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

Question Paper Code : B1112

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

ADHOC WIRELESS AND SENSOR NETWORKS

(Wireless and Mobile Communications)

Date : 08 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 applications of mobile adhoc networks.	6M
	b)	Briefly explain the issues related to adhoc wireless internet.	6M
2.	a)	What are the main issues that need to be addressed while designing a MAC protocol for adhoc wireless networks?	8M
	b)	Give the classification of random access protocols.	4M
3.	a)	Give a detailed classification of routing protocols for adhoc wireless networks.	6M
	b)	Explain wireless routing protocol and how it avoids count to infinity problems.	6M
4.	a)	Give reasons why conventional multicast routing protocols cannot be used in adhoc networks.	6M
	b)	Explain bandwidth efficient multicast routing protocol.	6M
5.	a)	Explain why traditional TCP cannot be used in wireless adhoc networks.	6M
	b)	Assume that when current size of the congestion window is 48KB, the TCP sender experiences a timeout. What will be the congestion window size if the next three transmission bursts are successful? Assume that MSS is 1KB. Consider i. TCP Tahoe ii. TCP Reno	6M
6.	a)	Write a note on QOS frameworks for adhoc wireless networks.	6M
	b)	Discuss enhanced DCF and hybrid co-ordination function (HCF) to support QOS in both infrastructure based and infrastructure less network configurations.	6M
7.	a)	Briefly discuss why there is need for energy management schemes in adhoc wireless networks.	6M
	b)	Classify energy management schemes in adhoc wireless networks.	6M
8.	a)	Write a note on data dissemination in Wireless Sensor Networks.	6M
	b)	Discuss briefly research issues in WSN.	6M

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Question Paper Code : B1213

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

COMPUTER NETWORKS

(Computer Science and Engineering)

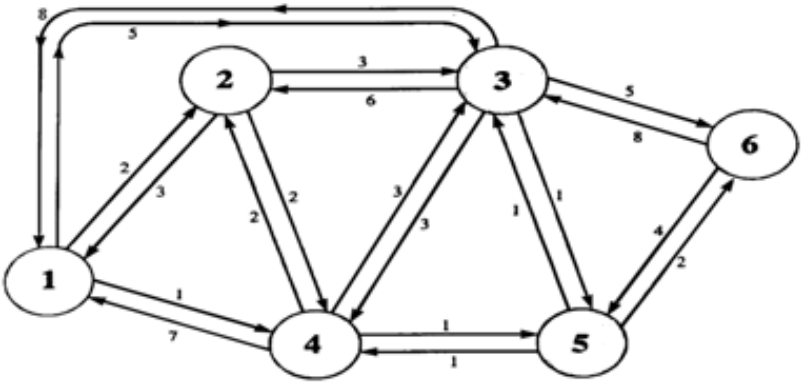
Date : 04 February, 2014 **Time : 3 Hours** **Max. Marks : 60**

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

1. a) Describe the history of computer networking. 6M
   b) Suppose that a host application needs to transmit a packet of 3,5000 bytes. The physical layer has an MTU of 1,500 bytes. The packet has an IP header of 20 bytes plus another attached header of 20 bytes. Fragment the packet, and specify the ID, MF and offset fields of all fragments. 6M

2. a) A string of 110011101 arrives at the line coder of a modem. Give output form if the line coder is designed by: 6M
   (i) Natural NRZ (ii) Polar NRZ (iiii) Manchester
   b) Write a brief note on Point to Point Protocol. 6M

3. a) With neat diagram, explain four types of BGP packets. 6M
   b) Using the Bellman-Ford algorithm find the least-cost path from Node 1 to Node 6 6M



4. a) Explain the operation / details of TCP. 4M
   b) Explain the reasons why congestion control is needed (with TCP). Explain some congestion control methods with TCP. 8M

5. With a suitable example, explain the working of persistent and non persistent HTTP. 12M

6. a) Explain how Mobile Internet (Mobile IP) protocol works. 6M
   b) Explain details of IEEE 802.11 based wireless network(in terms of the MAC protocols). 6M

7. a) Explain the concept of Optical routers. 6M
   b) Explain in detail about WDM concept used in optical networks. 6M

8. a) What is a Virtual Private Network? What are the advantages of using VPN to an organization? 6M
   b) Explain briefly the two widely used real-time media transport protocols. 6M

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Question Paper Code : B1214

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

DATABASE MANAGEMENT SYSTEMS

(Computer Science and Engineering)

Date : 06 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 attribute? Explain the different types of attributes. 6M
   b) What is the necessity of ER diagram? Explain the different notations for the construction of an ER diagram. 6M

2. a) What is functional dependency? Explain the different types of functional dependencies (FD's). 6M
   b) Compute the closure of the following set F of functional dependencies for the relation schema R = (A, B, C, D, E). 6M
   A → BC
   CD → E
   B → D
   E → A

3. a) Discuss the entity integrity and referential integrity constraints. Why each component considered important? 4M
   b) For relations Employee(name, ssn, sex, salary, superssn, dno); Manager(mgrssn, mgr joindt); deptloc(dno, dloc); proj(pno, pname, ploc, dno); works(ssn, pno, hrs); dept(dname, dno, mrgssn); dependent(essn, deptname, sex, relationship). 8M
   Write querries for the shema of figure in relational algebra.
   i. Retrieve the names of all employees in department 5 who work more than 10 hours per week on the product X project.
   ii. For each project, list the project name and the total hours per week (by all employees) spent on that project.
   iii. Retrieve the names of all employees who do not work on any project.
   iv. For each department, retrieve the department name and the average salary of all employees working in that department.

4. a) Give the syntax for creating and deleting stored procedures and functions? 6M
   b) Consider the SQL database below, where the primary keys are underlined. 6M
   Employee(person-name, street, city).
   Works(person-name, company-name, salary).
   Company(company-name, city).
   Manages(person-name, manager-name).
   Write the SQL queries' for the following
   i. Find the names of all employees who work for First Bank Corporation.
   ii. Find the names and cities of residence of all employees who work for First Bank Corporation.
   iii. Find the names, street address and cities of residence of all employees who work for First Bank Corporation and earn more than $10000 per month.

Cont…2

5.	a)	Explain the ways of organizing records in files.	6M
	b)	Explain how to perform insertion and deletion on an extendable hash structure.	6M
6.	a)	Explain the Two-Phase Locking protocol.	6M
	b)	Explain the concept of Thomas write rule.	6M
7.	a)	What is the necessity of developing the distributed databases?	6M
	b)	What are the different levels of distribution transparency provided by a DDBMS for read-only applications?	6M
8.	a)	What is the difference between structured and unstructured complex objects?	6M
	b)	How do spatial databases differ from regular databases? Discuss the different categories of spatial queries.	6M

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Question Paper Code : B1215

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

OBJECT ORIENTED ANALYSIS AND DESIGN

(Computer Science and Engineering)

Date : 08 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 Modeling? State the Importance of Modeling with examples.	4M
	b)	Explain the following terms with example: i. Aggregation ii. Association iii. Object Persistence iv. Abstraction	8M
2.	a)	Describe the various types of relationships that can exist among the classes and represent them in UML notation.	8M
	b)	Create a class hierarchy to organize the following drink classes: alcoholic, non-alcoholic, grape juice, mineral water, lemonade, beer and wine.	4M
3.	a)	Draw the sequence diagram for a telephonic conversation between two people and explain the exchange of messages w.r.t the classes.	6M
	b)	Develop sequence diagram for depositing an amount into the savings account through an ATM machine.	6M
4.	a)	With suitable example, show how activity diagrams are used to model a system dynamically?	6M
	b)	Draw a state chart diagram to depict the working of a digital clock.	6M
5.	a)	Describe where and when component and deployment diagrams are used during project development. Illustrate with an example.	8M
	b)	List the differences between component and class. Describe the relationship between interfaces and components in UML diagram.	4M
6.	a)	Explain the significance of the four P's namely people, project, product and process.	6M
	b)	Explain the significance of iterative incremental development.	6M

Cont…2

7. SafeHome software enables the home owner to configure the security system when it is installed, monitors all sensors connected to the security system and interacts with the home owner through a keypad and function keys contained in safehome control panel. During installation, the safe home control panel is used to program and configure the system. Each sensor is assigned a number and type, a master password is programmed for arming, disarming the system and telephone numbers are input for dialing when a sensor event occurs. When a sensor event is recognized, the software invokes an audible alarm attached to the system. After a delay time that is specified by the home owner during the system configuration activities. The software dials a telephone number of a monitoring service, provides information about the location, reporting the nature of the event that is detected. The telephone number will be redialed every 20 seconds until telephone connection is obtained. All interactions with safehome is managed by user interaction subsystem that reads input provided by the keypad. 12M

   i. Analyze the problem using noun list analysis.
   ii. Filter bad classes and find the candidate classes.
   iii. Give the generalization diagram fir the sensor object.
   iv. Give the whole-part structure for the control panel.

8. a) Draw a usecase diagram to model the behavior of a digital counter. 6M
   b) Describe the activities of transition phase with an example. 6M

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Question Paper Code : B1216

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

OPERATING SYSTEMS

(Computer Science and Engineering)

Date : 11 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) Describe the function of long term, medium term and short term schedulers with a block diagram. 6M
   b) Differentiate between: 6M
      i. One to One and Many to Many model
      ii. User and Kernel threads

2. a) The following processes arrive for execution in times indicated as given below: 6M

Process	Arrival time	Burst time
P1	0	1.5
P2	1.5	3
P3	3	1
P4	3	7.5

   Draw a Gantt Chart and calculate average waiting time for:
      i. FCFS scheduling
      ii. Preemptive SJF scheduling.
   b) Describe 'Test and Set' and 'SWAP' instructions and their use in synchronization of processes. 6M

3. a) Give the deadlock detection algorithm for both single and multiple instances of resources. 8M
   b) What is deadlock? What are the necessary conditions for a deadlock situation? 4M

4. a) What is thrashing? Explain the methods of overcoming thrashing. 6M
   b) Describe both internal and external fragmentation problems encountered in a contiguous memory allocation scheme. 6M

5. a) Compare the contiguous and linked file allocation methods. 6M
   b) Describe direct access file organization. 6M

6. a) What are the different goals of a distributed system? 6M
   b) Explain the working of ATM network with a neat diagram. 6M

7. a) Explain the ring algorithm with a neat labeled diagram. 6M
   b) Compare different algorithms for achieving mutual exclusion in a distributed system. 6M

8. Explain different methods used for distributed deadlock prevention with its advantages and disadvantages. 12M

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Question Paper Code : B1218

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

DATA WAREHOUSING AND DATA MINING

(Common to Computer Science and Engineering & Software Engineering)

Date : 15 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. Define each of the following data mining functionalities: 12M
   i. Correlation analysis
   ii. Classification
   iii. Prediction
   iv. Evolution analysis

2. Suppose a group of 12 sales price records has been sorted as follows: 12M
   5, 10, 11, 13, 15, 35, 50, 55, 72, 92, 204, 215
   Partition them into three bins by each of the following methods.
   i. Equal –frequency portioning
   ii. Equal width partitioning
   iii. Clustering

3. Suppose that a DW for Big University consists of following four dimension Student, Course, Semester and Instructor, two measures Count and Average grade. 12M
   i. Draw the snowflake schema diagram for the DW.
   ii. Describe any three OLAP operations that can be performed on the above DW.

4. The database of transactions in a book mart is as follows: 12M
   Let the min_support = 27%.

Trans_ID	Items
101	Book, pen, Eraser
102	Pen, Pencil
103	Notebook, Book, Pen, Eraser
104	Book, Pen
105	Book, Notebook, Eraser

   Find all the frequent itemsets using Apriori Algorithm. Write the FP tree, Conditional pattern base and Conditional FP-tree.

5. Briefly explain the different criteria that are used for comparing classification and prediction methods. 12M

6. a) Describe the usage of K-means algorithm in data mining. 6M
   b) Describe the methods used to compute dissimilarity between the objects described by ratio-scaled variables. 6M

7. What do you mean by similarity search in time series analysis? Discuss two different types of similarity search that can be used for time series analysis. 12M

8. Suppose that a city transportation department would like to perform data analysis on highway traffic for the planning of highway construction based on city traffic data collected at different hours every day 12M
   i. Design a spatial datawarehouse that stores the highway traffic information so that people can easily see the average and peak time traffic flow by highway, by time of day, and by weekends, the traffic situation when the major accidents occur.
   ii. What information can we mine from such a spatial datawarehouse to help city planners?

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Question Paper Code : B1407

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Embedded Systems)

Date : 08 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 FPGA design flow with each level in the design.	6M
	b)	Explain about the state assignment for FPGA.	6M
2.		Describe the different FPGA architectures and its programming technologies.	12M
3.		Write a synthesizable HDL code for 2:1 MUX in the behavioral style and structural style.	12M
4.		Design a system which counts the number of 1's in a register using shift operation. Draw the ASM chart for the design of control logic and implant the same on a PLA.	12M
5.	a)	What are the possible ways of implementing programming links at the single length interconnects and long interconnects in the arrays.	5M
	b)	Draw the diagram of traditional FPGA architecture consisting of a two dimensional array of logic blocks. Further decompose these logic blocks into a hierarchical collection of different logic elements such as LUT's, Flip Flops and MUX.	7M
6.	a)	Explain the datapath and functional partition of FSM system level design.	6M
	b)	Develop one hot state diagram for a sequence checker which is 'I' whenever the sequence is '0101'. Also specify the transition table.	6M
7.	a)	Draw and explain the basic configuration and symbology for a PLD sum of products array with a logic diagram.	6M
	b)	Explain output logic macro cell for a PALCE16V8 PLD with a circuit diagram.	6M
8.	a)	Draw the simplified block diagram for Xilinx XC4000 series CLB and explain the function briefly.	6M
	b)	Compare & list out the advantages of ALTERA's Logic8000 with Xilinx XC4000.	6M

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Question Paper Code : B1413

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

NETWORK SECURITY AND CRYPTOGRAPHY

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

Date : 13 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 following terms: i. Interception ii. Modification iii. Fabrication	6M
	b)	Explain the following cipher techniques: i. Hill Cipher ii. Ceaser Cipher	6M
2.	a)	Explain the AES algorithm.	8M
	b)	What do you mean by Block encryption technique? Explain how it is different from normal encryption technique.	4M
3.	a)	Explain the basic requirements for Public-Key Cryptography.	6M
	b)	Explain the RSA algorithm.	6M
4.	a)	Describe the different cryptographic functions provided by PGP.	6M
	b)	What is MIME? What are the different content types of MIME?	6M
5.		Explain in detail Oakley key determination protocol.	12M
6.	a)	How web security can be achieved? What are the different mechanisms?	6M
	b)	Explain the operation of SSL Record protocol with a neat diagram.	6M
7.	a)	What is bot net? Explain the application of bot nets and how it works.	6M
	b)	Explain the different types of intrusion detection techniques.	6M
8.	a)	What is distributed denial of service attacks? Explain in detail.	6M
	b)	Explain the basic principles of firewall design.	6M

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Question Paper Code : B1110

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

CODING THEORY AND TECHNIQUES

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

Date : 04 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) For any two random variables prove that mutual information is non- negative. 6M
   b) A zero memory source has a source alphabet S={s1,s2,s3,s4} with probabilities P={1/2,1/4,1/8,1/8}.Find the entropy of this source, also determine the entropy of its 2nd extension and verify that H(s2)=2H(s). 6M

2. a) The generator polynomial for a (15,7) cyclic code is $g[x]=1 + x^4 + x^6 + x^7 + x^8$ 8M
      i. Find the code vector in systematic form for the message $D(x)=x^2 + x^3 + x^4$
      ii. Assume that the first and last bit of the code vector V(x) for $D(x)=x^2 + x^3 + x^4$ suffer from a transmission error . Find the syndrome of V(x).
   b) For a (7, 4) cyclic code the generator polynomial is $g[x]=1 + x + x^3$. Draw the syndrome calculation circuit and find the syndrome for the received vector with single error 1110110. 4M

3. A [15, 5] linear cyclic code has a generator polynomial $g[x]=1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$ 12M
   i. Draw the block diagrams of an encoder and syndrome calculator for this code.
   ii. Find the code polynomial for the message polynomial $D(x)=1 + x^2 + x^4$ in the systematic form.
   iii. Is $V(x) = 1 + x^4 + x^6 + x^8 + x^{14}$ a code polynomial? If not find the syndrome of V(x)

4. Consider the (3,1,2) convolutional code with $g^{(1)}$=(1 1 0), $g^{(2)}$=(1 0 1) and $g^{(3)}$=(1 11) 12M
   i. Draw the encoder block diagram.
   ii. Find the generator matrix.
   iii. Find the code-word corresponding to the information sequence (1 1 1 0 1) using time domain and transform-domain approach.

5. a) Explain briefly with flowchart fano algorithm. 6M
   b) Explain why (23, 12) golay code is called as perfect code. 6M

6. a) Describe the different types of ARQ. Briefly discuss their features, advantages and disadvantages. 8M
   b) Consider a (15, 9) cyclic code generated by $g(x)=1+x^3+x^4+x^5+x^6$. This code has burst error correcting ability b=3. Find the burst error correcting efficiency of this code. 4M

7. Find table for GF(2^3) from GF(2) by using third degree irreducible polynomial $p(x)=x^3+x^2+1$. 12M

8. a) Determine the parameters of a q-ary RS code over GF(256) for a d_{min}=33. 4M
   b) Determine the parameters of a q-ary RS code over GF(16) for a d_{min}=9 also find the total number of code words in the code and also the nearest neighbors for any code word at a distance of d_{min}=9. 8M

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Question Paper Code : B1111

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

WIRELESS COMMUNICATIONS AND NETWORKS

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

Date : 06 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) With necessary electrical specifications, explain evolution of wireless systems. 6M
   b) Total 33 MHz bandwidth allocated to a FDD cellular system which uses 25KHz simplex channels to provide full duplex voice and control channels. Find the number of channels available per cell if a system uses: 6M
      i. 4-Cell reuse
      ii. 7-Cell reuse

      If 1MHz of the allocated spectrum is dedicated to control channels, find an equitable distribution of control channels and voice channels.

2. a) Explain the important features of FDMA with frame efficiency. 8M
   b) If GSM uses a frame structure where each frame consists of eight time slots and each time slot contains 156.25 bits and data is transmitted at 270.833kbps in the channel. Find: 4M
      i. Time duration of a bit.
      ii. Time duration of slot
      iii. Time duration of a frame
      iv. How long must a user occupying a single time slot wait between two successive transmission frames?

3. a) Explain the mechanism of traffic routing in wireless networks. 6M
   b) What is X.25 protocol? Explain with a neat diagram. 6M

4. a) With a neat block diagram, explain CDPD network. 8M
   b) What is SS-7? Give the network services part and user part of SS-7. 4M

5. a) Give the format for mobile IP agent advertisement message and describe each field in detail. 8M
   b) What is WTP? What are the transaction classes provided by WTP that may be invoked by WSP or another higher-layer protocol. 4M

6. a) Discuss in detail the three alternative transmission techniques commonly used for IR data transmission. 6M
   b) Describe the two types of authentication provided by IEEE 802.11. 6M

7. a) Explain the following for blue tooth technology: 8M
      i. Radio specification
      ii. Baseband specification
      iii. Links manager specification
   b) Write a note on “WLL technology”. 4M

8. a) Explain the process of short messaging service in GSM. 6M
   b) Explain how GPRS supports higher data rates and mobility. 6M

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Question Paper Code : B1113

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

SPREAD SPECTRUM COMMUNICATIONS

(Wireless and Mobile Communications)

Date : 11 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)	A system is operating with a link in which the interfering noise is 100 times greater than the signal and the information rate is 3 kbps. What is the minimum RF bandwidth needed?	4M
	b)	Discuss the direct sequence system with necessary waveforms and block diagram. Also explain the frequency spectrum of a hybrid FH/DS system with a neat diagram.	8M
2.	a)	What is the longest code sequence that can be generated with a single linear feedback network using a shift register of 23 stages?	4M
	b)	Write the properties held by all maximal code sequences. Also draw the auto correlation characteristics for a 21-chip maximal code [5, 4].	8M
3.	a)	Determine the mean and base frequencies for a direct, 64-frequency add-and-divide synthesizer with output at 70-MHz and 10-kHz output spacing.	6M
	b)	Discuss the effects of: i. Carrier Modulation ii. Code modification	6M
4.	a)	Write the block diagram of squaring loop demodulator. Define the functions of all blocks. What are the parameters on which the performance of squaring loop depends on?	7M
	b)	Given 30-dB process gain, what would be the output (S + I)/I ratio in a correlator when the input interference is 10 dB above the desired signal?	5M
5.	a)	Write the flow diagram for sliding correlator synchronizer and illustrate the synchronization process. Mention it's advantages.	6M
	b)	Discuss the carrier-lock tracking system.	6M
6.	a)	Explain about correlation receiver with AGC loop.	6M
	b)	What is the effect of: i. No multipath ii. In-phase multipath iii. Out-of-phase multipath	6M
7.	a)	If exactly 25-chip/mi range resolution is desired, what code chip rate is required?	6M
	b)	A 100-khop/sec frequency hopping system uses it's hopping interval to measure the range. Give an estimate of it's range resolution capability.	6M
8.	a)	How the evaluation of spread spectrum systems is done using Receiver sensitivity test setup? Explain.	6M
	b)	Write the block diagrams of TDRSS modulation and demodulation subsystems. Discuss the functions of each block.	6M

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Question Paper Code : B1317

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

RELIABILITY ENGINEERING

(Power Electronics and Electric Drives)

Date : 13 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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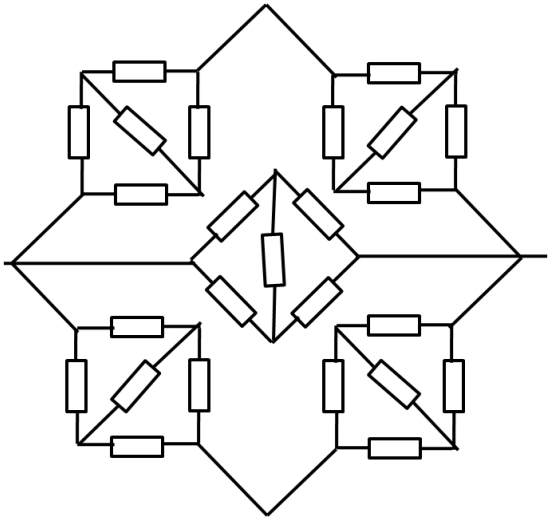
1. a) Write down the properties of Binomial distribution. 6M
   b) A die is thrown 6 times. Evaluate individual and cumulative probabilities of various possible events if getting of two is treated as success in each trail. Hence find the probability of getting two atleast once and probability of two not getting. 6M

2. a) Show that mean time to failure is equal to the reciprocal of the constant hazard rate function for exponentially distributed failure component. 6M
   b) A component with an MTTF of 100 hours is known to have exponential distribution. Calculate the reliability of the component for a mission time of 10 hours. 6M

3. a) Discuss the various measures of reliability. Provide expressions for each of them. 6M
   b) Fig. 1 shows a system configuration. The block shows elements of the system and each element has a reliability of 0.95. Find the system reliability. 6M



(In --→ Out)

Fig. 1

4. a) A parallel system have identical components and each component has a reliability of 0.5. What is the minimum number of components if the system reliability must be atleast 0.99? 6M
   b) A system consists of 4 components in parallel system requires that atleast 3 out of 4 must function. 6M
      i. What is the system reliability if each component has a reliability of 0.9?
      ii. What is the system rehability if 5 components are there to perform the same functions?

5. a) Define the following terms: 6M
   i. Tie sets
   ii. Cut sets
   iii. Minimal Cut Sets
   iv. Minimal tie Sets

   b) Calculate the reliability of the bridge Network using Minimal Cut Set method as shown in Fig. 2 assuming that each component's reliability is 0.9. 6M

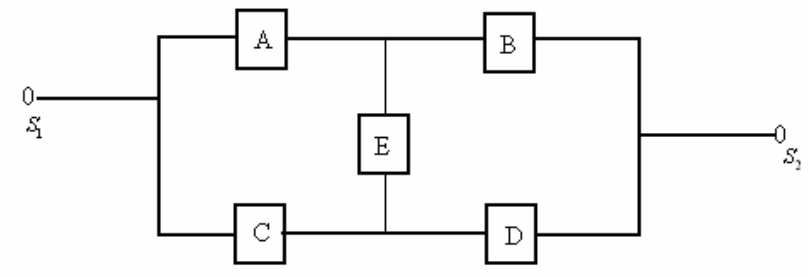


Fig. 2

6. In one component, repairable model with state space diagram and the corresponding rates of transition are shown in Fig. 3, if state 2 is an absorbing state, evaluate the expected number of intervals the system can reside in other state. And also derive the formula used. 12M

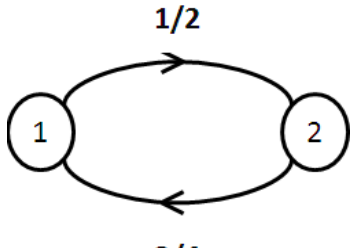


Fig. 3

7. a) A continuous-time Markov chain is a special case of a semi-Markov process. Justify 6M
   b) Each second, a laptop computer's wireless LAN card reports the state of the radio channel to an access point. The channel may be (0) poor, (1) fair, (2) good or (3) excellent. 6M
   i. In the poor state, the next state is equally likely to be poor or fair.
   ii. In states 1, 2, and 3, there is a probability 0.9 that the next system state will be unchanged from the previous state and a probability 0.04 that the next system state will be poor.
   iii. In states 1 and 2, there is a probability 0.6 that the next state is one step up in quality.
   iv. When the channel is excellent, the next state is either good with probability 0.04 or fair with probability 0.02.
   v. Sketch the Markov chain and find the state transition matrix.

8. a) Explain how the reliability indices are evaluated using minimal cutest approach. 6M
   b) A system consists of four components in parallel. System success requires that at least three of these components must function. What is the probability of system success if the component reliability is 0.9? What is the system reliability if five components are placed in parallel to perform the same function? 6M

Hall Ticket No										

Question Paper Code : B1411

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

LOW POWER CMOS VLSI DESIGN

(Digital Electronics and Communication Systems)

Date : 08 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) Explain different sources of power dissipation in digital CMOS circuit. 6M
   b) Explain the following: 6M
      i. Sub Threshold Swing
      ii. Effects of short channel length

2. a) Explain briefly how signal probability is calculated using BDD. 6M
   b) How switching activity in sequential circuits is calculated? Explain briefly. 6M

3. Explain Monte-Carlo based technique for estimating the average power in sequential circuits. 12M

4. a) Explain the algorithmic level transforms for low power. 6M
   b) With appropriate example, explain the drawback of power reduction using parallelism. 6M

5. Explain the algorithm for power dissipation driven multilevel logic optimization with an example. 12M

6. With neat figures and waveforms for read and write, explain the operation of 4T and 6T SRAM cell. 12M

7. a) Explain different precharge techniques employed by SRAM's. 6M
   b) With a neat diagram, explain the operation of differential sense amplifier. 6M

8. Explain the following: 12M
      i. Instruction level power analysis
      ii. Voltage Island

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

Question Paper Code : B1416

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

DESIGN FOR TESTABILITY

(Digital Electronics and Communication Systems)

Date : 15 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) Construct a binary decision diagram for the following: 6M
   i. Exclusive OR function of two variable
   ii. Exclusive NOR function of two variable
   b) Write two RTL model for a positive edge triggered D Flip Flop. First assume an RTL that does not allow accessing past values of signals. Remove the restriction for the second model. 6M

2. a) Explain the following with examples 6M
   i. Delay modeling for gates
   ii. Delay modeling for functional elements
   b) Construct a Zoom table for evaluating AND, OR, NAND and NOR gates with two inputs with Binary values. 6M

3. For the circuit of Fig. 1: 12M

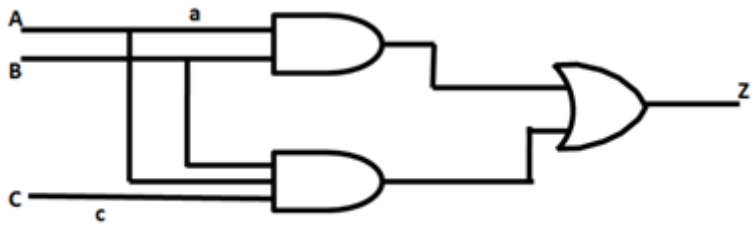

Fig. 1

   i. Find the set of all tests that detects the fault ‘c’ at stuck at 1
   ii. Find the set of all tests that detects the fault ‘a’ stuck at 0
   iii. Find the set of all tests that detects the multiple fault {‘c’ at stuck at 1, ‘a’ stuck at 0}

4. a) Construct a truth table for an XOR function of two input using the five logic values 0, 1, x, D, and D’. 6M
   b) Show that the expected fault coverage of a random test sequence of length N is greater than: 6M
   i. its testing quality t_N
   ii. its detection quality d_N
5. a) Using Huffman model for sequential circuit, explain full integrated scan. 6M
   b) Explain isolated serial scan. 6M

Cont…2

6. a) Explain the following compression techniques: 6M
   i. Ones count compression
   ii. Transition count compression
   b) For an autonomous LFSR show that if it's initial state is not all 0 state then it will never enter the all 0 state. 6M

7. a) Show that complementing one column of a matrix representing a pseudoexhaustive test set creates a test set that is also pseudoexhaustive. 6M
   b) Prove that for a case where p=w+1, applying all possible binary patterns of p bits with either odd or even parity will either produce a test set where for every subset of w lines all possible binary patterns will occur. 6M

8. a) Explain random test data (RTD) BIST architecture. 6M
   b) List the memory test requirements for Memory BIST. 6M

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Question Paper Code : B1313

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONVERTERS-II

(Power Electronics and Electric Drives)

Date : 04 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 cross sectional view of half cell, explain turn-on and turn-off processes of static induction thyristor (SITH), along with its equivalent circuit. 6M
   b) Compare features of MTO, ETO and MCT with respect to their gate control, switching frequency, on-state voltage. 6M

2. a) What are the advantages and disadvantages of resonant inverters with bi-directional switches? 6M
   b) Discuss about the methods for voltage control of series resonant inverters. 6M

3. a) With a neat circuit diagram and valid mathematical equations, discuss about parallel resonant inverters. 6M
   b) With a neat circuit diagram and waveforms, explain the circuit operation of Class E resonant rectifier. 6M

4. a) With a neat circuit diagram, equivalent circuits and relevant waveforms, explain the operation of L-type ZCS resonant converter. 6M
   b) With a neat circuit diagram, relevant waveform and valid equations explain the operation of resonant DC link inverter. 6M

5. a) Discuss in detail about the special features of diode-clamped multilevel inverters. 6M
   b) With a neat circuit diagram, explain the operation of flying capacitor type multi-level inverter. 6M

6. a) Discuss in detail about the reactive power compensation of a 1-Phase multi-level converter. 6M
   b) With a neat circuit diagram, explain the operation of a push-pull converter. 6M

7. a) Discuss in brief about switched mode AC Power Supplies. 6M
   b) Discuss brief about resonant DC power supply. 6M

8. Write short notes on: 12M
   i. Double ended flyback converter
   ii. Multistage conversion
   iii. Emitter turn-off thyristors

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

Question Paper Code : B1314

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

POWER ELECTRONIC CONTROL OF AC DRIVES

(Power Electronics and Electric Drives)

Date : 06 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) Draw the per-phase equivalent circuit of an induction motor. Simplify the equivalent circuit by stating the approximations made and draw the phasor diagram for the simplified equivalent circuit. 7M
   b) Explain how the variable voltage, constant frequency operation of an induction motor affects the speed-torque characteristics. 5M

2. a) Discuss about the closed loop speed control of induction motor by slip regulation. 6M
   b) Draw the block diagram of speed/flux control of current fed inverter drive and write short notes on it. 6M

3. a) Mention the advantages and disadvantages of slip power recovery schemes. 4M
   b) With the help of a neat diagram, explain how slip power can be recovered using static kramer's scheme. 8M

4. Write short notes on the following: 12M
   i. Self-tuning control
   ii. Model referencing adaptive control

5. Explain in detail about operation of synchronous motor with neat diagram and also explain its characteristics. 12M

6. Explain the designing and operation of maximum permissible torque speed control scheme with its implementation strategy. 12M

7. a) Elaborately discuss the current limit control of variable reluctance servo drives. 8M
   b) Briefly explain the principle of operation of any one type of variable reluctance motor. 4M

8. a) Draw the constructional diagram of a brushless dc motor and explain its features. 6M
   b) Mention the differences between trapezoidal and sinusoidal type of brushless dc motors. 6M

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Question Paper Code : B1315

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

FLEXIBLE AC TRANSMISSION SYSTEMS

(Power Electronics and Electric Drives)

Date : 08 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 need for transmission interconnections. Show how a FACTS device can control power flow in parallel paths.	6M
	b)	What is loadability? What system constraints limit the loadability?	6M
2.	a)	Explain how the transformers are connected for a 12 pulse operation to reduce the harmonics.	6M
	b)	Explain how a 24-pulse converter can be made from 12-pulse converter.	6M
3.	a)	Describe the working of a pulse-width modulation converter.	8M
	b)	Compare the advantages and the disadvantages of a current-sourced converter VS. voltage-sourced converter.	4M
4.	a)	Prove that midpoint shunt compensation can significantly increase the transmittable power.	8M
	b)	What are the functional requirements of reactive shunt compensator?	4M
5.	a)	With a neat diagram and wave forms describe the operation of a basic thyristor controlled reactor.	6M
	b)	With a block diagram explain the functional control scheme for the TSC-TCR type static var generator.	6M
6.		Draw the block diagram of the basic static var compensator and derive an expression for the amplitude variation of the terminal voltage against amplitude variation of power system voltage.	12M
7.		Explain the method of implementation of power oscillation damping by modulating the reference voltage according to frequency or power flow variations.	12M
8.	a)	Briefly discuss the operation of TSSC.	6M
	b)	What is SSR? How do series FACTS devices control SSR?	6M

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

Question Paper Code : B1316

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

MODERN CONTROL ENGINEERING

(Power Electronics and Electric Drives)

Date : 11 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) What are the advantages and disadvantages of state space analysis? 6M
   b) For the electric network shown in Fig. 1, choose V_Q, V_R and i_L as state variables and derive the state space model. Voltage across the C_2 is output. 6M

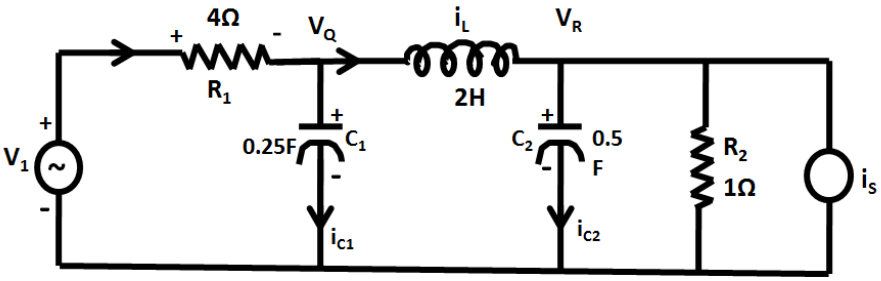

Fig. 1

2. a) Construct a state model for a system characterized by the differential equation. 6M

$$\frac{d^3y}{dt^3}+6\frac{d^2y}{dt^2}+11\frac{dy}{dt}+6y+4u=0$$

Give the block diagram representation of the state model.

   b) Derive the solution of Non-homogeneous state equations. 6M

3. a) State and explain the observability theorem. 6M
   b) The state model of a system is given by 6M

$$\dot{x}=Ax+Bu,\quad y=Cx$$

Where $A=\begin{bmatrix}0 & 0 & 1\\ -2 & -3 & 0\\ 0 & 2 & -3\end{bmatrix}$, $B=\begin{bmatrix}0\\2\\0\end{bmatrix}$, $C=\begin{bmatrix}1 & 0 & 0\end{bmatrix}$

Convert the state model to controllable phase variable form.

4. a) Define singular points. List the singular points based on the location of eigen values of the system , along with the phase portraits. 6M
   b) Plot eigen values and phase portraits of the system expressed by the following equations: 6M

   i. $\ddot{y}+9\dot{y}+20y=0$

   ii. $\ddot{y}-8\dot{y}+17y=34$

Cont…2

5. a) A system is described by the following state space model: 6M

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -6 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

Design a state feedback controller such that the desired closed poles are at (-1±j) & (-5).

b) What are state observers? Explain with block diagram of the full order state observer. 6M

6. a) Explain the method of constructing Liapunov function by Krasoviski's method for non linear systems. 6M

b) State and explain Lyapunov's stability theorem. 6M

7. a) The control system has the following characteristics equation 6M

$$P(z) = z^3 - 1.3z^2 - 0.08z + 0.24 = 0$$

Determine the stability of the system using jury's stability test.

b) Explain stability analysis using bilinear transformation. 6M

8. a) Obtain the pulse transfer function G(z) of the system shown in Fig. 2 where G(s) is given by $G(s) = \frac{1}{s+a}$ 6M

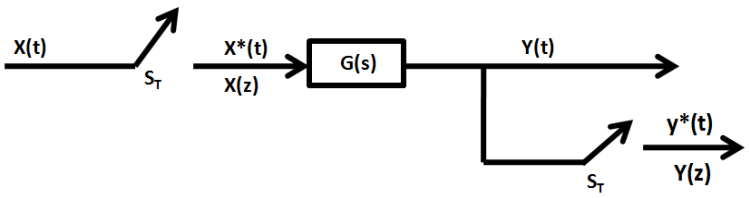

Fig. 2

b) Write a note with example: 6M

i. Eigen value
ii. Eigen vector
iii. Canonical form representation of linear operators

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

Question Paper Code : B1616

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

ROBOTICS AND AUTOMATION

(Embedded Systems)

Date : 15 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 several applications for non-servo robots for point to point and for continuous path robot. 6M
   b) Explain the general classification of robot. 6M

2. a) Differentiate between degree of freedom and degree of motion. 6M
   b) Explain the three rules of robot by Asimova. 6M

3. a) How are grippers classified? Give neat sketches for four sample gripper designs. 6M
   b) Enlist gripper design considerations. 6M

4. Write the racer controller state map and explain different states in operational race scenario. 12M

5. Discuss the steps that the `snow making control ppdev` program takes and write the program that uses `ppdev` to control the parallel port registers that control the interface circuit. 12M

6. Describe an incremental interpolator based on the resolved motion rate control method. 12M

7. a) With block diagram explain robot control architecture for n-DOF manipulator. 8M
   b) List some of the Industrial applications of robotics. 4M

8. a) List the factors which should be considered while selecting a robot for a particular application. 6M
   b) Write a short note on robotic cell design. 6M

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

Question Paper Code : B1320

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

M. Tech II Semester Supplementary Examinations, February – 2014

(Regulations: VCE-R11)

PROGRAMMABLE LOGIC CONTROLLERS AND APPLICATIONS

(Power Electronics and Electric Drives)

Date : 15 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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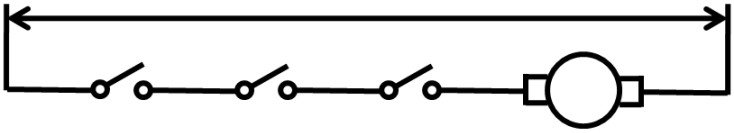
1. a) List the Microprocessor used in PLC CPUs which is the least powerful and which is the most powerful? And explain in detail. 6M
   b) The switching circuit shown in Fig.1 below is to be implemented using a PLC. Show how the controller's inputs and output can be arranged. Write the Ladder program. 6M



Multiple And Operation

Fig.1

2. Write short notes on the following: 12M
   i. OPTO-ISOLATED Digital Inputs
   ii. Relax Inputs
   iii. Transistor Inputs

3. a) Convert the following binary numbers into equivalent octal, hexa-decimal and decimal values. 6M
   i. 1011 **ii.** 111010001 **iii.** 1010101010101010
   b) Explain the difference between 6M
   i. RAM and ROM
   ii. EEPROM and EPROM

4. a) List the five major types of registers. Use a block diagram to show where each type fits into the PLC scheme of operation. 6M
   b) Write short notes on characteristics of registers module addressing. 6M

5. a) Draw a Ladder Latch diagram and explain its operation. 6M
   b) Draw and label a timing diagram which shows how a counter having a preset value of five, operates. 6M

6. a) Illustrate a process requiring a Jump with returns Instruction and draw the necessary Ladder diagram. 6M
   b) Explain a basic PLC sequence application with timing. 6M

7. a) How do you change the status of bit patterns of a register? Explain. 6M
   b) Develop a "Coil and Contact" (Input and Output) control system to operate a basic robot? 6M

8. Write short notes on the following: 12M
   i. PID modules
   ii. PID timing
   iii. PID control
   iv. PID function