Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code : B1110

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
CODING THEORY AND TECHNIQUES
(Common to Digital Electronics and Communications Systems &
Wireless and Mobile Communications)

Date: 07 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Prove that the entropy attains a "Maximum value" when all the source symbols become equiprobable. 6M
    b) The parity check bits of (7,4) hamming code are generated by: 6M
       C5= d1+d3+d4
       C6=d1+d2+d3
       C7=d2+d3+d4
       Find the Generator matrix and Parity check Matrix.

2. a) Prove that the generator Polynomial $g(x)$ of a (n,k) Cyclic code is a factor of x^n+1 5M
    b) Write the [H] matrix for the (15, 11) cyclic code using $g(x) = 1+x+x^4$.Calculate the code Polynomial for the message polynomial $d(x) =1+x^3+x^7+x^{10}$. Construct the decoder for the same. 7M

3. a) With the help of a block diagram, explain the general decoder for cyclic codes, Also explain the step-wise procedure of error correction? 8M
    b) Briefly discuss the construction of shortened cyclic codes. 4M

4. In a (3,2,1) convolution encoder the impulse response is given by: 12M
    $g1^{(0)}=[1\ 1]$, $g1^{(1)} =[0\ 1]$, $g1^{(2)}=[1\ 1]$
    $g2^{(0)} =[0\ 1]$, $g2^{(1)}=[1\ 0]$, $g2^{(2)}=[1\ 0]$
    Draw the encoder circuit. For the message $U^{(1)} =[1\ 1\ 0]$ and $U^{(2)}=[1\ 0\ 1]$. Find the codeword using Time Domain and Transform domain approach.

5. a) Explain Stack algorithm and mention four demerits of stack algorithm? 6M
    b) Draw Flow chart for Fano algorithm and explain the algorithm in detail. 6M

6. a) What are 'burst error correcting codes'? Explain with an example, the technique of cyclic interleaving to achieve burst error correction. 6M
    b) Compute the burst-error-correcting efficiency of a (15,9) Cyclic code with $g(x)= 1+x^3+x^4+x^5+x^6$ and a burst error correcting ability b=3. 6M

7. a) Construct a table for GF(2^3) based on the primitive Polynomial $P(x) = 1+x+x^3$.Write the power polynomial and vector representation of each element. 8M
    b) Compute the addition table for GF(5) and GF(7). 4M

8. a) With a suitable diagram, explain the decoding of BCH codes using the syndrome computation circuit? 6M
    b) Consider a (15,7) double error Correcting BCH code with $g(x)= 1+x^4+x^6+x^7+x^8$ and $m(x)=1+x$. Find the codeword c(x). 6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
WIRELESS COMMUNICATIONS AND NETWORKS
(Common to Digital Electronics and Communications Systems & Wireless and Mobile Communications)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Explain the Cellular concept in Mobile Communication and illustrate with necessary expressions how the frequency reuse helps in increasing its capacity.   6M
    b) What are adjacent and co-channel interferences? Show that co-channel Interference of 18db can be achieved with 7 cell cluster.   6M

2. a) What is FDMA? Explain the different features of FDMA.   6M
    b) Explain the differences between PURE and Slotted ALOHA. Determine the maximum throughput that can be achieved in slotted ALOHA protocols.   6M

3. a) Explain the first generation cellular radio network with a neat figure showing its block diagram.   6M
    b) Discuss the features of X.25 and explain the hierarchy of X.25 protocols in the OSI model with a neat figure.   6M

4. a) Explain the features, services and working of Cellular Digital Packet Data with a neat figure of the CDPD network.   6M
    b) Explain the different layers of the SS7 protocol architecture with a neat figure along with the comparison of the OSI Network model and SS7 protocol standard.   6M

5. a) Illustrate the operation of Mobile IP with a neat figure of Mobile IP scenario.   6M
    b) Explain the different client components of WAE (Wireless Application Environment) and discuss the different services of Wireless Session protocol.   6M

6. a) Describe the advantages, drawbacks, and the various transmission techniques of Infrared LANs.   6M
    b) Explain the IEEE 802.11 architecture with a neat figure and discuss its services.   6M

7. a) List and describe the different usage models of Bluetooth.   6M
    b) Explain the operation of a Piconet in terms of the different states of operation with a neat figure of Bluetooth state transition diagram.   6M

8. a) What is Mobile Data? Show the classification of Mobile Data Networks.   6M
    b) What is SMS? Describe the different services, Reference and Layered protocol architecture for SMS with a neat figure.   6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ADHOC WIRELESS AND SENSOR NETWORKS
(Wireless and Mobile Communications)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Briefly discuss the major security threats that exist in adhoc wireless networks.	4M
	b)	Discuss the major issues to be considered for a successful adhoc wireless Internet and draw the diagram of adhoc wireless Internet.	8M
2.	a)	Briefly discuss the design goals of a MAC protocol for ADHOC wireless networks.	6M
	b)	List the disadvantages of receiver-initiated BTMA and explain how it is overcome in DBTMA.	6M
3.	a)	Illustrate the process of route establishment and route maintenance in Destination Sequenced Distance-Vector Routing Protocol (DSDV) by taking an example.	8M
	b)	Explain different power-aware routing metrics considered in power-aware routing protocol.	4M
4.	a)	Briefly discuss the advantages and disadvantages of different approaches for maintenance of the multicast tree in bandwidth efficient multicast protocol (BEMRP).	6M
	b)	Illustrate the tree initialization phase in Multicast Routing Protocol Based on Zone Routing (MZRP).	6M
5.	a)	Discuss the major reasons behind the degradation that TCP faces when used in adhoc wireless networks.	4M
	b)	What is Blackhole problem and discuss the solution for blackhole problem by taking an example.	8M
6.	a)	Enumerate how a node estimates its expected location and under what circumstances the node generates a TYPE2 update message in PLBQR protocol.	6M
	b)	Explain Flexible QoS model for Mobile adhoc Networks (FQMM).	6M
7.	a)	Discuss the advantages of distributed power control algorithms in adhoc wireless networks over centralized control algorithms.	4M
	b)	Explain Power-Saving Localized Routing (SP-Power) algorithm and Cost-Saving Localized Routing (CP-Power) algorithm.	8M
8.	a)	Briefly discuss the Sybil attack and sinkhole attack on sensor networks.	6M
	b)	Explain the working of Rumor routing and Sequential Assignment Routing in data dissemination of wireless sensor networks.	6M

Hall Ticket No: ⬜⬜⬜⬜⬜⬜⬜⬜⬜⬜   Question Paper Code : B1113

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)

SPREAD SPECTRUM COMMUNICATIONS
(Wireless and Mobile Communications)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	What is Jamming Margin? Determine the Jamming threshold for a particular system with suitable expressions and compare it with processing gain.	6M
	b)	Explain the Frequency hopping system with its block diagram and relevant waveforms.	6M
2.	a)	Explain how the Gold codes are generated and configured with suitable figures and illustrate the Gold code generation with $[5,3]_s$ and $[5,4,3,2]_s$ generators along with their advantages .	6M
	b)	Discuss the need for generating high rate codes in various applications. Illustrate the features of seven-stage high-speed code generator.	6M
3.	a)	Explain the Quadriphase modulator with its block diagram. Illustrate the output carrier phase derivation corresponding to data input and also discuss the comparison of biphase and quadriphase signal spectra.	6M
	b)	Explain the various components of basic indirect frequency synthesizer with the help of neat figures.	6M
4.	a)	What is heterodyne correlation? Describe the comparison of heterodyne correlators for direct sequence and frequency hopping correlator figures.	6M
	b)	Explain the Phase-lock loop with a neat figure. Discuss the various outstanding characteristics of phase-lock loop.	6M
5.	a)	Explain the sliding correlator synchronizer with its flow diagram and mention its advantages.	6M
	b)	Explain the multiple –integration synch detector with a neat diagram and illustrate a typical synch-decision process using a flow chart and timing diagram.	6M
6.	a)	Illustrate the operation of a correlating receiver with AGC loop and discuss its various operating conditions.	6M
	b)	Discuss the role of power amplification in the transmitter design for spread spectrum signals. Also illustrate the comparison of loss versus bandwidth for conventional and modified quadriphase signals.	6M
7.	a)	Illustrate the interrogating and responding modes of hybrid ranging systems using suitable figures for the same along with its timing diagram.	6M
	b)	Explain the simple two-receiver direct sequence direction finder showing its block diagram and discuss its advantages and drawbacks.	6M
8.	a)	Explain the procedure used in the receiver sensitivity test setup with a neat diagram .	6M
	b)	Discuss how avionics system employ spread spectrum methods with examples.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
OPTICAL NETWORKS
(Wireless and Mobile Communications)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Draw the functional block diagram of SONET/SDH system and explain it in detail.	6M
	b)	Explain briefly the storage area networks.	6M
2.	a)	Describe OADM. Explain the various OADMs along with their architectures.	6M
	b)	What are the key functions provided by OXC in a large network?	6M
3.	a)	Discuss the cost tradeoffs in the design of a WDM networks design.	6M
	b)	Distinguish between statistical dimensioning models and maximum load dimensioning models.	6M
4.	a)	What are the fault and configuration management services offered by Layers with in optical layer.	6M
	b)	For a WDM link, discuss the requirements of transmitters, receivers and amplifiers.	6M
5.	a)	What are the protection schemes available for optical layer?	6M
	b)	Explain the protection mechanism available in SONET / SDH links and rings.	6M
6.	a)	Explain the elements of optical access network architecture.	6M
	b)	Give the differences between enhanced HFC and FTTC approach in a network.	6M
7.	a)	Explain the synchronization and buffering in OTDM systems.	6M
	b)	Differentiate Broadcast OTDM networks with Switch-based OTDM networks.	6M
8.	a)	Briefly explain the deployment approaches in the interexchange networks, undersea networks, local exchange networks and enterprise links.	6M
	b)	Explain in detail the working principle of WDM along with a neat sketch.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
COMPUTER NETWORKS
(Computer Science and Engineering)

Date: 07 July, 2014   **Time: 3 hours**   **Max Marks: 60**

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

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1. a) List the responsibilities of different layers in TCP/IP model.   7M
    b) Consider an application which transmits data at a steady rate (e.g., the sender   5M
        generates a N bit unit of data every k time units, where k is small and fixed). Also, when
        such an application starts, it will stay on for relatively long period of time. Answer the
        following questions, briefly justifying your answer:
        i.   Would a packet-switched network or a circuit-switched network be more
             appropriate for this application? Why?
        ii. Suppose that a packet-switching network is used and the only traffic in this
             network comes from such applications as described above. Furthermore, assume
             that the sum of the application data rates is less that the capacities of each and
             every link. Is some form of congestion control needed? Why?

2. a) Draw neatly router structure and list the responsibilities of router in network layer.   6M
    b) A string of 110011101 arrives at the line coder of a modem. Give the output form if the   6M
        line coder is designed by:
        i.   Natural NRZ
        ii. Polar NRZ
        iii. Manchester NRZ

3. a) Consider the following network.   6M
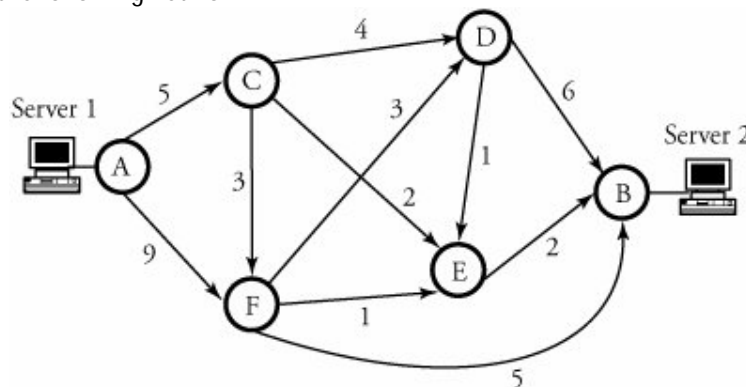

Fig.1

Find the least-cost path between the two servers, using the Bellman-Ford algorithm.
Show an iteration graph as the least-cost path is developed.

    b) Explain briefly the significance of intra-domain routing protocols   6M

4. a) Describe the connection set-up phase of TCP with a neat diagram. 6M

   b) Assume that a TCP connection is established. Find the number of round-trip times the connection takes before it can transmit n segments, using Slow-start congestion control. 6M

5. a) Assume a web page consists of a base HTML file and 10 JPEG images, and that all 11 of these objects reside on the same server. Suppose the URL for the base HTML file is: www.someSchool.edu/someDepartment/home.index.
   List the steps for transferring a Web page from server to client for the case of non-persistent connections. 8M

   b) Internet TCP sockets treat the data being sent as a byte stream but UDP sockets recognize message boundaries. List one advantage and one disadvantage of byte-oriented API versus having the API explicitly recognize and preserve application-defined message boundaries? 4M

6. a) Explain briefly Spread-Spectrum LANs and Narrowband RF LANs. 6M

   b) If cells split to smaller cells in high-traffic areas, the capacity of the cellular networks for that region increases. What would be the trade-off when the capacity of the system in a region increases as a result of cell splitting? 6M

7. a) Depending on the type of a switch fabric used in the structure of an optical router, we can further classify optical routers into two main groups – Comment. 4M

   b) Consider a crossbar switching network similar to size 8 x 8. Suppose that the crosstalk suppression of each 2 x 2 switch element is 40 dB. Draw the crossbar switch with above information. 8M

8. a) Consider an overlay network that consists of five connected nodes. Compare two methods for a peer-to-peer connection on top of the Internet using a star topology. 4M

   b) Describe the Real-Time Transport Protocol Header. 8M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
DATABASE MANAGEMENT SYSTEMS
(Computer Science and Engineering)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	What is the difference between logical data independence and physical data independence? Which one is harder to achieve? Why?	6M
	b)	Discuss user-defined and predicate-defined subclasses, and identify the differences between the two.	6M
2.	a)	Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = { {A, B}$\rightarrow${C}, {A}$\rightarrow${D, E}, {B}$\rightarrow${F}, {F}$\rightarrow${G, H}, {D}$\rightarrow${I, J} }. What is the key for R? Decompose R into 2NF and then 3NF relations.	6M
	b)	Illustrate how the process of creating first normal form relations may lead to multivalued dependencies. How should the first normalization be done properly so that MVDs are avoided?	6M

3. a) Consider the following relational schema:
    Employee(empno, name, office, age)
    Books(isbn, title, authors, publisher)
    Loan(empno, isbn, date)
    Write the following queries in relational algebra:
    i.   Find the names of employees who have borrowed all books published by McGraw-Hill
    ii. Find the names of employees who have borrowed more than five different books published by McGraw-Hill
    iii. For each publisher, find the names of employees who have borrowed more than five books of that publisher   **6M**

    b) Why tuples in a relation are not ordered?
        Why duplicate tuples are not allowed in a relation?   **6M**

4.	a)	Give declaration, defnition and invocation of a PL/SQL function that computes and returns the maximum of two values.	6M
	b)	Explain briefly advantages of a procedure or function in PL/SQL.	6M
5.	a)	What are the highlights of the popular RAID levels 0, 1, and 5?	4M
	b)	What are the differences among primary, secondary, and clustering indexes? How do these differences affect the ways in which these indexes are implemented? Which of the indexes are dense, and which are not?	8M
6.	a)	Discuss the timestamp ordering protocol for concurrency control. How does strict timestamp ordering differ from basic timestamp ordering?	6M
	b)	What implications would a no-steal/force buffer management policy have on checkpoint and recovery?	6M
7.	a)	Bring out the significance of distributed databases.	6M
	b)	List the correctness rules of data fragmentation.	6M
8.		Explain briefly some of the emerging database technologies and applications.	12M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
OBJECT ORIENTED ANALYSIS AND DESIGN
(Computer Science and Engineering)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Bring out the significance of encapsulation? Is the concept of encapsulation and abstraction same? If yes, How? If no, Why?   6M
    b) Explain the concept of active class and note in UML.   6M

2. a) Illustrate the concept of state chart diagram.   4M
    b) The Online Shopping Cart system facilitates the Customer to view the Items Products, enquire about the item details. The major functionality of system is to allow the user to book and cancel the product. Design a class diagram for the same.   8M

3. The Airlines Reservation system facilitates the user to view the flight schedules, enquire about the flight details, availability of seats and many more. The major functionality of system is to allow the user to book and cancel the flights as per user requirements. It also provides the administrator or manager to modify existing flights or to introduce new flights in the schedule. Major features provided by the system are: 12M
    i.   Flight Enquiry: The system allows the user or member to perform flight inquiry including flight scheduling, seats availability status, fare details, etc.
    ii. User Registration: It allows the user to register in order to be a member of the organization. User is then granted a privilege to book or cancels flights.
    iii. Flight Reservation: The system allows the member to book the flights as per his/her requirements. The member is prompt to enter the passenger details and credit card details. The member then receives the unique PNR No. and E-ticket.
    iv. Flight Cancellation: The functionality is used by the member to cancel an existing reservation made by the member earlier.
    v.   Administration: The administration module of the system allows the admin/manager to manage the flight scheduling. It provides the admin /manger to modify or change the existing flights or to introduce a new flight's. Apart from scheduling it also allow the admin/manager to generate report of daily or weekly transactions based on requirements.
    vi. Design sequence and collaboration diagrams for member login and flight administration

4. a) Financial institutions are always looking for innovative ways to market their products. A recent industry trend, for example, is to use the ATM as an advertising platform. Therefore, let's imagine that Maruti Auto Ltd. want to use the ATM system to entice customers with a great new auto loan rate offer. They wish to tailor the advertised rate, though, to each customer according to the individual's credit rating. The better the credit score, the better the rate. Since we are using our imaginations, let us assume for simplicity's sake that customer's credit scores are easily accessed by proposed system. The ATM will now offer auto loan rates to its bank customers, in accordance with their credit-worthiness, while they are waiting for the Withdraw Cash transaction to process. Draw a suitable activity diagram for the same.   8M
    b) Identify any four parts of a state with one line description for each.   4M

5. a) The Library Management System that is to be developed provides the members of the Library and employees of the library with books information, online blocking of books and many other facilities. The Library Management System is supposed to have the following features.   **8M**

    i. The product provides the members with online blocking of books capabilities and the library Management System is up and running all day

    ii. The system provides logon facility to the users.

    iii. The system provides the members with the option to check their account and/or change their options like password of the account whenever needed all through the day during the library hours

    iv. Design component and deployment diagram for this system

  b) Consider the following delpoyment diagram representing online shopping system.   **4M**
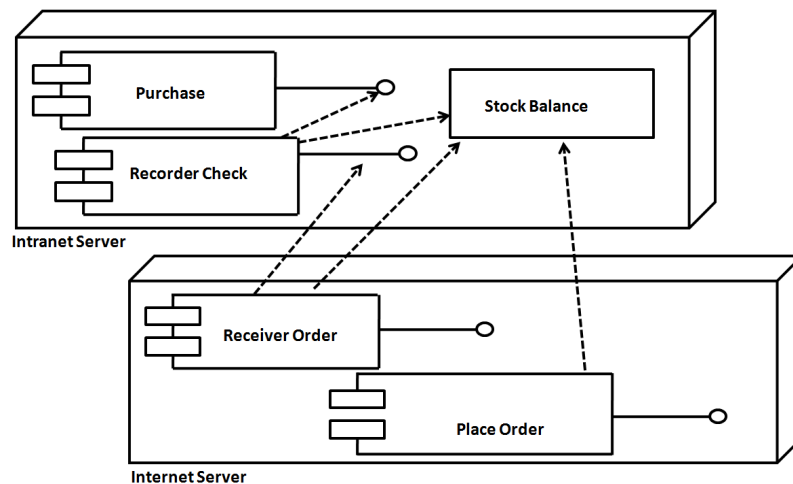
Draw a component diagram for the same.

6. a) Describe the realtionship between usecase and architecture.   **6M**

  b) Illutrate the importance of People, Project, Product and Process.   **6M**

7. a) Explain briefly the aim, tasks and deliverables of elaboration phase of unified process.   **8M**

  b) Explain any two riks categories in inception phase of unified process.   **4M**

8. Describe the activities in transtition phase of unified process.   **12M**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
OPERATING SYSTEMS
(Computer Science and Engineering)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Explain briefly process creation and termination.	6M
	b)	Differentiate between user level threads and kernel level threads.	6M

2. a) A CPU-scheduling algorithm determines an order for the execution of its scheduled processes. Given n processes to be scheduled on one processor, how many different schedules are possible? Give a formula in terms of n. 4M

   b) Explain briefly thread scheduling with an example. 8M

3. a) Consider a computer system that runs 5,000 jobs per month with no deadlock-prevention or deadlock-avoidance scheme. Deadlocks occur about twice per month and the operator must terminate and return about 10 jobs per deadlock. Each job is worth about $2 (in CPU time) and the jobs terminated tend to be about half-done when they are aborted. A systems programmer has estimated that a deadlock-avoidance algorithm (like the banker's algorithm) could be installed in the system with an increase in the average execution time per job of about 10 percent. Since the machine currently has 30-percent idle time, all 5,000 jobs per month could still be run, although turnaround time would increase by about 20 percent on average: 6M
   i.   What are the arguments for installing the deadlock-avoidance algorithm?
   ii.   What are the arguments against installing the deadlock-avoidance algorithm?

   b) Explain briefly how the system can be recovered from deadlock. 6M

4. a) Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames: 4M
   i.   How many bits are there in the logical address?
   ii.   How many bits are there in the physical address?

   b) Consider the page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 8M
   Apply FIFO replacement algorithm if the number of frames are two and seven. Calculate the number of page faults.

5. a) Consider a system that supports 5000 users. Suppose that you want to allow 4990 of these users to be able to access one file. How would you specify this protection scheme in UNIX? **4M**

   b) Consider a file currently consisting of 100 blocks. Assume that the file control block (and the index block, in the case of indexed allocation) is already in memory. Calculate how many disk I/O operations are required for contiguous, linked, and indexed (single-level) allocation strategies, if, for one block, the following conditions hold. In the contiguous-allocation case, assume that there is no room to grow in the beginning, but there is room to grow in the end. Assume that the block information to be added is stored in memory: **8M**

      i.   The block is added at the beginning
      ii.   The block is added in the middle.
      iii. The block is removed from the beginning
      iv.   The block is removed from the end.

6. a) List any three advantages and disadvatnages of distributed operating systems. **6M**

   b) An ATM system is transmitting cells at OC-3 rate. Each packet is 48 bytes long and thus fits into a cell. An interrupt takes 1μsec. What fraction of the CPU is devoted to interrupt handling? Next repeat this problem for 1024-byte packets. **6M**

7. a) Compare the centeralized, distributed and token ring based mutual exclusion algorithms for distributed systems. **6M**

   b) Explain briefly the bully algorithm. **6M**

8. Descibe the concept of distributed deadlock prevention. **12M**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
CLOUD COMPUTING
(Common to Computer Science and Engineering & Software Engineering)

Date: 16 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Discuss the advantages and disadvantages of fullvirtualization and paravirtualization.	6M
	b)	List and explain different services provided by Amazon.	6M
2.	a)	Bring out any four security benefits of data in cloud.	8M
	b)	AppExchange is a directory of Applications built for salesforce.com by third party developers. Give a summary of the same.	4M
3.	a)	Explain briefly the features included in Salesforce for GoogleApps.	6M
	b)	Assume that a company wishes to move to cloud. List some of best business practices that the company should adopt.	6M
4.	a)	The bandwidth and connection are two important factors in cloud – commenet	8M
	b)	What are the web service standards that makes API's work?	4M
5.	a)	What is Live Mesh. List the components of Live Mesh.	6M
	b)	List any two usage of Javascripts. Write a javascript to print the message "Welcome to First Java Script Program".	6M
6.	a)	QuickBooks Online gives samll buisness owners the ability to access their finanacial data on demand. Identify any three features offered by QuickBooks Online.	8M
	b)	List any two pros and cons of Software plus Services.	4M
7.	a)	Explain briefly layer zero, layer one and layer two of Azure.	6M
	b)	Virtual infrastructure capabilities help deliver increased infrastructure availablity and resilence – comment.	6M
8.	a)	Bring out the capabilities provided by Skytap to its customers.	6M
	b)	Describe the perfromance of Hyperic HQ.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
DATA WAREHOUSING AND DATA MINING
(Common to Computer Science and Engineering & Software Engineering)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) What Motivated Data Mining? Why is it important?   6M
   b) Discuss the major issues in data mining.   6M

2. a) Discuss the different forms of data preprocessing.   6M
   b) Discuss whether or not each of the following activities is a data mining task.   6M
      Computing the total sales of a company
      Dividing the customers of a company according to their profitability

3. a) Illustrate with the key features, how a data warehouse differs from other data repository   6M
      systems, such as relational database systems, transaction-processing systems and file
      systems.
   b) Describe briefly the architecture of a data warehouse.   6M

4. a) A database has 5 transactions. Let min sup=40%   6M

TID	Items list
T100	I1, I2, I3, I4
T200	I1, I2, I4
T300	I1, I5, I6
T400	I1, I4, I5
T500	I2, I4, I5

   Generate the frequent item sets using Apriori algorithms for the above data set (Assume
   necessary data).

   b) A database has five transactions. Let min sup= 60% and min conf=80%.   6M

TID	Items_bought
T100	{M, O, N, K, E, Y}
T200	{D, O, N, K, E, Y}
T300	{M, A, K, E}
T400	{M, U, C, K, Y}
T500	{C, O, O, K, I, E}

   Find all frequent item sets using Apriori and FP-growth respectively. Compare the
   efficiency of the two mining processes.

5. a) Explain the 'k' Nearest Neighbor classifier. Compare the advantages and disadvantages   6M
      of eager classification versus lazy classification.
   b) What is boosting? State why it may improve the accuracy of decision tree induction.   6M

6. a) Why it is that BIRCH encounters difficulties in finding clusters of arbitrary shape but OPTICS does not? Can you propose some modifications of BIRCH to help it find clusters of arbitrary shape?   6M

    b) Why is outlier mining important?   Briefly describe the different approaches behind statistical-based outlier detection, distanced-based outlier detection and deviation-based outlier detection.   6M

7. a) Describe the differences between biological sequential patterns and transactional sequential pattern.   6M

    b) Tremendous and potentially infinite volumes of data streams are often generated by real-time surveillance systems, communication networks and other dynamic environments. Elaborate different types of mining data streams with an example.   6M

8. Explain the following in detail: 12M
    i.   Special data mining
    ii.   Multimedia data mining
    iii.   Mining the World wide web

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
POWER ELECTRONIC CONVERTERS-II
(Power Electronics and Electric Drives)

Date: 07 July, 2014   Time: 3 hours   Max Marks: 60

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

1. With suitable diagram, describe the structure of the following power semiconductor devices: 12M
    i.   MOS turn-off thyristor (MTO)
    ii. Integrated gate commutated thyristor (IGCT)
    iii.

2. a) What is the disadvantage of resonant inverters with unidirectional switches over resonant inverters with bidirectional switches?   2M
    b) With suitable diagrams explain the operation of series resonant inverters with bidirectional switches, in half-bridge configuration and full-bridge configuration.   10M

3. Explain the different modes of operation of a Class-E resonant inverter with suitable diagrams.   12M

4. Draw the circuit diagram of two-quadrant Zero Voltage Switching (ZVS) converter and discuss the operation of the converter in various operating modes.   12M

5. a) Explain the concept behind the operation of multilevel inverters using a generic topology. Also sketch the typical waveform of a five level multilevel inverter.   8M
    b) List the major advantages and disadvantages of diode-clamped multilevel inverter.   4M

6. a) Suggest a multilevel inverter topology for reactive power compensation in a power system and briefly discuss about the operation.   8M
    b) Mention the key features of multilevel inverters.   4M

7. a) Sketch the circuit diagram, voltage and current waveforms of a full-bridge converter in a dc power supply. Also explain the operation of the converter.   8M
    b) Compare flyback converter and forward converter.   4M

8. a) With neat block diagram, explain the operation of on-line UPS and off-line UPS.   8M
    b) Draw the control circuit diagram of a PWM controlled forward converter.   4M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
POWER ELECTRONIC CONTROL OF AC DRIVES
(Power Electronics and Electric Drives)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

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1. a) Draw the speed torque characteristics of an induction motor. Mark the different operating regions and write short notes on these operating regions.   6M
   b) Explain the variable frequency operation of an induction motor. Also draw the speed-torque characteristics during variable frequency operation.   6M

2. a) Explain the operation of current-controlled voltage-fed inverter drive.   6M
   b) Discuss how the disadvantages of open-loop volts/Hz control are overcome in closed loop speed control by slip regulation.   6M

3. Explain how induction motor slip power is controlled in sub-synchronous speed range through Static Kramer's drive. Also explain the performance of the drive system using a fundamental frequency phasor diagram.   12M

4. a) Elaborately discuss the operation of PWM voltage fed inverter drive when controlled using direct vector control technique.   10M
   b) What is the main difference between direct and indirect vector control method.   2M

5. Write short notes the theoretical aspects of the following PMSM drive system control strategies: 12M
   i.   Constant mutual air gap flux-linkages control
   ii.   Zero-direct-axis-current control

6. a) How can the demagnetizing component of PMSM stator current be found using direct-flux-weakening algorithm? Explain elaborately.   10M
   b) What is the main advantage of indirect flux weakening technique?   2M

7. a) Write short notes on current controlled variable reluctance servo drive.   6M
   b) Explain how torque is produced in a Variable Reluctance motor.   6M

8. Explain the principles of operation of a three phase brushless DC motor. Also discuss about the converter circuit which can be used to control the brushless motor.   12M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
FLEXIBLE AC TRANSMISSION SYSTEMS
(Power Electronics and Electric Drives)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Bring out the necessity of interconnections in Electrical power transmission. Show how FACTS devices can control the power flow in a meshed system.	6M
	b)	What are the different types of FACTS controllers? Briefly explain each one of them?	6M
2.	a)	With a neat circuit diagram and necessary waveforms explain the operation of single phase full wave bridge voltage source converters.	6M
	b)	With a neat sketch explain different means to obtain 24 pulse voltage source converter using two 12 pulse converters.	6M
3.	a)	With a neat circuit diagram and necessary waveforms explain the operation of a three level voltage source converters.	6M
	b)	Compare current source converter with voltage source converter.	6M
4.	a)	Show that midpoint shunt compensation can significantly increase the transmittable power.	6M
	b)	Explain the effect of shunt compensation on transient stability.	6M
5.	a)	With a neat circuit diagram and waveforms explain the operation of a basic Thyristor-Switched Capacitor. Also write the expression for branch current and amplitude of capacitor voltage.	6M
	b)	What are hybrid VAR generators? What are their standard configurations?	6M
6.	a)	Draw the VI characteristics of SVC and STATCOM and compare.	6M
	b)	With suitable block diagram show how the transient stability enhancement concept can be implemented by summing signal δ V to the fixed reference voltage V_{ref} .	6M
7.	a)	Discuss in brief about the transient stability enhancement in STATCOM.	6M
	b)	With a neat block diagram, explain the control scheme used successfully to dampen sub-synchronous oscillations encountered with transmission lines employing series capacitive compensation.	6M
8.	a)	Briefly discuss about the TCSC scheme for static series compensator technique.	6M
	b)	With a neat block diagram and waveforms explain the functional internal control scheme for the GCSC.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
MODERN CONTROL ENGINEERING
(Power Electronics and Electric Drives)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

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1. a) Find the eigen values and eigen vectors for the following matrix.   6M
$$\begin{bmatrix} 4 & 1 & -2 \\ 1 & 0 & 2 \\ 1 & -1 & 3 \end{bmatrix}$$

    b) What are the advantages and disadvantages of state space analysis?   6M

2. a) State and explain sampling theorem with an example.   6M
    b) Obtain the Z transform of the following.   6M
$$X(s) = \frac{S}{(S-1)^2 (S+2)}$$

3. a) The state diagram of a linear system is as shown in Fig 1. Assign the state variables and   6M
        write the dynamic equations of the system.
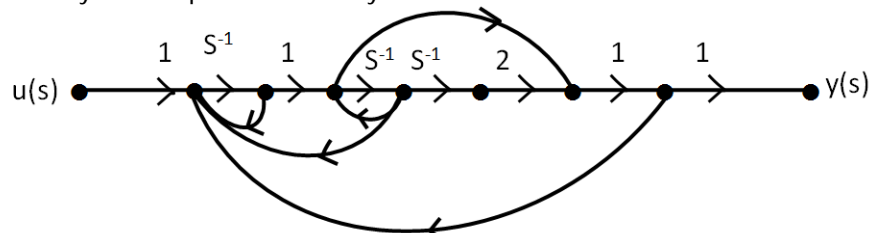
Fig.1

    b) Consider a system with a single input u(t) and a single output y(t) and two state   6M
        variables x1 and x2 described as,

$$\dot{x}_1(t) = a_{11}x_1(t) + a_{12}x_2(t) + b_1 u(t); x_1(0) = x_1^0$$

$$\dot{x}_2(t) = a_{21}x_1(t) + a_{22}x_2(t) + b_2 u(t); x_2(0) = x_2^0$$

$$y(t) = C_1 x_1(t) + C_2 x_2(t)$$

        Obtain the state diagram in block diagram form and signal flow graph form.

4. a) Find the state transition matrix of the following homogeneous equation.   6M

$$\dot{x}(t) = \begin{bmatrix} t & 1 \\ 1 & t \end{bmatrix} x(t)$$

    b) Explain the properties of state transition matrix.   6M

5. a) Explain with an example the concept of observability in continuous time invariant systems. — 6M

   b) Examine the controllability and observability of the following system. — 6M

   $$x(K+1) = \begin{bmatrix} 1 & K \\ 0 & -1 \end{bmatrix} x(K) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(K)$$

   $$y(k) = \begin{bmatrix} 1 & 1 \end{bmatrix} x(K)$$

6. a) State and prove Lyapunov's instability theorem. — 6M

   b) Check the stability of the system described by: — 6M

   $$\dot{x}_1 = x_2$$

   $$\dot{x}_2 = -x_1 - x_1^2 x_2$$

7. a) Explain Stability analysis using bilinear transformation. — 6M

   b) The control system has the following characteristics equation. — 6M

   $P(z) = z^4 + 1.3z^3 + 0.07z^2 - 0.08z - 0.08 = 0$ Determine the stability of the system using jurys stability test.

8. a) A single – input system is described by the following state equations. — 6M

   $$\dot{x} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 0 & 1 & -3 \end{bmatrix} x + \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix} u$$ Design a state feedback controller which will give

   closed – loop poles at $-1 \pm j2, -6$.

   b) Explain how to design digital control through dead beat response method? — 6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech II Semester Regular Examinations July - 2014

(Regulations: VCE-R11)

RELIABILITY ENGINEERING

(Power Electronics and Electric Drives)

Date: 16 July, 2014   **Time: 3 hours**   **Max Marks: 60**

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

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1. a) Define Reliability and discuss about the discrete random variables and continuous   6M
        random variables.

    b) In a certain manufacturing process, one percent of the products are known to be   6M
        defective. If 50 items are purchased by a customer, what is the probability of getting
        two or less number of defectives? Use Poisson distribution to solve the problem.

2. a) A circuit consists of five modules having constant failure rates of   6M
        $\lambda 1 = 0.025$f/yr
        $\lambda 2 = 0.038$f/yr
        $\lambda 3 = 0.0008$f/yr
        $\lambda 4 = 0.004$f/yr
        $\lambda 5 = 0.018$f/yr
        Determine the reliability function for the circuit.

    b) Derive the relationship between the reliability functions R(t), F(t), f(t), h(t).   6M

3. a) Find the system reliability for the configuration shown in Fig.1, if R=0.9   6M
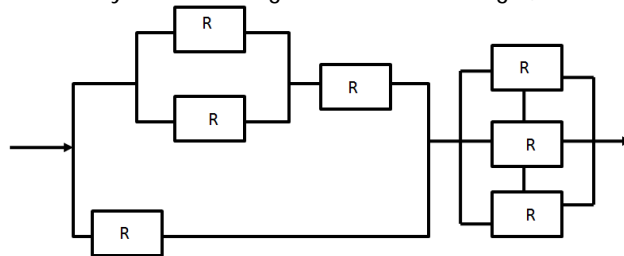

Fig.1

    b) What are the various causes of failures? Briefly explain any two of them.   6M

4. a) For the Fig.2 shown, derive an expression for the system reliability in terms of   6M
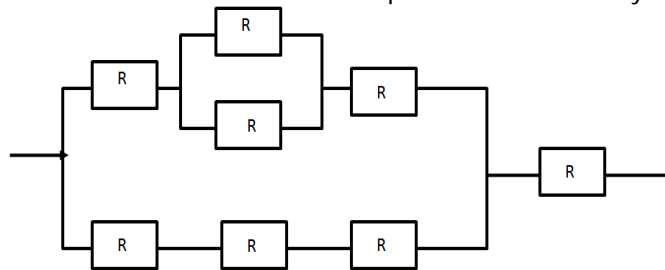   component reliabilities. Assume that each component has a reliability R.

Fig.2

    b) Ten identical components are connected in parallel to achieve the system reliability of   6M
        0.9. Determine the additional number of components to be added in parallel to
   increase the reliability to 0.98.

5. a) Define tie sets and cut sets. Write all possible tie sets and cut sets for the system shown in figure 3. 6M

    b) Calculate the reliability of the bridge network using minimal tie set method shown in Fig 3, if each component reliability is 0.8. 6M
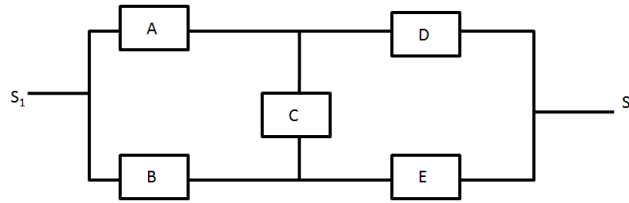
Fig.3

6. a) Describe discrete Markov chains. Derive stochastic transitional probability matrix 6M

    b) Explain two-state Markov process. (Single component with repair) and derive the equations for steady state probabilities. 6M

7. a) For the following state space diagram shown in figure.4 write the transition matrix 'T' and derive the steady state probabilities and state frequencies 4M
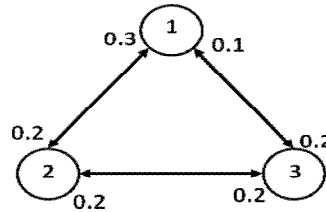
Fig.4

    b) Define mean cycle time and how it can be calculated for one and two component repairable model. 8M

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

    b) Three identical units each with a reliability of 0.9 for 1000h are operating in parallel. What is the system reliability for 1000h if only one of the units is required for the system to be successful. If you add another unit with identical reliability characteristics what will be the increase in system reliability and mean life. 6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
PROGRAMMABLE LOGIC CONTROLLERS AND APPLICATIONS
(Power Electronics and Electric Drives)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Explain the difference between legal (proper) and illegal (improper) PLC Ladder Programming Layouts?	6M
	b)	Write the formats required to draw the switching circuit in a ladder diagram format.	6M
2.	a)	Explain operational procedures used in PLC programming with an example.	6M
	b)	With a neat block diagram, explain the concept of PLC operating system.	6M
3.	a)	Illustrate the difference between: i. RAM and ROM ii. EEPROM and EPROM	6M
	b)	Perform the following conversions: i. $(956)_{10} = (?)_2 = (?)_8 = (?)_{16}$ ii. $(110110111)_2 = (?)_{10} = (?)_8 = (?)_{16}$	6M
4.	a)	Show how a PLC may be interfaced to a Variable-speed motor drive.	6M
	b)	List the five major types of registers. Use a block diagram to show where each type fits into the PLC scheme of operation.	6M
5.	a)	Explain Counter functions of PLC and their industrial applications in detail.	6M
	b)	Setup a PLC program to obtain an output, P, in register OR0055. The output is to give a value based on two inputs M and N. P equals the square of M plus the square root of N.	6M
6.	a)	Explain the operation of following data handling functions with an example: i. SKIP ii. FIFO iii. SWEEP	6M
	b)	Illustrate a process requiring a Jump with return instruction and draw the necessary ladder diagram.	6M
7.	a)	Explain sequence functions and their applications in detail.	6M
	b)	How do you change the status of bit patterns of a register? Explain.	6M
8.	a)	With an example explain analog output applications.	3M
	b)	Write a short note on the following: i. Analog signal processing ii. PID modules iii. PID control	9M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech II Semester Regular Examinations July - 2014

(Regulations: VCE-R11)

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Embedded Systems)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

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1. a) Write the steps followed to design a digital system using FPGAs.   6M
    b) Draw the logic diagram of half adder. Name each logic gates. Design full adder using 2   6M
       half adders and a logic gate. Draw the component hierarchy.

2. a) Explain two technologies used to build FPGAs that are configured only once with the   6M
       help of necessary diagrams.
    b) Explain SRAM based FPGA. Also explain its programming techniques.   6M

3. a) What are the features of I/O pins on a chip?   3M
    b) Write a synthesizable HDL code for 3 to 8 decoder in the behavioral style and structural   6M
       style.
    c) Compare between lookup tables and static gates.   3M

4. Build a SM chart for the control logic to multiple 2 unsigned binary numbers. Also draw the   12M
    block diagram of the control logic and the datapath of the system.

5. a) Write a short note on logic synthesis of FPGA.   6M
    b) Draw the diagram of traditional FPGA architecture consisting of a two dimensional array   6M
       of logic blocks. Further decompose these logic blocks into a hierarchical collection of
       different logic elements such as LUT's, Filpflops and Multiplexers.

6. a) Develop one hot state diagram for a sequence checker, which is '1' whenever the   8M
       sequence is '1001'. Also specify the transition table.
    b) Mention 2 different FSM models. Write the difference between the same.   4M

7. a) Draw a basic PAL circuit having four inputs, eight product terms and one active- LOW   6M
       combinational output. Draw fuses on your diagram showing how to make the following
       Boolean expression.
       $$F^I = A^I BC^I + B^I CD + A^I CD + AC^I D$$
    b) Describe PLDs with respect to features, programming and applications.   6M

8. a) With a neat diagram, explain ALTERA's FLEX 8000 in detail.   6M
    b) Compare Xilinx XC4000 and ALTERA's FLEX logic 8000.   6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
LOW POWER CMOS VLSI DESIGN
(Digital Electronics and Communications Systems)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Briefly outline the needs for low power VLSI chips.	4M
	b)	With usual notations derive an expression for short circuit power dissipation.	8M
2.	a)	Calculate the static probability for a function $y = ab + cd$, given $P(a) = 0.2$, $P(b) = 0.1$, $P(c) = 0.3$, $P(d) = 0.2$. Use Shannon's decomposition theorem.	6M
	b)	Briefly explain the estimation of switching activity in combinational logic.	6M
3.	a)	Briefly explain the estimation of average power in combinational circuits.	7M
	b)	Explain the power dissipation in a domino CMOS AND gate.	5M
4.	a)	Discuss the effects of voltage reduction on parallel and pipeline architectures.	8M
	b)	Discuss the power optimization using operation substitution method.	4M
5.	a)	What are the important factors used in a circuit-level optimization algorithms?	4M
	b)	Explain the transistor reordering and characterization of gates in library with respect to CMOS gates.	8M
6.	a)	With a neat block diagram, explain the organization of a static RAM.	8M
	b)	Discuss the power consumption in a 4-Transistor SRAM cell.	4M
7.	a)	Explain how to reduce the power dissipation in WRITE driver circuits.	8M
	b)	With a neat circuit diagram, explain the operation of a differential charge amplifier.	4M

8.   Explain the following: 12M
      i.   Power optimization
      ii.   Reversible logic
      iii. Voltage Island

Question Paper Code : B1412

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ALGORITHMS FOR VLSI DESIGN AUTOMATION
(Digital Electronics and Communication Systems)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	List out various design styles. Explain standard cell design style in detail.	6M
	b)	Briefly explain the typical VLSI design cycle with a flow chart.	6M
2.	a)	With a pseudo code, explain the Shortest-Path algorithm.	6M
	b)	With an example, explain the Line-Sweep method used in physical design.	6M
3.	a)	Define partitioning. Explain the different objectives and constraint parameters concerned to partitioning problem.	6M
	b)	With the pseudo code, explain the Simulated Annealing algorithm for partitioning of digital circuits.	6M
4.	a)	How are floorplanning algorithms classified? Explain the constraint based floorplanning in detail.	6M
	b)	Discuss various general pin assignment techniques.	6M
5.	a)	Explain the Cluster growth placement algorithm.	6M
	b)	With the pseudo code, explain Simulated- Evolution algorithm for placement.	6M
6.	a)	Write the pseudo code for Hadlock-Router algorithm and explain the operation for the same.	6M
	b)	Briefly explain the Line-Probe-Router algorithm.	6M
7.	a)	What are the parameters dictated by the design rules and the routing strategy on detailed routing algorithm?	6M
	b)	With an example briefly explain the general river routing problem.	6M
8.	a)	With an example, explain how the dogleg router is used to reduce channel density.	6M
	b)	Explain the Greedy-Channel-Router two-layer channel routing algorithm.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)

NETWORK SECURITY AND CRYPTOGRAPHY
(Common to Digital Electronics and Communications & Wireless Mobile Communications)

Date: 16 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	What are the key principles of security? Explain in detail.	6M
	b)	Explain the Following Encryption Techniques:	6M
		i. Hill Cipher	
		ii. Ceaser Cipher	
2.	a)	What are the design parameters of Feistal cipher network?	6M
	b)	Explain in detail about AES design criteria.	6M
3.	a)	Describe a Brute Force attack on a digitally signed message. Discuss the complexity of the brute force attack. How can the complexity of the attack be increased without changing the size of the key?	6M
	b)	Assume that a client C wants to communicate with a server S using Kerberos protocol. How can it be achieved?	6M
4.	a)	With a neat diagram explain the process of transmission and reception of PGP messages.	6M
	b)	Explain the different authentication procedures in X.509 certificate.	6M
5.	a)	With a neat diagram explain the IPSec Authentication Header in detail.	6M
	b)	Compare and contrast the OKALEY and ISAKMP protocols in detail.	6M
6.	a)	What is Secured Electronic Transaction? Discuss the requirements and key features of SET.	6M
	b)	Explain the different alert codes of TLS protocols.	6M
7.	a)	Explain in detail the different types of Intrusion Detection Techniques.	6M
	b)	How does a signature-based IDS differ from a behavior based IDS?	6M
8.	a)	Explain the difference between Virus, Worm and Trojan Horse.	6M
	b)	Explain the design principles of Firewalls.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
DESIGN FOR TESTABILITY
(Digital Electronics and Communications Systems)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Explain the construction of state tables and flow tables for synchronous and asynchronous sequential circuit taking few examples.   6M
    b) Draw the Bipartite graph model for the circuit shown in Fig.1. Also construct *ELEMENT TABLE, SIGNAL TABLE, FANIN TABLE* and *FANOUT TABLE* for the same circuit.   6M
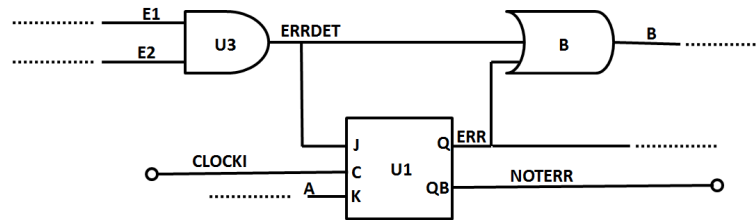
Fig.1

2. a) Explain Transport Delays and Inertial Delays in detail.   6M
    b) Explain how to construct Zoom Tables and given a few advantage of zoom tables. Outline typical Gate evaluation routine for 3-valued logic based on scanning the input values and based on input counting method.   6M

3. a) For the circuit shown in Fig.2   6M
    i.   Find the set of all tests that detect the fault a s - a – 0
    ii. Find the set of all tests that detect the fault b s - a – 0
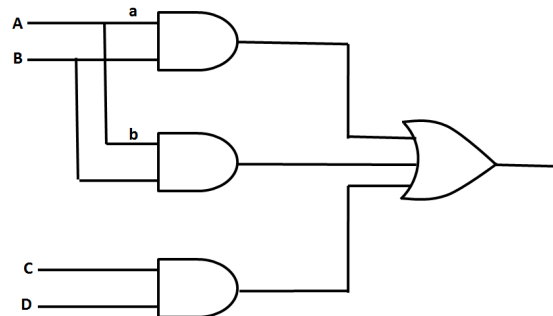   iii. Find the set of all tests that detect the multiple fault { a s-a-0, b s-a-0}

Fig.2

    b) Explain briefly the following terms: 6M
    i.   Sensitization
    ii. Detectability
    iii. Redundancy

4. a) Explain concept of ATG in combinational circuit using Fanout-Free circuit.   6M
    b) Explain Vector simulation, vector compaction and compression in detail.   6M

5. a) Explain generic boundary scan and fully integrated scan with neat diagrams. 6M
    b) With neat diagrams, explain Board-Level and System level DFT Approaches. 6M

6. a) Explain Ones- Count compression technique in detail. 6M
    b) Explain how LFSR is used in signature analysis compression technique. 6M

7. a) How a built-in-self test is classified? Give some examples. 6M
    b) Explain BIST designs with BILBO register. And also explain Bus-oriented and Pipeline-oriented BILBO architecture. 6M

8. a) With neat diagrams explain different types of memory and Key Issues in Memory Integration. 6M
    b) Explain the following: 6M
       i.   JTAG testing features
       ii. Memory chip test algorithms

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
HARDWARE SOFTWARE CO-DESIGN
(Embedded Systems)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) With an example, explain the pipelined and control-driven concurrency.   6M
    b) Discuss a Generic Co-Design methodology.   6M

2. a) With reference to hardware/software partitioning algorithm, explain the Vulcan system in detail.   6M
    b) Briefly explain an integer linear programming co-synthesis method for distributed computing systems.   6M

3. a) Explain about Zycad Paradigm RP and XP prototyping systems.   6M
    b) Briefly explain the Component architecture specialization techniques.   6M

4. a) Explain the architecture of TMS320C80 MVP.   6M
    b) Discuss in detail the architecture for Control-Dominated systems.   6M

5. a) What are the major problems encountered when adapting the traditional compilation model to Embedded Processors.   6M
    b) Explain the architecture and algorithm exploration with respect to practical considerations in a compiler development environment.   6M

6. a) Explain the Shared State Versus Messages dimensions in detail for co-ordination paradigms.   6M
    b) Explain the following three orthogonal dimensions for classifying coordination mechanisms   6M
        i.   Open versus closed operations
        ii. Blocking versus non blocking

7. a) Explain the homogeneous and heterogeneous system-level specifications.   6M
    b) Explain the Language Oriented Intermediate Forms used in co-design.   6M

8. a) Explain Validation through composition and co-simulation.   6M
    b) Explain how the following issues are solved in C-VHDL co-synthesis.   6M
        i.   Communication between VHDL and C modules
        ii. Coherence between results of co-simulation and co-synthesis

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
SOFTWARE QUALITY ASSURANCE AND TESTING
(Software Engineering)

Date: 09 July, 2014   **Time: 3 hours**   **Max Marks: 60**

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

1.	a)	Explain the ethical basis for the software quality.	6M
	b)	Explain principles behind total quality management.	6M
2.	a)	Explain different types of quality standards and practices.	6M
	b)	What is software configuration management? How is it helpful in deploying the product?	6M
3.	a)	Explain process and product metrics in detail.	8M
	b)	List all complexity metrics and models.	4M
4.	a)	Which are the quality assurance activities of top management?	6M
	b)	Which are project management responsibilities of quality assurance?	6M
5.	a)	Explain the roles of process in software quality.	6M
	b)	List the strategic approach for software testing.	6M
6.	a)	Illustrate the relation between defect repository and test design.	8M
	b)	Which are the different classes of defects?	4M
7.	a)	Explain test case design strategies.	6M
	b)	Explain black box testing method with some examples.	6M
8.	a)	Explain how cotsuses white box testing for test design.	6M
	b)	With an example explain the use of control flow graph in test design.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
SERVICE ORIENTED ARCHITECTURE
(Software Engineering)

Date: 11 July, 2014　　　　　　Time: 3 hours　　　　　　Max Marks: 60

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

1.	a)	Contemporary SOA is fundamentally autonomous-Comment.	6M
	b)	Give the comparison among Service Oriented Architecture and Distributed Internet Architecture.	6M
2.	a)	Briefly discuss common set of primitive Message Exchange Patterns	6M
	b)	Bring out the significance of Orchestration relating to other parts of SOA.	6M
3.	a)	Illustrate the Get Metadata request and response messages with a suitable example.	6M
	b)	With the help of basic structure of a policy description, explain different specifications of WS-Policy framework.	6M
4.	a)	Illustrate the relationship among the components of a Service Oriented Architectures.	6M
	b)	What is business service? Explain two business service models.	6M
5.	a)	Explain different types of derived business services.	6M
	b)	An agile strategy process includes different steps, explain how agile strategy process applies to the level of SOA.	6M
6.	a)	Explain basic building blocks of the enterprise business model.	6M
	b)	Illustrate a parent business service layer acting as an orchestration layer.	6M
7.	a)	Briefly discuss different objectives of Service-oriented design.	6M
	b)	Illustrate different steps for composing a preliminary Service Oriented Architecture.	6M
8.	a)	Service interface granularity is a key strategic decision point that deserves a good deal of attention during the service-oriented design phase. Explain the three guidelines for tackling this issue.	6M
	b)	How WS-Security relates to the other WS-* specifications?	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
(Software Engineering)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) What is an architectural pattern? Discuss any two types of architectural patterns.   6M
    b) Briefly discuss about the architectural structures with suitable example.   6M

2. a) Discuss the factors for evaluating architecture.   6M
    b) Explain the roles and responsibilities involved in ATAM evaluation.   6M

3. a) Briefly explain how stakeholders influence the architect.   6M
    b) Illustrate the process of evaluating the product line architecture.   6M

4. a) Which pattern separates user interface from functional core? Explain in detail.   6M
    b) Compare and contrast architectural patterns, design patterns and idioms.   6M

5. a) Briefly discuss a step-by-step approach how to use a design pattern effectively.   6M
    b) Illustrate the relationship between the different types of design patterns with suitable   6M
        diagrams.

6. a) A patient is suffering from Headache for some time and hence forth, he went to a   6M
        hospital where he stated the same to the receptionist. After listening to the problem
        the receptionist confirmed him to consult a general physician, he confirmed that he is
        not a right person to look after this problem and asked him to meet a specialist for a
        proper treatment. How chain of responsibility will fit into this problem?
    b) Briefly discuss applicability of façade structural patterns.   6M

7. a) Discuss the application of visitor class and visitor pattern with a suitable example.   6M
    b) Compare and contrast Mediator, Strategy and Observer design patterns.   6M

8. Discuss the case study of A-7E in utilizing architectural structures.   12M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
SEMANTIC WEB AND SOCIAL NETWORKING
(Software Engineering)

Date: 07 July, 2014 | Time: 3 hours | Max Marks: 60

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

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1. a) Describe your understanding of the phrase "thinking and intelligent web applications". 8M
   b) Explain how HTML limits the manipulation of information? 4M

2. a) What is machine intelligence? Bring out its significance from semantic web view. 6M
   b) What is an intelligent agent? List any two properties of it and key problems associated with it. 6M

3. a) Comment on the following: 8M
      i. The Web Ontology Language is in fact a set of three languages with increasing expressiveness
      ii. OWL Full is a "limitless" OWL DL
   b) What is the most commonly observed similarity between XML and RDF? 4M

4. a) Suggest one tool with a brief description for: 6M
      i. Ontology mapping between local ontologies
      ii. Ontology mapping in ontology merging, alignment, and integration
   b) List the first six steps in an iterative approach for building ontologies. 6M

5. a) Explain the significance of semantic web in the context of e-learning? 8M
   b) What are the two approaches for improving search results through semantic methods? 4M

6. a) Describe the working of XML-based Web Services. 6M
   b) Design an algorithm that forms a web of documents and words connecting all documents to all words. 6M

7. What is a Social network analysis? How is it different from other approaches to social sciences? Explain with suitable examples. 12M

8. a) Write short notes on: 8M
      i. Online community spaces
      ii. Livejournal
   b) Explain average prescision w.r.t Semantic Web? 4M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
COMPUTER ARCHITECTURE AND PARALLEL PROCESSING
(Embedded Systems)

Date: 07 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	List and discuss the different categories of parallel processing mechanisms developed in Uniprocessor computers.	6M
	b)	Illustrate any two applications for parallel processing.	6M
2.	a)	What is Interleaving? Explain the two methods of Interleaving.	6M
	b)	Explain the different cache placement policies.	6M
3.	a)	Illustrate the design of a pipeline floating-point adder with the help of a neat figure.	8M
	b)	Discuss the two different implementations of internal buffers in a pipeline.	4M
4.	a)	Explain the architecture of a typical vector processor with multiple functional pipes with a neat figure.	6M
	b)	Explain the following four primitive types of vector instructions:	6M

        i. $f_1: V \rightarrow V$
        ii. $f_2: V \rightarrow S$
        iii. $f_3: V \times V \rightarrow V$
        iv. $f_4: V \times S \rightarrow V$

5.	a)	Discuss the two independent arithmetic pipelines in the Star-100.	6M
	b)	Explain the architecture of AP-120B.	6M
6.	a)	Explain the classification of vector instructions in the CRAY-1.	6M
	b)	Explain the architecture and computer system configuration of Cyber-205.	6M
7.	a)	Illustrate the features, functionality and configurations of tightly coupled multiprocessors with an example.	6M
	b)	Discuss any THREE algorithms used for bus arbitration in Multiprocessors.	6M
8.	a)	Explain the three configurations utilized in the design of operating systems for multiprocessors.	6M
	b)	Explain how concurrency is employed for multiple processes using the Conways FORK-JOIN statements.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
EMBEDDED SOFTWARE DESIGN
(Embedded Systems)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	What is an Embedded system? List the components that are present inside the embedded system.	6M
	b)	Discuss different special Pentium Processor registers.	6M
2.	a)	Give schematic representation of the embedded design life cycle and explain different phases involved in it.	6M
	b)	Write a short note on hardware/ software partitioning embedded system.	6M
3.	a)	Differentiate between Microcontrollers based embedded system and Microprocessors based embedded system.	6M
	b)	Explain the issues that are encountered in the selection process.	6M
4.	a)	Explain the Embedded Software Development process with a neat figure.	6M
	b)	What is a watchdog timer? Explain how watchdog timers are implemented with an example.	6M
5.	a)	With the help of neat diagram, explain the functional block diagram of a typical ROM emulator.	6M
	b)	Write a short note on remote debuggers and Debug Kernels.	6M
6.	a)	What is a reconfigurable hardware and write a Conceptual diagram of FPGA.	6M
	b)	Explain in detail the concept of setting the trigger in BDM.	6M
7.	a)	With a neat block diagram, explain the concept of compilation process.	6M
	b)	Explain the process of rebuilding kernels for new configurations.	6M
8.	a)	What is double buffering? Illustrate the process of double buffering technique.	6M
	b)	Explain the scenario of single cycle processor with large external memory with an example.	6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)

EMBEDDED NETWORK AND PROTOCOLS
(Embedded Systems)

Date: 16 July, 2014   **Time: 3 hours**   **Max Marks: 60**

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

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1. a) Explain error messages used for CAN and error management strategy used in CAN Protocol.   6M
    b) With waveforms explain NRZ coding and bit stuffing method adopted in CAN bus.   6M

2. a) Explain CAN bit and topology used for CAN with examples.   6M
    b) How the value of propagation segment is estimated in CAN.   6M

3. a) Explain physical systems used for CAN frame transmission and types of coupling to the network.   6M
    b) Write short notes on isolators and repeaters used in CAN.   6M

4. a) With a neat diagram, explain general architecture and functional division of CAN Components.   6M
    b) Explain the operating principle of TTCAN.   6M

5. a) Explain data link layer used by LIN.   6M
    b) With a neat block diagrams, explain TJA 1020/1021 LIN drivers and UJA 1023 LIN I/O Slave.   6M

6. Explain different ways of designing nodes or modules of electronic systems and networks of motor vehicles or industrial systems.   12M

7. Briefly explain the following: 12M
    i. I^2C Bus
    ii. D2B Protocol
    iii. Physical layer and medium used for MOST Bus

8. a) Explain how Radio – Frequency communication is used for internal applications in vehicles.   6M
    b) Write short notes on Wireless Networks operating at radio frequency.   6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ROBOTICS AND AUTOMATION
(Embedded Systems)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Explain the different types of programming languages used in robots.	6M
	b)	List the different applications of robots and explain any three areas where robots are used in maximum.	6M
2.	a)	Classify robots and explain any two of the classifications.	6M
	b)	Write explanatory notes on Dynamic stabilization of robots.	6M
3.	a)	List the different types of grippers in robots and explain any one of them with a neat sketch.	6M
	b)	Enumerate the various design considerations in robots.	6M
4.		Explain the concept of inverse kinematics in robots and explain any one application in the industry where reverse kinematics is used.	12M
5.		Explain the Euler Lagrangian formulation of robot dynamics and state where this formulation would be useful in the industry.	12M
6.	a)	Explain the trajectory planning in terms of joint space v/s Cartesian.	8M
	b)	What is the aim of trajectory generation? How is it carried out?	4M
7.	a)	With the help of a neat sketch explain any one type of architecture of industrial robotic controllers.	8M
	b)	Explain the concept of linear control of robot manipulation.	4M
8.	a)	Explain the different factors to be considered in selection of a robot.	5M
	b)	What is spot welding? Describe briefly the operations involved in robotic spot welding. What are the advantages of robotic welding over manual welding?	7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)

ROBOTICS
(Engineering Design)

Date: 07 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	With the help of neat sketches explain rotary, prismatic joints.	8M
	b)	Write short notes on the history of robots.	4M
2.	a)	Explain the inverse characteristics of 2R and 3R manipulator.	6M
	b)	Explain the direct kinematics of Stewart – Gough platform.	6M
3.	a)	Explain statics of a parallel manipulator.	6M
	b)	Explain the static force and torque analysis of 3R manipulator.	6M
4.	a)	Explain the recursive formulation of dynamics using Newton Euler equation.	8M
	b)	Write short notes on Inertia of link.	4M
5.		Write short notes on:	12M
	i.	Trajectory planning for orientation	
	ii.	Cartesian space schemes	
6.	a)	Explain how PID control of a multi link manipulator can be accomplished.	6M
	b)	Enumerate on the force control of manipulators of a single mass.	6M
7.	a)	With the help of a neat sketch explain the construction and working of a reversible ac motor.	8M
	b)	Compare hydraulic and pneumatic actuators.	4M
8.	a)	With the help of neat sketches explain eddy current proximity sensors.	8M
	b)	Explain how LVDT works as a sensor.	4M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
MECHANICAL VIBRATIONS
(Engineering Design)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

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1. a) Derive an expression for logarithmic decrement in case of free underdamped viscous vibrations.   6M

   b) A centrifugal pump, weighing 600 N and operating at 1000 rpm, is mounted on six springs 6000 N/m each. Find the maximum permissible unbalance in order to limit the steady-state deflection to 5 mm peak-to-peak.   6M

2. a) Explain unit step, unit ramp and unit impulse functions with an example for each.   6M

   b) A trailer being pulled at a high speed hits a h cm high curb. Considering the trailer to be single degree freedom spring mass system, analyse the system for its response.   6M

3. a) Explain the concept of vibrometer and accelerometers with sketches, necessary equations and frequency ratio curves.   8M

   b) A seismic instrument with a natural frequency of 5 Hz is used to measure the vibration of a machine operating at 150 rpm. The relative displacement of the seismic mass as read from the instrument is 0.05 mm, neglecting air damping, determine the amplitude of vibration of the machine.   4M

4. Fig.1. shows a spring-mass system. Determine (i) equation of motion (ii) frequency equation and natural frequencies of the system and (iii) Modal vectors and mode shapes.   12M
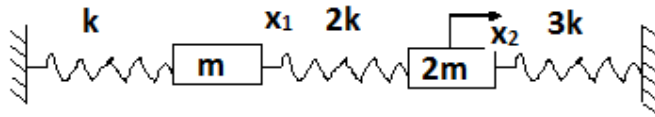

Fig.1

5. a) Define influence coefficient. State and prove Maxwell's reciprocal theorem.   6M

   b) Determine the influence coefficients of the triple pendulum of lengths l_1, l_2, l_3 and masses m_1, m_2, m_3 as shown in fig.2.   6M
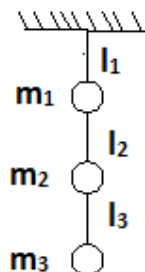

Fig.2

6. Using Stodola method, find the fundamental natural frequency of the system as shown in the fig.3. Assume K = 1N/m and m = 1 Kg.   12M
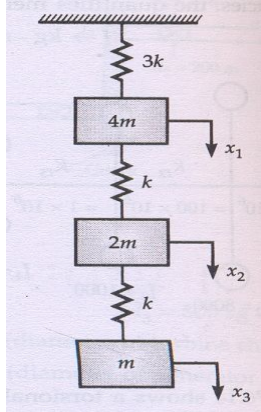

Fig.3

7. Obtain one dimensional wave equation and its solution for longitudinal vibration of a bar.   12M

8. a) Derive an expression for critical speed of a shaft with damping.   7M

   b) A shaft 10 mm in diameter and 600 mm long between long bearings carries a central mass of 4 Kg. If the C.G of the load is 0.2 mm from the axis of the shaft, compute the maximum flexural stress in the shaft when it is running at 90% of its critical speed. Take E = 200 GPa.   5M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ADVANCED OPTIMIZATION TECHNIQUES
(Engineering Design)

Date: 11 July, 2014   **Time: 3 hours**   **Max Marks: 60**

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

1. Solve the problem by Big- M method: 12M
    Max $Z = 3x_1 + 4x_2$,
    Subject to
    $2x_1 + x_2 \leq 1$,
    $3x_1 + 4x_2 \geq 4$
    $x_1, x_2, \geq 0$

2. Solve the following travelling salesman problem satisfying two conditions: 12M
    i.   The salesman should visit the city only once
    ii.   The salesman should return back to the starting point of the journey

	A	B	C	D	E
A	0	2	5	7	1
6	6	0	3	8	3
C	8	7	0	4	7
D	12	4	6	0	5
E	1	3	2	8	0

3. Find the dimensions of a cylindrical tin (with top and bottom) made up of sheet metal to   12M
    maximize its volume such that the total surface area is equal to $A_0 = 24\pi$

4. Min $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ starting from the point $X_1 = \{0,0\}$ 12M

5. a) Explain the similarities between conventional and evolutionary algorithms.   6M
    b) Enumerate the drawbacks of Genetic Algorithm.   6M

6. a) Explain the principles of genetic programming citing an example.   7M
    b) Enumerate the applications of genetic programming in the industry.   5M

7. a) Explain the concept of Pareto's analysis for multi objective Genetic Algorithms.   8M
    b) State the applications of Pareto's analysis in the industry. Explain any one application.   4M

8. Explain by a step by step procedure for optimization of path synthesis of a four bar   12M
    mechanism.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
GEAR ENGINEERING
(Engineering Design)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	What is a cycloidal teeth? Explain in brief the generation (geometric construction) of cycloid teeth.	9M
	b)	Explain the following: i. Circular pitch ii. Diameteral pitch iii. Module	3M
2.	a)	State two important reasons for adopting involute curve for gear tooth profile.	2M
	b)	It is required to design a spur gear speed reducer for a compressor running at 250 rpm driven by a 7.5kW, 1000 rpm electric motor. The centre distance between the axis of the gear shafts should be exactly 250mm. The starting torque of the motor can be assumed to be 150% of the rated torque. The gears are made of carbon steel 50C4 (S_{ut}= 700 N/mm^2). The pressure angle is 20°. The factor of safety is 2 for preliminary design based on the use of velocity factor: i. Design the gears and specify their dimensions ii. Assume that the gears are manufactured to meet the requirements of Grade 6 and calculate the dynamic load by using Buckingham's equation iii. Calculate the effective load iv. What is the actual factor of safety against bending failure v. Using the same factor of safety against pitting failure, specify suitable surface hardness for the gears	10M
3.	a)	Why are crossed helical gears not used for high power transmission?	3M
	b)	A pair of parallel helical gears consists of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20°, while the helix angle is 25°. The face width is 40 mm and the normal module is 4 mm. The pinion as well as the gear is made of steel 40 C8 (S_{ut}= 600 N/mm^2) and heat treated to a surface hardness of 300 BHN. The service factor and the factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of gears.	9M

4. a) Where do you use bevel gear? List the advantages of straight bevel gears over spiral bevel gears.　　3M

   b) A pair of straight bevel gears, mounted on shafts which are intersecting at right angles, consists of a 24 teeth pinion meshing with a 32 teeth gear. The pinion shaft is connected to an electric motor developing 12.5 kW rated power at 1440 rpm. The starting torque of the motor is 150 % of the rated torque. The pressure angle is 20°. Both gears are made of case hardened steel (S_{ut}= 750 N/mm^2). The teeth on gears are generated and finished by grinding and lapping processes to meet the requirements of class-3 grade. The factor of safety in the preliminary stages of gear design is 2.　　9M
      i. In the initial stages of gear design, assume that velocity factor accounts for the dynamic load and that the pitch line velocity is 7.5 m/s. Estimate the module based on beam strength
      ii. Select the first preference value of the module and calculate the main dimensions of the gears
      iii. Determine the dynamic load using Buckingham's equation and find out the effective load for the above dimensions. What is the correct factor of safety for bending
      iv. Specify the surface hardness for the gears assuming a factor of safety of 2 for wear consideration

5. a) What kind of contact occurs between worm and worm wheel? How does it differ from other types of gears?　　4M

   b) A pair of worm gears is designated as, 1/30/10/8. Determine the following:　　8M
      i. The centre distance
      ii. The speed reduction
      iii. The dimensions of the worm and
      iv. The dimensions of the worm wheel

6. a) What is wear? Explain abrasive wear with neat sketch.　　6M
   b) Explain lubrication contamination failures in gear trains. What are the precautions to be taken?　　6M

7. a) What is gear train? Explain with neat sketch compound gear train.　　6M
   b) Describe the procedure for ray diagrams in gear train.　　6M

8. a) Briefly explain the weight minimization for gear design.　　6M
   b) Explain the following in optimal gear design:　　6M
      i. Strength
      ii. Dynamic considerations

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
COMPUTATIONAL FLUID DYNAMICS
(Engineering Design)

Date: 16 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Explain in detail how finite difference method is adopted for the fluid flow.   6M
   b) What are the advantages, limitations and applications of computational fluid dynamics?   6M

2. a) Derive an expression of finite difference equations for forward difference scheme, backward difference scheme and central difference schemes.   6M
   b) A large plate of thickness L=2cm, with a constant thermal conductivity K=0.5 W/mK is subjected to uniform heat generation of 1000kW/m^3. The left and right faces are maintained at temperatures of 100^{0}C and 200^{0}C respectively. Considering 1 D problem, formulate the steady state temperature distribution using finite difference method.   6M

3. a) Describe Euler's forward time and forward space approximations.   6M
   b) Discuss the Burgers equation using Explicit schemes.   6M

4. a) Using artificial compressibility method, discuss the governing equation for incompressible viscous flows.   6M
   b) Describe semi implicit method for pressure linked equations using control volume approach.   6M

5. a) Discuss the artificial compressibility method for transonic potential flows.   6M
   b) Discuss the following with respect to compressible flows: 6M
      i. Eulers equations
      ii. First order upwind schemes

6. $\dfrac{d^2u}{dx^2} 2u = f\left(x\right)$ $0 < x < 1$, $f\left(x\right) = 4x^2 - 2x - 4$ Subject to boundary conditions $u = 1$ at   12M

   $x = -1$ which has the exact solution $u = -2x^2 + x$. Solve the equation using Neumann boundary conditions.

7. a) Explain Lagrange multipliers approach for linear flow problems.   6M
   b) Explain how Neumann boundary conditions applied are for steady state problems.   6M

8. a) Describe time dependent differential equation using standard Galerkin method using DST approximations.   6M
   b) Deduce the hyperbolic equations for transient flow problems.   6M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
NANO TECHNOLOGY
(Engineering Design)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Explain with examples the dependence of shape and size on the material properties in the nano scale.	7M
	b)	Explain the limits of smallness as applied to nano materials.	5M
2.	a)	Draw a neat sketch and explain the principle of electron beam lithography.	6M
	b)	Differentiate between top down and bottom up approaches in nanotechnology.	6M
3.	a)	Elaborate the phenomenon of layer by layer growth in self assembly.	6M
	b)	Briefly describe the self-assembly of nanoparticles using organic molecules.	6M
4.	a)	List out the different characterization techniques of nano structures.	6M
	b)	Explain with neat sketch Atomic Force Microscope (AFM) technique used for characterization.	6M
5.	a)	Explain the optical and electronic properties of nano particles with reference to specific applications as to where these properties suitable for certain applications.	6M
	b)	Write the various applications of bioengineering nanoparticles.	6M
6.	a)	Explain the concept of nano wire transistors and its applications.	6M
	b)	With the help of a neat sketch explain the vapour technique for growth of metal nano wires.	6M
7.	a)	Enumerate as to how nano tubes can used to enhance the speed of computers.	6M
	b)	Explain how nano tubes can be effectively used as a reinforcement to improve mechanical properties.	6M
8.		Explain the following applications of nanotechnology in:	12M
	i.	Nano Electro Mechanical Systems	
	ii.	Nano fluidics	
	iii.	Molecular motors	

Hall Ticket No:

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ANALYSIS AND DESIGN OF SHELLS AND FOLDED PLATES
(Structural Engineering)

Date: 07 July, 2014	Time: 3 hours	Max Marks: 60

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

1.	a)	Explain cylindrical, multiple cylindrical and continuous cylindrical shells with a neat sketch.	9M
	b)	Define Gauss Curvature and write its specifications.	3M
2.	a)	Write the classification of shells.	8M
	b)	Write the specifications for thickness of shells, Span and chord with of shell.	4M
3.	a)	Explain with usual notations, three equations of used to calculate membrane stresses i.e., T_x, T_y and S, when the shell membrane is in equilibrium?	9M
	b)	What are the characteristics of true membrane?	3M
4.		A reinforced concrete shell with circular directrix has the following data, Radius 6m, 2L = 24m, t = 50mm, $\phi = 60^0$. Self weight of (0.05 x 25) = 1.25 kN/m^2. Calculate max stress in the shell and max BM and tension developed in the edge beams.	12M
5.	a)	Differentiate between beam action and arch action?	6M
	b)	How do you analyse an arch using beam theory and derive expression for transverse moments and thrusts?	6M
6.	a)	Design a hypar shell roof of tilted inverted umbrella type to cover an area of (24 x 24)m. The edges are 3.66m and 2.44m respectively to left and right above central	6M
	b)	valley 2.44m, respectively to left and right above central valley point. Adopt structural components of the hypar shell roof.	6M
7.	a)	Explain the advantages of folded plates over shells.	6M
	b)	A folded plate with two folds is subjected to a moments in the plane of the plate for thickness of plate of 100mm. Depth of plates $h_1 = h_2 = 333$ kNm.	6M
8.		Write short notes on any three of the following:	12M

i.   Equations of three shear – Folded Plates
ii.   Features of beam Theory
iii. Stress condition in hipped plates
iv.   Pre-stressed concrete folded plates

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
STRUCTURAL DYNAMICS
(Structural Engineering)

Date: 09 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Discuss the vectorial representation of SHM with respect to displacement, velocity and acceleration.   6M

   b) Discuss the lumped mass idealization in structural dynamics with examples and its advantages.   6M

2. a) Define the following terms - Linear and non linear vibrations, Frequency, period and cycle.   4M

   b) A machine weighing 1500 N is mounted on a supporting system consisting of four springs and four dampers. The vertical deflection of the supporting system under the weight of the machine is measured as 25 mm. The dampers are designed to reduce the amplitude of vertical vibration to 1/6 of the initial amplitude after two complete cycles of free vibration. Find the undamped NF, damping ratio, damped NF and damping coefficient.   8M

3. a) Discuss the various steps involved in solving a structural dynamics problem.   8M

   b) Discuss the effect of gravitational forces in structural dynamics with a simple example.   4M

4. An SDOF system is undamped and is subjected to a half cycle sine pulse excitation force of time duration, t_d. Using Duhamel's integral, obtain expressions for $(DLF)_{max}$ in both free and forced vibration phase.   12M

5. Using stiffness method, calculate the natural frequencies and mode shapes for the system shown below Sketch the mode shapes and check the orthogonality conditions between second and third modes with respect to stiffness and mass matrices.   12M
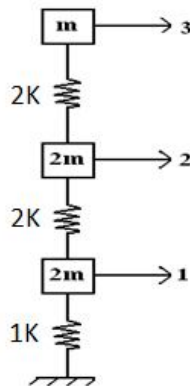

Fig.1

6. a) Calculate the fundamental frequency for the system shown below using Holzer's method.   6M
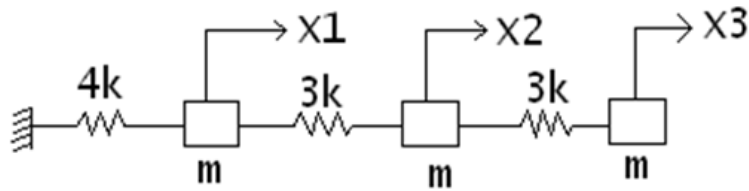

Fig.2

   b) Discuss Stodola's method of finding higher modes and frequencies.   6M

7. a) Using method of separation of variables, obtain the solution for natural frequencies and mode shapes in a continuous system having free flexural vibrations.   6M

   b) Obtain the natural frequencies and mode shapes for a uniform propped cantilever subjected to free flexural vibrations.   6M

8. Discuss the analysis of earthquake forces of SDOF and MDOF systems assuming rigid base translation.   12M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ADVANCED STEEL STRUCTURES DESIGN
(Structural Engineering)

Date: 11 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) An industrial building of height 20m is built at Mumbai near a hillock. The height of hill is 150m and has a slope of 1 in 5. The building is proposed to be at a distance of 120m from the base of the hill. Design the wind pressure. — 6M

   b) For analysis of an industrial building what are the types of loads to be considered and how they can be considered if the building is situated in Jammu and Kashmir and height of 25m situated near a hill lock of height 200m having a slope of 1in 4. The structure is to be situated at a distance of 100m from the base of the hill. — 6M

2. a) ISA 100x 90x 8mm is used as a tie member in a roof truss. The longer leg is connected to a gusset plate of 10mm thick by means of 4 bolts. Which arrangement of bolts provides greater strength in block shear: — 8M
   i. Four bolts are arranged in one line which is at 60mm from the corner line of ISA. The bolt diameter is 16mm and pitch is 50mm.
   ii. Four bolts are arranged in two lines which are at 40mm and 80mm from the corner line of ISA. In both cases the end distance is 40mm

   b) What are connections? What are the various types of connections we come across? Explain in brief? — 4M

3. Analyse the frame show in Fig.1 using portal method. The frame is intermediate frame spaced at 4m c/c. analyse the frame taking LL of 4kN/m2 and DL of 3kN/m2, 3.25 kN/m2 and 2.75kN/m2 for first bay (6m),second bay (3m) and third bay (4m) respectively. The self weight of beam for fisrt bay 5kN/m second bay is 3.5kN/m and third bay is 2.5kN/m. — 12M
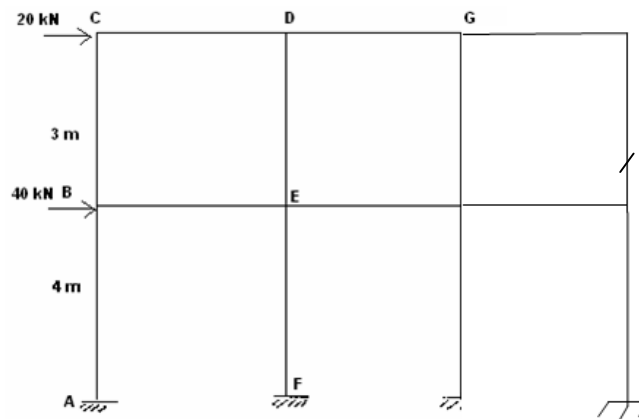

Fig.1

4. A 50m high microwave tower is to be built near Agra where the terrain at the site is nearly a level ground with category 2. The diameter of hemi- spherical antenna disc fixed at the top is 3m. The width of the tower has to be 3.5m. Select a suitable configuration for the tower and determine the maximum compression and the maximum shear at the base for the following data: **12M**
   i. Weight of antenna disc and fixtures: 10kN
   ii. Weight of platform at top :0.9kN/m2
   iii. Weight of railing at top:0.5kN/m2
   iv. Weight of ladder and cage:0.55kN/m2
   v. Weight of miscellaneous items:3KN

5. Design a through type plate girder for single track B.G loading for the following.   **12M**
   Effective span=24m:
   i. Spacing of main girder:5m c/c
   ii. Spacing of stringer beam: 2m c/c
   iii. Sleepers and their spacing 250mmx 150mmx 3mm @0.5m c/c.
   iv. Density of timber 7.5kN/m3
   v. Weight of stock rails : 500N/m
   vi. Weight of guard rails: 300N/m
   vii. Weight of fastenings: 250N/m

6. Obtain the plastic moment value for the frame shown in the Fig.2. The loads given are ultimate loads. Draw the BMD at collapse load.   **12M**
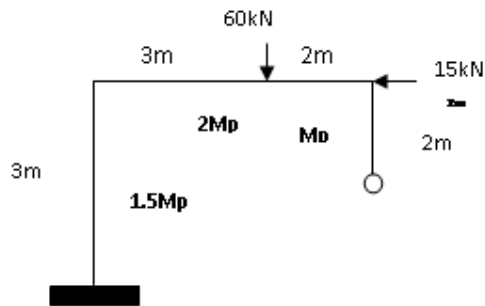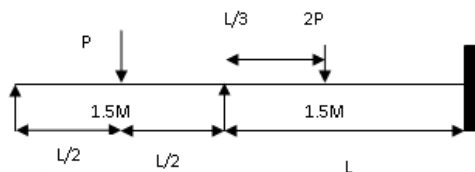

Fig.2

7. Find the plastic moment capacity of the continuous beam shown in Fig.3.draw BMD at collapse load? Assume a load factor of 1.5   **12M**
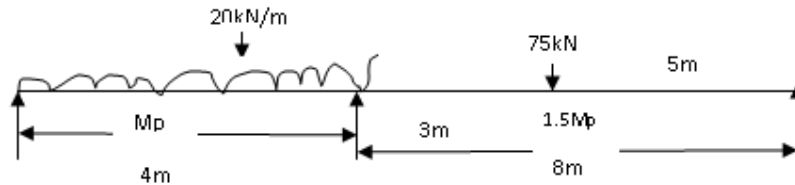
Fig.3

8. Compute the deflection under the load 2Pof the continuous beam shown in the Fig.4.   **12M**

Fig.4

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
ADVANCED REINFORCED CONCRETE DESIGN
(Structural Engineering)

Date: 14 July, 2014   Time: 3 hours   Max Marks: 60

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

1. a) Which are the conditions to be satisfied for moment redistribution in RCC.   6M
    b) Determine the ordinates of the bending Moment diagram at every 1/8 th point of   6M
       beam AB of span 20m with a UDL of 30kN/m if the fixing moments at A is 1000kNm
       and B is 500kNm.

2. a) Distinguish between upper bound and lower bound solutions in estimating the collapse   6M
       load in slabs.
    b) A reinforced concrete slab 5m x 5m is simply supported along the 4 edges and is   6M
       reinforced with 10mm dia Fe415 steel bars at 150mm C/C both ways. The average
       effective depth of the slab is 100mm and overall depth of slab is 130mm. The slab
       carries a flooring 50mm thick, having its unit weight 2.2 kN/m^2. Determine the
       maximum permissible service load using yield line theory. Use M20 concrete.

3. a) Explain the methods of constructing ribbed slabs in situ.
    b) Design a ribbed slab 3.6 x 3.9 m continuous over two adjacent sides and simply supported
       on the other two sides if it is made of precast funicular shells so that ribs are spaced at 1.2 x
       1.2m as showin in Fig.1. Factored UDL w= 10kN/m^2 , fck = 25N/mm^2, fy = 415 N/mm^2.
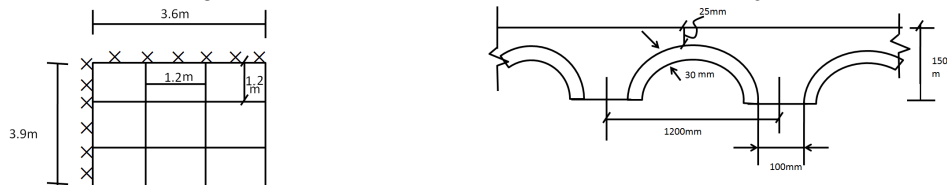

Fig.1

4. a) With a neat sketch explain components of a flat slab.   6M
    b) Estimate the dimensions of a flat slab system (with drops) for a four storey building   6M
       with 5 spans of 7.5 m in longer direction, 5 spans of 6m in shorter direction and storey
       height is 3m. Use M20 grade of concrete and Fe 415 steel.

5. a) Explain the important steps involved in design of RC deep beams.   6M
    b) Design a dep beam 300mm wide, 4m deep simply supported over a clear span of 6m.   6M
       The beam carries a live load of160 kN/m @ service state and is supported on walls of
       600mm thick on each end. Use M20 concrete and Fe415 steel. Permissible tensile
       stress = 230 N/mm^2.

6. a) With a neat sketch Explain corbels and nibs.   6M
    b) A corbel attached to a 250mm x 250mm RCC column carries a factored load of 400 kN   6M
       at a distance of 170mm from the face of the column. Design the corbel using M25
       Concrete and Fe 415 steel.

7. a) With a neat sketch explain how shear walls are classified.   6M
    b) Design a shear wall of length 3.16m and thickness of 250mm subjected to the following   6M
       forces fck = 25N/mm^2, fy = 415 N/mm^2 with high wall in the following Fig.2.
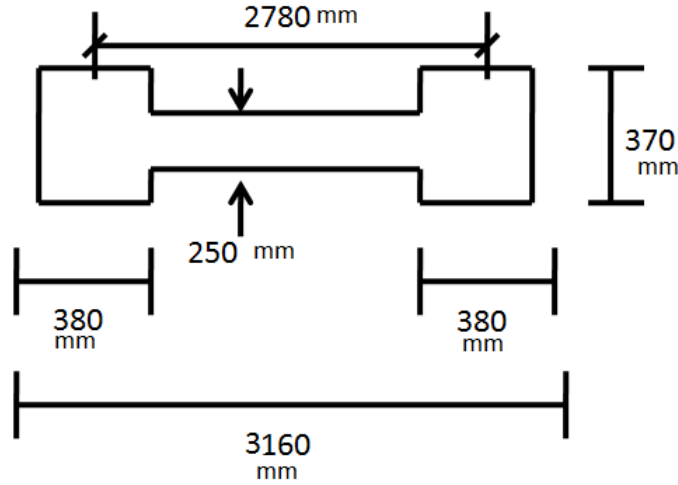
Fig.2

Loading	Axial Force kN	Moment kN m	Shear kN
DI+LL	1950	600	20
Seismic load	250	4800	700

8. a) Distinguish between short term and long term deflection. Write the expression for   6M
       total Deflection.
    b) A reinforced Concrete wall is 100mm thick. Determine the critical ratio of horizontal   6M
       steel required to control shrinkage cracks with grade of concrete M25 and Fe 415 steel.
       If 10mm dia @ 300mm spacing is provided on both the faces of the wall, estimate the
       spacing of cracks and its width due to drop in temperature of 20°C . Assume:
       i.   Drying shrinkage of Concrete = 100 x 10^{-6}
       ii. Co Efficient of thernmal Expansion = 100 µ/ °C
       iii. Modulus of concrete in Tension Ec = 10 x 10^3 N/mm^2
       iv. Strength of concrete in tension = 1.5 n/mm^2

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
LOW COST HOUSING TECHNIQUES
(Structural Engineering)

Date: 16 July, 2014   Time: 3 hours   Max Marks: 60

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

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1. Explain the function and achievements of the following formal financing institutions: 12M
    i.   Housing and Urban Development Corporation (HUDCO)
    ii. Life Insurance Corporation (LIC) and General Insurance Corporation (GIC)

2. Explain briefly how Town and Country Planning Organization (TCPO) have helped in   12M
    planning of urban land in India.

3. What are approaches and strategies for housing urban poor? Explain National Housing   12M
    Policy and UCD approach.

4. Which are the popular prefabrication systems adopted for mass housing programmes in   12M
    India? Explain any three of them.

5. Explain lime pozzolona mix and ferrocement which are used as substitute for building   12M
    materials.

6. Explain :   12M
    i.   Accelerated Urban Water Supply Programme (AUWSP)
    ii. Rural Water Supply
    iii. Accelerated Rural Water Supply Programme

7. Explain the method of soil stabilization by traditional water proofers and method of fire   12M
    retardant treatment for thatch roof.

8. Explain the concept of repair and restoration of earthquake damaged non-engineered   12M
    buildings.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
M. Tech II Semester Regular Examinations July - 2014
(Regulations: VCE-R11)
PLASTIC ANALYSIS
(Structural Engineering)

Date: 18 July, 2014   Time: 3 hours   Max Marks: 60

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

1.	a)	Determine the shape factor for a rectangular beam of width *b* and depth *d*.	5M
	b)	Explain the lower bound and upper bound theorem.	7M
2.	a)	Explain the fundamental principles of analysis of structures for ultimate loads.	8M
	b)	State the applications of the moment balancing method in design.	4M
3.		Design a continuous beam of spans 4.9m, 6m and 4.9m carrying a UDL of 32.5kN/m and the beam is laterally supported.	12M
4.	a)	Derive equation for plastic bending of rectangular section.	4M
	b)	A simply supported beam is 8m long with a uniformly distributed load of 50000 N/m. Calculate the flemrral fluess which limits the deflection to 2mm at the middle. Calculate the gradient at the ends.	8M
5.		What is meant by lateral torsional buckling of a beam member? Under what conditions lateral buckling can occur.	12M
6.		Explain the reasons for a interior beam column to fail with neat diagrams.	12M
7.		State the applications of steel framed structures and explain in brief the design considerations.	12M
8.		Explain the concept of ultimate deflections and state the design considerations for ultimate load deflection at working load.	12M