiconductor SAA1064.	6M
8.	a)	Explain creating and testing of project trailblazer database & development of target and CGI integration scripts.	6M
	b)	Write short notes on project trailblazer hardware.	6M

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

Question Paper Code : B1801

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADVANCED ENGINEERING MATHEMATICS

(Structural Engineering)

Date : 3 February, 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

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1. a) Solve the following system of linear equations by using Gauss-Jordan method. 6M

$$\begin{bmatrix} 2 & 1 & 3 \\ 4 & -3 & 5 \\ -3 & 2 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ -7 \\ -3 \end{bmatrix}$$

b) Find four conditions on a, b, c, d to get the LDU factorization of 6M

$$A = \begin{bmatrix} a & a & a & a \\ a & b & b & b \\ a & b & c & c \\ a & b & c & d \end{bmatrix}$$

with four pivots where A=L+D+U. Also compute L, D and U. Establish a relation between L and U and explain why such a relation exists.

2. a) Using the Jacobi method find all the eigenvalues and the corresponding eigenvectors of the matrix $A = \begin{bmatrix} 3 & 2 & 2 \\ 2 & 5 & 2 \\ 2 & 2 & 3 \end{bmatrix}$ 6M

b) Transform the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ to tridiagonal form by using Householder's method. 6M

3. a) Given the following values of $f(x)$ and $f'(x)$ 6M

x	$f(x)$	$f'(x)$
-1	1	-5
0	1	1
1	3	7

Estimate the values of $f(-0.5)$ and $f(0.5)$ using the Hermite interpolation

b) Obtain the cubic spline approximation for the function defined by the data 6M

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

with $M(0) = M(3) = 0$. Hence, find an estimate of f(2.5).

4. a) Find the first three derivatives of $f(x) = x^2 e^{-4x}$ and express Taylor's series expansion of $f(x)$ at $x = 1$ 6M

   b) Compute $f''(0.6)$ from the following table using the formula $f''(x_1) = \frac{f(x_2) - 2f(x_1) + f(x_0)}{h^2}$ with $h = 0.4, 0.2 \; and \; 0.1$ and perform repeated Richardson extrapolation. 6M

x	0.2	0.4	0.5	0.6	0.7	0.8	1.0
$f(x)$	1.420072	1.881243	2.128147	2.386761	2.657971	2.942897	3.559753

5. a) Evaluate the mixed partial derivatives $\frac{\partial^4 f}{\partial x^2 \partial y^2}$ of the function $f(x, y) = 2x^4 y^3$ using central differences at $x = 1$ and $y = 1$ with a step size 6M

   b) Find $\frac{dy}{dx}$ and $\frac{d^2 y}{dx^2}$ at $x = 1.2$ from the following table 6M

x	1.0	1.2	1.4	1.6	1.8	2.0
y	2.72	3.32	4.06	4.96	6.05	7.39

6. a) A differentiation rule of the form $f'(x) = \alpha_0 f_0 + \alpha_1 f_1 + \alpha_2 f_2, \quad (x_k = x_0 + \mathrm{kh})$ is given. Determine the values of α_0, α_1 and α_2 so that the rule is exact for a polynomial of degree 2. Find the error term. 6M

   b) Find the Jacobian matrix for the system of equations 6M

$$f_1(x, y) = x^2 + y^2 - x = 0$$
$$f_2(x, y) = x^2 - y^2 - y = 0$$

   at the point $(1, 1)$

7. a) A rocket is launched from the ground. Its acceleration f is registered during the first 80 seconds and is tabulated below. Using the Simpson's rule, find the velocity of the rocket at t = 80 seconds. 6M

t (sec)	0	10	20	30	40	50	60	70	80
f (cm/sec^2)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

   b) Evaluate the integral $I = \int_{y=1}^{1.5} \int_{x=1}^{2} \frac{dxdy}{x + y}$ using the Simpsons' rule with h=0.5(along X axis) and k=0.25(along Y axis) 6M

8. a) Solve $y' = y^2 + x, \;\; y(0) = 1$ using Taylor's series method & compute $y(0.1) \; and \; y(0.2)$ 6M

   b) Solve the differential equation $\frac{dy}{dx} = -xy^2, \; y = 2$ at $x = 0$, by Euler's method and obtain y at x = 0.2 in two stages of 0.1 each. 6M

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

Question Paper Code : B1101

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Wireless and Mobile Communications)

Date : 07 February, 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 briefly simplex, half-duplex telephone circuit and telephone circuit with side tone coupling with neat diagrams.	6M
	b)	With a neat diagram, explain cross point technology and crossbar exchange organization.	6M
2.	a)	What is Stored Program Control (SPC)? Explain briefly. Compare centralized SPC and distributed SPC.	6M
	b)	Write short note on application software of a switching system.	6M
3.	a)	Explain basic time division time switching in detail.	6M
	b)	Explain three-state combination switching using diagrams and equations.	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)	Mention the advantages of common-channel signaling and explain signaling networks in common-channel signaling.	6M
	b)	With neat diagrams, explain different formats of signal units in CCITT no.7 signaling system.	6M
6.	a)	Explain datagram and virtual circuits, routing and flow control in large-scale networks.	6M
	b)	Explain the working principle of ATM switches and self routing ATM switches.	6M
7.	a)	Explain the mathematical model of the traffic offered to telecommunication system.	6M
	b)	Explain queuing system. Derive second erlang distribution equation.	6M
8.	a)	With a neat diagram, explain typical configuration of an electronic mail system.	6M
	b)	What are the principles of ISDN? Explain the ISDN architecture with a neat diagram.	6M

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

Question Paper Code : B1102

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

INTERNETWORKING AND INTERNET PROTOCOLS

(Wireless and Mobile Communications)

Date : 10 February, 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)	In the standard Ethernet, if the maximum propagation time is 25.6 μs, what is the minimum size of the frame?	4M
	b)	Describe the concept of Piconet and Scatternet. What is a bridge? How does it differ from repeater?	8M
2.	a)	An address in a block is given as 200.11.8.45. Find the number of addresses in the block, the first address, and the last address	4M
	b)	Illustrate the five components of ARP with a neat diagram	8M
3.	a)	A packet has arrived with an M bit value of 1. Is this the first fragment, the last fragment, or a middle fragment? Do we know if the packet was fragmented?	6M
	b)	Explain the phrase “TCP is a reliable transport layer protocol”.	6M
4.	a)	Explain briefly the packet format of Stream Control Transmission Protocol (SCTP).	6M
	b)	Describe the Request and Reply messages of Routing Information Protocol (RIP).	6M
5.	a)	Change the multicast IP address 238.212.24.9 to an Ethernet multicast address.	5M
	b)	Explain Multicast Open Shortest Path First protocol.	7M
6.	a)	Describe the following terminologies w.r.t Domain Name Space i. Root Server ii. Primary Server iii. Secondary Server	6M
	b)	What is Network Virtual Terminal (NVT)? Explain with a neat diagram.	6M
7.	a)	Explain briefly Hypertext Transfer Protocol (HTTP) transaction with a neat diagram	6M
	b)	Describe the terms Home Agent and Foreign Agent w.r.t Mobile IP	6M
8.	a)	Why does RTP need the service of another protocol, RTCP, but TCP does not?	6M
	b)	With a neat diagram, explain packet filter firewall.	6M

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Question Paper Code : B1305

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADVANCED MICROPROCESSOR AND MICROCONTROLLERS

(Power Electronics and Electric Drives)

Date : 12 February, 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 general and special functions of General Purpose Registers in 8086 Microprocessors. 5M
   b) Explain the function of following Assembler directives. 3M
   (i) DB (ii) .CODE (iii) ORG
   c) Given that, 4M
   DS = D470 H; CS = 2123 H ; SS = 2091 H ; ES = 1ABC H;
   BP = 0030 H; SP = 0123 H ; SI = 0A12 H ; DI = 1234 H ;
   BX = 3F00 H ;
   Determine the physical address resulting from the following instructions.
   i. MOV DL, [BP + SI]
   ii. MOV AX, [BX][DI – 04 H]

2. a) Explain the function of the following pins of 8086. 4M
   (i) DT/ $\overline{R}$ (ii) HOLD (iii) $\overline{BHE}$/S_7 (iv) ALE
   b) Write a table showing the function of 3 status bits in the maximum mode. 2M
   c) Explain the difference between minimum and maximum mode operation. 6M

3. a) Write an assembly language program to convert the BCD number in AL to 7-segment code, using lookup table concept. 6M
   b) Explain an interrupt vector table in detail. 6M

4. a) What do you mean by paging? Discuss the paging unit of Pentium Processor with an example. 8M
   b) List the salient features of Pentium Pro Processor. 4M

5. a) Explain various mode of operation of 8255 giving the control word register formats. 6M
   b) Interface a typical 8 bit DAC with 8255 and write a program to generate a triangular waveform of +4V amplitude. Assume the reference voltage of DAC is connected to +5V. 6M

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

7. a) What is addressing mode? Explain different addressing modes with an example. 6M
   b) With a neat diagram, write the programming model of 8051. Also give the 128 bytes RAM allocation. 6M

8. a) What is the difference between JMP and CALL instructions? Explain various CALL instructions in 8051 Microcontroller. 6M
   b) Explain the different modes of operation of timer/counter of 8051 with a relevant block diagram and steps to program the modes. 6M

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

Question Paper Code : B1602

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

MICROCONTROLLERS FOR EMBEDDED SYSTEM DESIGN

(Embedded Systems)

Date : 05 February, 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 short notes on microcontrollers for embedded system design. 6M
   b) Explain in detail about the various registers available in 8051 microcontroller. 6M

2. a) Write a program to get 8-bit data from P2 and send it to P0 and P1. 8M
   b) For a 8051 system of 11.0592MHz, find the time delay for the following subroutine. 4M

```
                          Machine cycle
DELAY:  MOV R3, #250          1
HERE :  NOP                   1
        NOP                   1
        NOP                   1
        NOP                   1
        DJNZ R3, HERE         2
        RET                   2
```

3. a) Identify the valid and invalid instructions from the instructions given below. If any of the instruction are found to be invalid, justify. 6M
      i. MOV R6, R7
      ii. MOVX A, R1
      iii. MOV A, @R5
      iv. MOVC @A+DPTR, #06h
      v. ADD A, 70h
      vi. ORL c, /bit
   b) Write an example to show how the upper 128 bytes of 8051 are accessed. 6M

4. a) Write a program to transfer value 41h serially (one bit at a time) via pin P2.1. Put two HIGHs at the start and end of the data. Send the byte LSB first. 7M
   b) Write instructions to do the following: 5M
      i. Complement the content of RAM location 38H
      ii. Mask the upper 4 bits of A register
      iii. Get the result of ANDing 0C6H and 97H
      iv. Ex-OR the content of A register and R1 register
      v. Make the lower nibble of R5 to the higher nibble

5. a) With an example, describe RT level custom single purpose processor design. 9M
   b) List and define the three main IC technologies. 3M

Cont…2

6. a) Explain the tools used in embedded system design. 6M
   i. Debuggers
   ii. Emulators
   iii. Device programmers

   b) Explain the application specific instruction set processors. 6M

7. a) Explain the control of stepper motor using driver and direct analysis. 8M

   b) Explain briefly about the use of Watch Dog Timers (WDTs). 4M

8. Write short notes on the following: 12M
   i. Ability of a memory
   ii. Composing larger memory from a smaller memory
   iii. Memory hierarchy and Cache replacement policy

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

Question Paper Code : B1608

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

SYSTEM MODELING AND SIMULATION

(Embedded Systems)

Date : 14 February, 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 the following simulation models: 9M
   i. Static vs Dynamic
   ii. Deterministic vs Stochastic
   iii. Continuous vs Discrete

   b) List out some of the pitfalls of simulation model. 3M

2. a) List any four simulation packages. 4M
   b) Describe the classification of simulation software. 8M

3. Explain briefly any four techniques for increasing validity and credibility of simulation models. 12M

4. a) Consider the ideal triangular signal $x_1(t)$=tri(0,10,1)super imposed with additive white noise w(t). The noise is uniformly distributed on [—3 ,3] and the actual signals $x(t)=x_1(t)+w(t)$,as illustrated by the following block diagram in Fig. 1: 9M

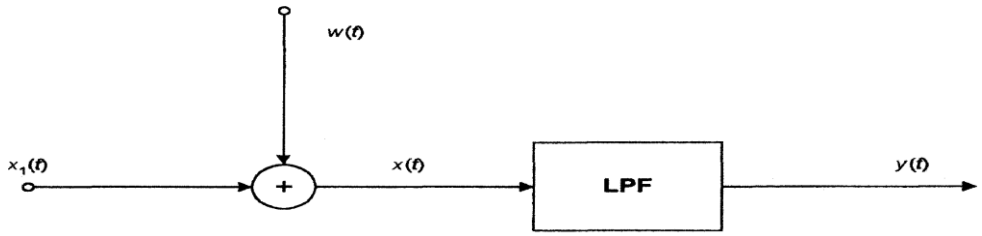


Fig. 1

The signal is passed through an RC low-pass filter with adjustable parameter T to produce an output y(t). The problem is to find a good value for T. To do this, create a simulation and print the ideal input x1(t) and output y(t) as functions of time. Superimpose the graphs of the results for t = 50, 5, 0.5 and 0.05 so as to compare the output against the ideal input.

   b) Use relational notation to specify the following signal sin(0, 6, 0.5, t) in Fig. 2: 3M

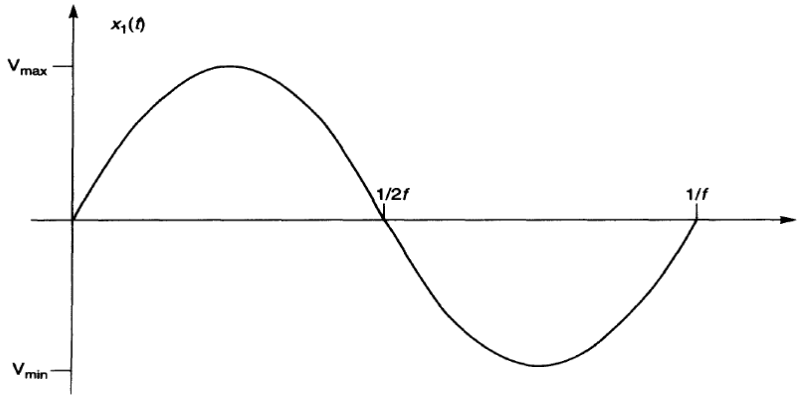


Fig. 2

5. Consider a finite state machine with four states: 1, 2, 4 and 8. If the input x(k) is 0, it counts up (1, 2, 4, 8, 1, 2, 4, 8, . . .) and if x(k) is 1, it counts down (1, 8, 4, 2, 1, 8, 4, 2, . . .). The system is complicated in that a disturbance causes the system to jump over the next number. In particular, if d(k) = 2 and x(k) = 0, the state sequence is 1, 4, 1, 4, 1, 4, . . . , and if d(k) = 3 and x(k) = 0, the sequence is 1, 8, 4, 2, 1, 8, 4, 2, 1, ... If d(k) = 1, the state sequence is normal. The behavior is analogous but backward for the case where x(k) = 1. 12M
   i. Create the defining state table and diagrams for this FSM.
   ii. Assuming that the input signal is regular and that it takes 1 second between each input simulate the output over the time horizon [0, 10].

6. It has been found that a certain car wash receives, on the average 20 cars per hour between the hours of 7 a.m. and 10 a.m. The average drops to 8 cars per hour for the rest of the business day, which finishes at 6 p.m. 12M
   i. What is the expected number of cars washed in one complete business day?
   ii. What is the probability that no more than 2 cars will enter the car wash between 9:00 and 9:30a.m.?
   iii. What the probability that more than 3 cars will arrive between 4:00 and 5:00 p.m.?

7. a) A communication network uses two transponder channels to transmit messages. Each channel has the capacity to hold one message in the queue at the same time another call is being transmitted. Messages arrive for transmission as a Poisson process at the rate of 12 messages per hour. Transmission time is exponentially distributed, with a mean of 3.33 minutes per message, 8M
      i. Compute the probability that there is no message being held.
      ii. Find the probability that a call is waiting for transmission.

   b) A mail order company's phone system is equipped with an automatic answering module. Customer's calls arrive as a Poisson process at the rate of 20 calls per hour, whereas the service time is exponentially distributed with a mean of 2.5 minutes. Determine the probability of a customer taking more than 4 minutes of service time. 4M

8. Explain briefly alpha and beta trackers with neat block diagrams. 12M

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

Question Paper Code : B1302

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

PRINCIPLES OF MACHINE MODELING ANALYSIS

(Power Electronics and Electric Drives)

Date : 05 February, 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. Two coupled coils have the following parameters: 12M
L_{11} = 100 mH, r_1 = 10 Ω, L_{22} = 25 mH, r_2 = 25 Ω, N_1 = 1000 turns, N_2 = 500 turns, L_{L1} = 0.1 L_{11}, L_{L2} = 0.1 L_{22}. Develop an equivalent T circuit with coil 1 as the reference coil.

2. Draw the basic two pole machine diagrams and primitive machine diagrams for the following machines:- 12M
   i. D.C compound machine
   ii. Polyphase induction Machine
   iii. Schrage motor

3. a) Explain the transient analysis of a separately excited D.C. motor. 6M
   b) Obtain an electrical circuit which is equivalent to a separately excited D.C. Motor. 6M

4. a) What is the physical concept of Park's transformation and explain it. 6M
   b) Derive 3-phase currents in terms of d-q axis currents and its inverse. 6M

5. Write down the voltage equations for the mathematical model of a polyphase induction machine and hence obtain an expression for the steady state torque when balanced polyphase supply is impressed on the stator. 12M

6. a) Explain the two axis model of a three phase induction motor. 6M
   b) Explain the steady- state analysis of the operation of a three phase induction motor. 6M

7. a) Explain the dynamics of induction motor during starting and braking. 6M
   b) Explain the acceleration, braking and the reversing times. 6M

8. a) Explain the two axis representation of a synchronous machine. 6M
   b) Develop the state space voltage- current equation of a synchronous machine. 6M

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

Question Paper Code : B1309

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ENERGY CONVERSION SYSTEM

(Power Electronics and Electric Drives)

Date : 14 February, 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 a short note on spectral distribution of energy in solar radiation and the insolation level in the atmosphere at different heights. How can maximum part of solar energy be harnessed at all times?	6M
	b)	The average measured total power density over the entire spectral content in solar radiation can be taken as 1070 W/sq. m at sea level and 1350 W/sq. m. above the atmosphere. Taking an efficiency of cell as 18%, calculate the area required for generation of i) 20 kW ii) 1 MW and iii) 1000 MW above atmosphere.	6M
2.	a)	Briefly explain the salient properties and applications of Faraday and Hall configurations of MHD generation.	5M
	b)	An MHD duct has the idealized dimensions of width, w = 0.5 M, height = 0.5 m, length, l = 2 m. The magnetic field B= 3 T along h, while gas velocity is u = 400 m/s along l. Take K = 0.55. Calculate the generated voltage along w and the load voltage.	7M
3.	a)	Starting from fundamentals, show that an ideal wind turbine cannot extract more than 59.3 % of the power available in undisturbed wind.	6M
	b)	What is tip speed ratio? Explain the variation of co-efficient of performance as a function of tip speed ratio for various types of turbines.	6M
4.	a)	Explain the factors to be considered while selecting turbines for tidal power generation.	6M
	b)	With simple figures, explain the types of turbine-generator arrangements used for tidal power schemes.	6M
5.	a)	Draw the block diagram of wave energy conversion system and write a brief note on the applications of electrical power generated by waves.	6M
	b)	With relevant block diagrams, explain the open cycle and closed cycle OTEC system.	6M
6.	a)	What is Anaerobic digestion? Briefly explain the process and its applications.	6M
	b)	Describe with a help of a block diagram the process of obtaining ethanol from biomass.	6M
7.	a)	Write a short note on co-generation schemes adopted in power plants and industrial systems.	6M
	b)	Draw the schematic of a thermo-electric generator and derive the expression for maximum power output.	6M
8.	a)	Briefly explain the three active parts involved in a battery.	6M
	b)	Write a brief note on pollution free energy systems.	6M

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

Question Paper Code : B1414

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

DSP PROCESSORS AND ARCHITECTURES

(Embedded Systems)

Date : 10 February, 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 Decimation and Interpolation Process with an example. 6M
   b) For the IIR filter H (z) = (Z-2) / (Z-0.2) (Z-0.6) find the step response. 6M

2. a) Find the decimal equivalent of the floating –point binary number 1011000011100. Assume a format similar to IEEE-754 in which the MSB is the sign bit followed by 4 exponent bits followed by 8 bits for the fractional part. 6M
   b) Discuss the sources of error in DSP implementations. 6M

3. a) List the basic features required in the DSP architecture to implement Nth order FIR filter $y(n)=\sum_{i=0}^{N-1}h(i)x(n-i);n=0,1,2...$ 6M
   b) Draw the Braun Multiplier structure to multiply two unsigned numbers A=A3 A2 A1 A0, B=B3 B2 B1 B0. How many adders are required? 6M

4. a) Explain the following with respect to interrupts: 6M
      i. Interrupt effects
      ii. Branching effects
   b) Compare Parallel implementation and Pipeline Programming model. 6M

5. a) Describe the operation of the following instructions of TMS 320C54XX Processors. 6M
      i. MPY #2314, A
      ii. MAC *AR5-,*AR6+, A, B
      iii. RPT #3; MAC * AR3-,*AR2+, A
   b) Assume that the register AR4 with contents 2040h is selected as the Pointer for the circular buffer. Let BK=50 h. Determine start and end addresses for the buffer. What will be the contents of the register AR4 after the execution of the instruction? 6M
      i. LD* AR4+0%, A.
      ii. *AR4-0B, if the contents of AR0 is 0035h?

6. a) What values are represented by the 16-bit fixed point number N=5736h in Q0,Q6,Q10 and Q15 notations. 6M
   b) Explain how the IIR filters can be implemented using TMS320C54XX Processor (only algorithm is needed). 6M

7. a) Determine the following for a 128-point FFT computation: 6M
      i. Number of stages
      ii. Number of butterflies in each stage
      iii. Number of butterflies needed for the entire computation
      iv. Number of butterflies that need no twiddle factors
   b) Explain how a scaling prevents overflow conditions in the butterfly computation. Derive the optimum scaling factor for the DIT-FFT butterfly. 6M

8.	a)	Draw the block diagram of the PCM3002 CODEC and explain about it.	6M
	b)	With the help of block diagram, explain the memory interface for TMS320C5416 Processor. Also draw the timing diagram for a read-write sequence of operations.	6M

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

Question Paper Code : B1603

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

EMBEDDED REAL TIME OPERATING SYSTEMS

(Embedded Systems)

Date : 07 February, 2014 **Time : 3 Hours** **Max. Marks : 60**

Answer any FIVE Questions. All Questions carry equal marks

All parts of the questions must be answered in one place only

1. a) Define the following process control commands: fork, vfork, exit, wait, waitpid, exec. 6M
   b) Define the following File I/O commands: open, create, close, lseek, read and write. 6M

2. a) Define: Hard real time systems, Aperiodic and Sporadic tasks, precedence constraints and data dependency. 8M
   b) Explain the functional parameters: pre-emptivity of jobs, criticality of jobs, optional executions. 4M

3. a) Discuss in detail offline versus online scheduling. 6M
   b) Differentiate between Dynamic versus Static systems. Explain with an example effective release times and deadlines. 6M

4. a) Explain with an example priority inversion problem and deadlock situations. 6M
   b) Explain the inter-process communication (IPC). 6M

5. a) Explain the three alternative systems in three RTOSs for responding to a hardware source call on interrupts. 6M
   b) Mention the need of a well tested and debugged real time OS. 6M

6. a) How priority inversion situations can be prevented in Vx works? Explain creating and activating a task by task spawn function. 6M
   b) Explain with an example how a binary semaphore for the IPCs can be created. 6M

7. Explain the case study of embedded system for an adaptive cruise control system in a car. 12M

8. Write a short note on the following: 12M
   i. RTOS for Fault tolerant applications
   ii. RTOS for image processing

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

Question Paper Code : B1707

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

TRIBOLOGY AND BEARING DESIGN

(Engineering Design)

Date : 12 February, 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)	State Newton's law of viscosity and explain the effect of pressure and temperature on viscosity.	6M
	b)	Explain fluid film, boundary and extreme boundary lubrication with sketches.	6M
2.	a)	Sketch and explain how capillary tubes are used to measure the viscosity of oil.	4M
	b)	Derive Petroff 's equation for the frictional force and coefficient of friction for a lightly loaded bearing. Show that in Petroff's bearing, the power loss is independent of the load.	8M
3.	a)	What is the physical significance of Reynold's equation? Starting from the first principles derive the Reynold's equation in 2D.	6M
	b)	A full idealised journal bearing has the following specifications: Diameter of journal = 50 mm; Length of the bearing = 65 mm; Speed of journal = 1200 rpm; Attitude = 0.8; Diametral clearance = 0.001 mm; Viscosity of the lubricant = 11.25 cP. Determine: i. Load carrying capacity ii. Coefficient of friction iii. Power loss	6M
4.	a)	State the assumptions made in the analysis of an idealised full journal bearing.	4M
	b)	A full idealised journal bearing has the following specifications: Diameter of journal = 40 mm; Length of the bearing = 65 mm; Speed of journal = 3000 rpm; Attitude = 0.85; radial clearance = 0.025 mm; Viscosity of the lubricant = 15 cP; Location of inlet hole = 305^0; The pressure of oil at inlet = 0.35 N/mm^2. Determine the magnitude of minimum and maximum pressure in the oil film of the bearing.	8M
5.	a)	Derive the governing differential equations for gas lubricated bearings.	6M
	b)	Explain Elasto-hydrodynamic lubricated bearings.	6M
6.	a)	Explain the working principle of Hydrostatic journal bearing with a neat sketch.	6M
	b)	Explain oil lifts with reference to hydrostatic partial journal bearing.	6M
7.	a)	Write short notes on gas bearings with examples.	6M
	b)	Describe the stages of fretting phenomenon.	6M
8.	a)	Explain the working principle of magnetic bearings and also mention its applications.	6M
	b)	Differentiate between passive and active magnetic bearing with diagrams.	6M

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

Question Paper Code : B1303

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONVERTERS-1

(Power Electronics and Electric Drives)

Date : 07 February, 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 neat circuit diagram and relevant waveforms, explain the operation of 1-phase AC voltage controller feeding R-L load. Derive the expression for rms value of output voltage. 8M

   b) A single-phase full wave bidirectional controller has a resistive load of R=10 Ω and the input voltage is V_s=120 V (rms), 60 Hz. The delay angles of thyristors T_1 and T_2 are equal: $\alpha_1=\alpha_2=90^0$. Determine 4M
   i. The rms output voltage V_0
   ii. The input power factor

2. a) Discuss in brief about the effect of source inductance in AC voltage controllers. 6M

   b) The three-phase full-wave controller is supplying a star-connected resistive load of R = 10 Ω and the line-line input voltage is 208 V (rms), 60 Hz. The delay angle α is 60^0. Determine 6M
   i. The rms output phase voltage V_0
   ii. The input power factor

3. Discuss in detail about the 3-phase step-down cyclo-converter system. Mention the advantages, disadvantages and applications of 3-phase cyclo-converters. 12M

4. a) Why power factor correction is required for line commutated converters? Discuss in brief about: 8M
   i. Symmetric angle control
   ii. PWM control techniques as applicable to rectifiers

   b) A single-phase full converter bridge is connected to R-L-E load. The source voltage is 230 V, 50 Hz. The average load current of 10 A is continuous over the working range. For R=0.4 Ω, and L = 2m H, compute 4M
   i. Firing angle delay for E=120 V
   ii. Firing angle for E= -120V

5. With relevant voltage and current waveforms, explain the operation of three-phase full 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. What is a buck-boost converter? Discuss in detail about the operation of the buck-boost converter with valid equations. Obtain the expression for critical values of inductor and capacitor for continuous mode of operation. 12M

Cont…2

7.	a)	What is an Inverter? With a neat circuit diagram explain the operation of single-phase full-bridge inverter feeding R-L load. Obtain load voltage and load current waveforms.	7M
	b)	Discuss in brief about the staircase modulation technique of 1-phase inverter.	5M
8.	a)	Discuss in brief about the harmonic reduction techniques of voltage control of three phase inverters.	5M
	b)	With a neat sketch and relevant waveforms, explain the operation of three-phase bridge inverter operating in 120^0 mode of operation. Draw two phase and one line voltage waveforms.	7M

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

Question Paper Code : B1304

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONTROL OF DC DRIVES

(Power Electronics and Electric Drives)

Date : 10 February, 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 full-wave 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) Sketch and discuss about the variation of the average output voltage *Vs* firing angle for (i) semi-converter and (ii) full converter with continuous conduction 4M

2. a) With neat circuit diagram, explain the operation of three-phase fully controlled converter fed separately excited DC motor operating with $\alpha=30^0$. Derive the expression for the average value of output voltage and thereby obtain expression for speed of motor in rad/sec. 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) Discuss in brief about the load-side quantities and supply side quantities effect applicable to the three-phase controlled bridge rectifiers 8M
   b) Write a short note on three phase controlled bridge rectifier feeding passive load impedance 4M

4. Discuss in detail about the steady-state analysis of the three-phase converter controlled DC motor drive system 12M

5. With a neat block diagram, discuss in detail about the speed controller/outer speed loop control of DC motor drive 12M

6. With neat sketches and waveforms, explain in detail, the operation of four-quadrant chopper fed armature of DC motor. 12M

7. Discuss in brief about the (A) PWM current controller and (B) hysteresis current controller of speed control of DC drive system 12M

8. a) What did you understand with dynamic simulation of speed controlled Dc motor drive? Write a short notes on command current generator 6M
   b) Discuss in brief about the state diagrams of speed feedback and speed controller of 6M

dynamic simulation of DC motor drive

Hall Ticket No											Question Paper Code : B1702

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

ADVANCED MECHANICS OF SOLIDS

(Engineering Design)

Date : 05 February, 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. Derive an equation for the position of the shear center of a simple semi-circular cross section 12M

2. A cantilever beam has a length of 3m with cross section indicated in the fig.1 The beam is constructed by welding two 40mm by 40mm steel bars (E = 200 GPa) bars longitudinally to the S-200x27 steel I beam (I_x = 24x10^6 mm^4 and I_{yy} = 1.55x10^6 mm^4). The bars and the I-beam have the same yield stress, Y = 300MPa. The beam is subjected to a concentrated load P at the free end at an angle Φ = π/3 with the x axis. Determine the magnitude of P necessary to initiate yielding in the beam and the resulting deflection of the free end of the beam. 12M

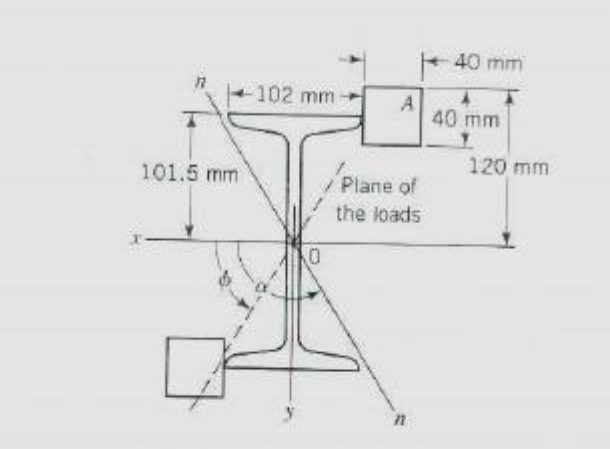


Fig.1

3. The curved section of the frame of a press is subjected to a positive moment M_0 = 96kNm and a shear load of P = 120kN. The dimensions of section BC are shown in the fig.2 Determine the circumferential stress at point B and the radial stress at points B′ and C′ of the section BC. Include the effects of traction N. 12M

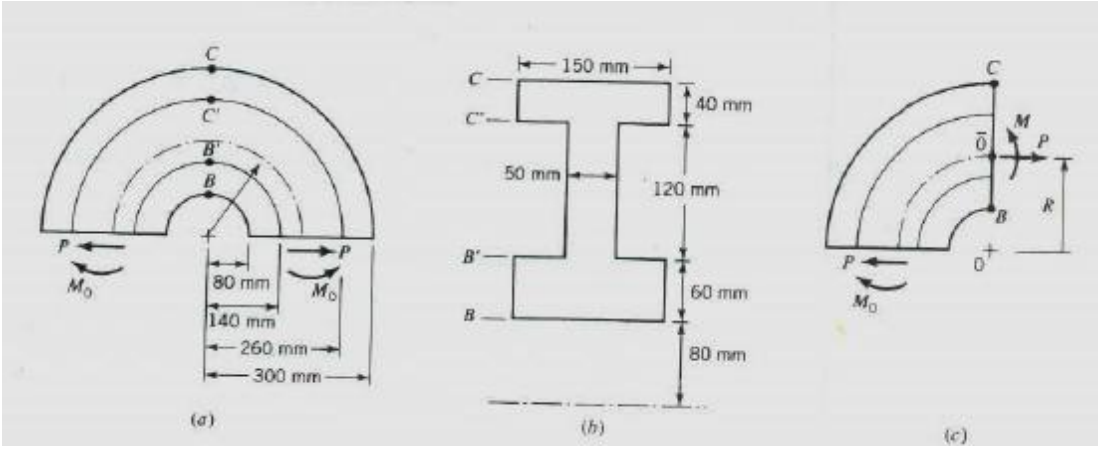


Fig.2

Cont…2

::2::

4. A hollow thin wall torsion member has two compartments with cross sectional dimensions as shown in fig.3 The material is an aluminium 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

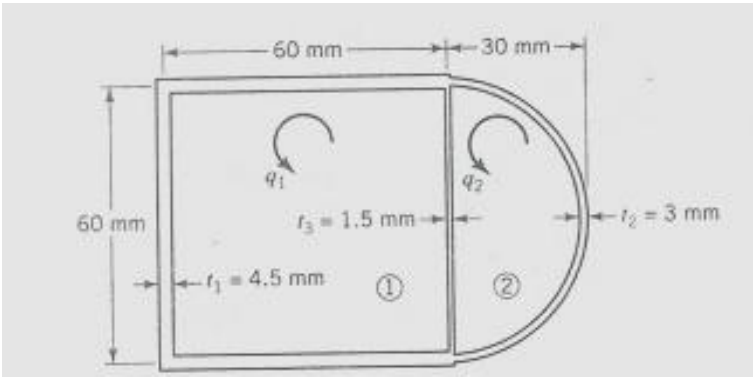


Fig.3

5. Derive an equation of bending of a cantilever beam loaded at the end. 12M

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

7. A rail road uses steel rails (E = 200 GPa) with a depth of 184mm. the distance from the top of the rail to the centroid is 99.1mm and the moment of inertia of the rail is $36.9 \times 10^6 mm^4$. The rail is supported by ties, ballast and a road bed that together are assumed to act as an elastic foundation with spring constant k = $14N/mm^2$. 12M
   i. Determine the max deflection, the max bending moment and the max flexural stress in a rail for a single wheel load of 170kN
   ii. A particular diesel locomotive has three wheels per bogie equally spaced at 1.70m. Determine the max deflection, max bending moment and the max flexural stress in the rail if the load on each wheel is 170kN

8. Enumerate the different methods of computing contact stresses with appropriate formulae for each. 12M

Hall Ticket No											Question Paper Code : B1805

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

ADVANCED CONCTRETE TECHNOLOGY

(Structural Engineering)

Date : 12 February, 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 is hydration? How does fineness of cement affect hydration of cement?	6M
	b)	What are the various types of tests conducted on cement? Give their specifications.	6M
2.	a)	How are aggregates classified based on their size, shape and texture and their influence on the properties of concrete?	6M
	b)	What are chemical compositions of cement? Explain their role in cement.	6M
3.	a)	What are the various stages involved in the manufacturing of concrete, explain?	6M
	b)	What is segregation and bleeding of fresh concrete, how can we control it?	6M
4.	a)	What is durability of concrete? What are the factors affecting durability?	6M
	b)	How can the tensile strength of concrete is determined indirectly?	6M
5.	a)	What is mix design? Give a brief procedure to do mix design?	6M
	b)	What are the factors that affect mix design of concrete?	6M

6. Design a mix design for M40 grade of concrete with the following data 12M

   i. Type of cement: opc
   ii. Maximum size of aggregates: 20mm
   iii. Workability:125mm slump
   iv. Min cement content:320kg/m3
   v. w/c: 0.55
   vi. Method of placing of concrete: pouring
   vii. Degree of supervision: good
   viii. Specific gravity of coarse aggregate: 2.7
   ix. Specific gravity of fine gravity:2.65
   x. Water absorption:
      - Coarse aggregate: 0.5%
      - Fine aggregate: 1%

- Free surface moisture: nil

7. a) What is light weight concrete? Give its applications. 6M
   b) What is ferro cement and also mention its properties. 6M

8. a) What is high strength concrete? Where are its major applications? 6M
   b) Which type of concrete do you suggest for a heavily reinforced beam? What are the ingredients present in that particular concrete? 6M

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

Question Paper Code : B1405

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

DETECTION AND ESTIMATION THEORY

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

Date : 12 February, 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) List out any four properties of receiver operating characteristics for simple binary hypothesis tests. 6M
   b) Explain bays criterion for M hypothesis. 6M

2. a) State and prove properties of PSD of random process. 6M
   b) Derive the expression for cumulative mean power and covariance of a process with period approaching infinity. 6M

3. a) Explain for the simple binary case the optimum receiver can be realized as a matched filter or a correlation receiver with neat diagrams. 6M
   b) For general binary case the optimum receiver can be realized as a matched filter or a pair of filters. 6M

4. a) Derive the solution for the optimum receiver for the simple binary detection problem of a known signal in non white Gaussian noise. 6M
   b) Explain joint MAP estimates in additive white Gaussian noise channel. 6M

5. Explain in detail filtering of signals in noise using ad hoc formulation. 12M

6. Derive MAP estimate of the waveform a(t) for modulation system without memory. 12M

7. Explain briefly about recursive estimation of time varying signals. 12M

8. Consider the RC circuit shown in Fig. 1, the output voltage y(t) is related to the input voltage U(t) by the differential equation RC $d/dt[y(t)]+y(t)=u(t)$ 12M

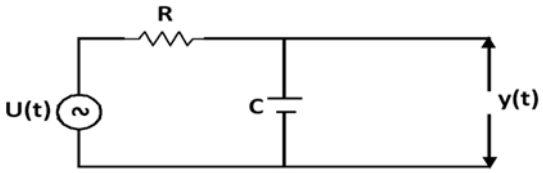


Fig. An RC Circuit

Fig. 1

i. Represent an analog computer realization
ii. Find out y(t) in differential equation representation of linear system

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

Question Paper Code : B1704

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech I Semester Regular Examinations, February – 2014

(Regulations: VCE-R11)

FINITE ELEMENT METHODS

(Engineering Design)

Date : 10 February, 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 Rayleigh Ritz method compared to Galerkin's method for engineering analysis — 3M
   b) Determine the maximum deflection of a simply supported beam subjected to a point load of K at the mid span using weighted residual method. Assume two trigonometric functions of orthogonal form for analysis — 9M

2. a) An axial load of 60 KN is applied at the centre of a rod measuring 300 mm length in the negative y direction. The member is oriented along y axis. The top end of the member is fixed; while the lower end has a wall at a distance of 1.2 mm from it. If E = $2.1X10^4$ MPa and the cross section of the member is 250 mm^2 determine the maximum displacement, stresses in the members and support reactions — 7M
   b) Derive an expression for the temperature load vector for a 1-D bar element having two dof per element. — 5M

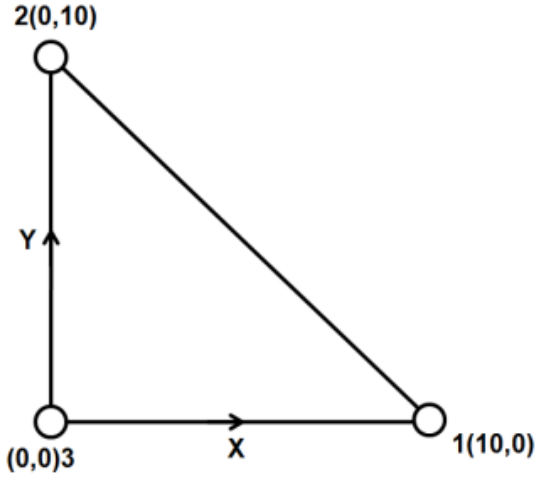
3. a) A planar truss is in the form of a right angled triangle with one corner on the origin of X-Y Cartesian coordinate system. One member located on the X axis measures 6 m and another member located on the Y axis measures 8 m. The left end of the member which is on the x axis has a roller support to constrain the displacement in Y axis and the right end of this member is fixed. A load of F KN is applied in the negative X direction at the node (origin). If the node at the origin experiences a displacement of 1 mm along the negative x axis, determine "F" and the stresses in the members. Area of each member = 750 mm^2 E= $2.1X10^5$ MPa — 10M
   b) What are the differences between Bar elements and Truss elements — 2M

4. a) Derive the stiffness matrix for a 1-D beam element having two degrees of freedom at each node. 8M

b) Write the expression for determining the shear force and bending moment for a 1-D beam element. 4M

Cont….2

5. Determine the strains experienced by a CST element shown in figure (Assume Plane stress condition). There is a node at each corner of the element. Edge 12 is fixed. A force of 10KN is applied at node 3 in the negative X direction. Poisson's ratio is 0.33, E=2.1X10^5 , Thickness = 0.3. All dimensions are in mm. 12M



6. Integrate the following function numerically using Gaussian quadrature technique. 12M

$$\left(x^2y+y^{-1}+x^{-1}y+\frac{1}{[1.73]}\right);7\le x\le 11;5\le y\le 8$$

7. a) What are Eigen values and Eigen vectors? For a beam problem, explain the procedure for carrying out the dynamic analysis. 7M

b) $[K]\{Q\}+[C]\{Q'\}+[M]\{Q''\}=\{F\}$ Explain each term in this equation and justify its importance in F.E.M. 5M

8. a) What are conforming and non conforming finite elements? Explain Patch test and its importance. 8M

b) What are the sources of error that may contribute to the inaccuracy of FE solution while refining FE meshes. 4M

Hall Ticket No											Question Paper Code : B1802

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

THEORY OF ELASTICITY AND PLASTICITY

(Structural Engineering)

Date : 05 February, 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) Derive an expression for stress components on an arbitrary plane in three dimensions. Also obtain the resultant stress and normal stress. 6M

   b) A rope of length 'L' is hung from the ceiling. The density of the material of the rope is ρ. Find the stress in the rope in its free end, as well as value of maximum tension. 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. If the state of stress at a point is given by $\sigma_x = y^2 + \mu(x^2 + y^2)$, $\sigma_y = x^2 + \mu(y^2 - z^2)$ and $\sigma_z = (x^2 + y^2)$, $\tau_{xy} = f(x, y)$, $\tau_{yz} = \tau_{zx} = 0$. Determine the values of τ_{xy} in order that the stress distribution is in equilibrium if μ is Poisson's ratio. 12M

4. a) Write a note on practical significance of compatibility equations, if C and C_1 are some constants. Under what circumstances the following strain system is compatible. $\varepsilon_x = C(x^2 - y^2)$, $\varepsilon_y = Axy$, and $\varepsilon_{xy} = C_1xy$. 6M

   b) A rectangular stress rosette gives $\varepsilon_0 = 670$, $\varepsilon_{45} = 330$ μm/m. , $\varepsilon_{90} = 150$ μm/m. Find the principal stresses σ_1 and σ_2 if E = (2×10^5) MPa, $\mu = 0.3$ 6M

5. a) Derive compatibility equation in terms of stresses for plane stress problems including body forces. 6M

   b) Distinguish between plane stress and plane strain problems. 6M

Cont…2

6. a) Using stress function method, obtain the solution for a cantilever beam subjected to pure bending. 6M

   b) A steel tube has an outer diameter of 100mm and inner diameter of 50mm. It is subjected to an internal pressure of 14 MPa and external pressure of 5.5 MPa. Calculate maximum hoop stress in the tube. 6M

7. a) Determine the maximum stress in a cantilever beam of 4.0m span subjected to a load of 1 kN at free end of the cross section (60 x 90) mm at an angle of 40^0 to vertical. 6M

   b) Also find the effect of size of the beam on maximum stress if the cross section of the beam is changed to (70 x 95)mm. 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)

Two Year M. Tech I Semester Regular Examinations, February - 2014

(Regulations: VCE-R11)

FINITE ELEMENT ANALYSIS

(Structural Engineering)

Date : 07 February, 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 cantilever beam is subjected to a point load P at the free end. Calculate the maximum deflection by Raleigh-Ritz method and hence compare the exact solution. 12M

2. A displacement field $U = 2x + 3x^2 + 4xy, V = 4xy - 3x^2$ is imposed on a square element of size two units whose coordinates are (2, 2), (4, 2), (4, 4) and (2, 4). Write the expressions for $\varepsilon_x, \varepsilon_y$, and ξ_{xy}. If E = 200 GPA, find σ_x, σ_y and ξ_{xy} assuming plane strain condition. 12M

3. A circular bar of 10mm diameter suspended from the wall in the vertical plane is subjected to an axial downward force of 50KN. Assuming E = 1.05 x 10^6 N/mm^2, determine the elongation over a length of 1 meter. Take unit weight of the material as 9KN/m^3. 12M

4. Determine the Jacobian matrix and strain development matrix for a triangular element whose nodes are at(1, 1), (-1, -1), (-4, -6). 12M

5. Derive the element stiffness matrix for a five noded pentagonal element. 12M

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

7. A hemispherical bowl of outer diameter 200mm and thickness 20mm is subjected to an internal pressure of 1Mpa. Identify the problem and explain in detail how the problem can be solved by finite element method. 12M

8. Using 2x2 rule, evaluate $\int\int_A \left(3x + 2x^2 + xy^2\right) dxdy$ over a square area of size $\sqrt[8]{2}$ unit side with nodes (2, 2), (-2, -2), (2, -2) as the three sides. 12M

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

Question Paper Code : B1703

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Two Year M. Tech I Semester Regular Examinations February - 2014

(Regulations: VCE-R11)

ADVANCED MECHANISMS

(Engineering Design)

Date : 07 February, 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 the terms related to elements of mechanism, link, joint and manipulator. 6M
   b) What is Kutzback's criterion for mobility of planar mechanisms? In what way is Gruebler's criterion different from it? 6M

2. a) Define the term collineation axis with suitable sketch. 4M
   b) Show the Bobillier construction for finding the point O_A when I, A and inflection point J_A are known on the ray IA. Assume the dimensions suitably where ever needed. 8M

3. a) State and prove Carter-Hall circle theorem. 6M
   b) State and explain Freudenstein's Collineation axis theorem. 6M

4. a) With a neat sketch, explain graphical synthesis of 4-bar mechanism $A_0A_1B_1B_0$, which guides body AB through three prescribed positions A_1B_1, A_2B_2 and A_3B_3. 6M
   b) Explain how Burmester's curve will be constructed for a four-bar mechanism. 6M

5. Synthesize a function generator to solve the equation $y = x^{0.8}$, 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
   $\theta_1 = 0^0, \theta_2 = 30^0, \theta_3 = 60^0$ and $\phi_1 = 20^0, \phi_2 = 45^0, \phi_3 = 85^0$. Take d=1. Use

Freudenstein's equation.

7.	a)	Sketch and explain the 3R PUMA manipulator, for coordinates frames based on D-H representation. Show the parameter table.	4M
	b)	Sketch and explain the Stanford arm RI-RI-P: RI-RI-R manipulator, for coordinate frames based on D-H representation. Show the parameter table.	8M
8.	a)	For the SCARA robot, give the link coordinate system with a neat sketch.	6M
	b)	Explain the formulation of Jacobian for planar manipulator.	6M