

30-08-2011

Code: MCS201

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram - 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**WEB TECHNOLOGIES**

CSE

Time: 3 hours

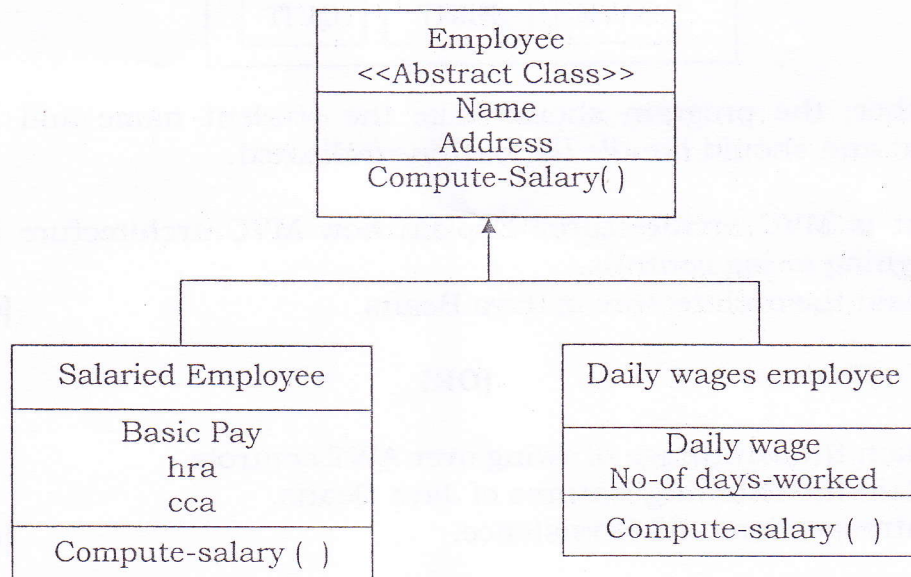
Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

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- 1(a) Distinguish between class and object with an example.  
(b) Consider the following class hierarchy.

[4+8M]



Implement the above hierarchy using Java. Explain how dynamic method dispatch takes place in the above example.

(OR)

- (c) Explain the usage of packages in organizing the classes.  
(d) What is an interface? Explain an interface can be implemented in more than one way with an example. [6+6M]
- 2(a) What are exception? Explain the usage of the following clauses  
(i) Try (ii) Catch (iii) Throw (iv) Finally.  
(b) What is a thread? Explain how mutual exclusion can be implemented using thread synchronization. [6+6M]

(OR)

- (c) Explain the hierarchy of Applet class. What are life-cycle methods of Applet class? Explain Applet working with an example.  
(d) Explain how two threads can communicate using a buffer. [6+6M]

- 3(a) Explain Delegation event model of handling events in Java.  
(b) Explain the usage of graphics class with an example. [6+6M]

(OR)

- (c) What are layout managers? Write a Java program to create grid layout.  
(d) Write a Java Program to create the following panel. [6+6M]

STUDENT DATA	
Name	<input type="text"/>
Roll No.	<input type="text"/>
<input type="button" value="SAVE"/>	<input type="button" value="NEXT"/>
<input type="button" value="QUIT"/>	

Further, the program should take the student name and roll no as input and should handle the buttons indicated.

- 4(a) What is MVC architecture? Explain how MVC architecture is used in designing swing controls.  
(b) Explain the architecture of Java Beans. [6+6M]

(OR)

- (c) Explain the advantage of swing over AWT controls.  
(d) Explain the following features of Java Beans.  
(i) Introspection (ii) Persistence. [6+6M]

- 5(a) Distinguish the following JDBC classes.  
Statement  
Prepared statement  
Callable statement  
(b) Explain the working of servlet with an example. [6+6M]

(OR)

- (c) Explain the usage of following  
(i) Cookies. (ii) Sessions.  
(d) Explain the working of RMI. [6+6M]



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M.Tech. II Semester Regular Examinations, August/September, 2011

**SOFTWARE METRICS**

(Software Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

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- 1(a) What is understood by quality? What are the different views on quality? What are the possible relationships among some quality attributes? Briefly explain. [12M]

(OR)

- (b) Discuss about the four different levers of measurement of quality. [12M]

- 2(a) Explain some of the in-process quality metrics which are essential to measure the quality of the process. [12M]

(OR)

- (b) Explain about challenges, importance and use of collecting software engineering data. [12M]

- 3(a) Explain how-checklist and pareto diagram are useful quality tools. [12M]

(OR)

- (b) How can defect removal effectiveness for each development step be defined Briefly explain the defect injection and removal of a process step. [12M]

- 4(a) What are the metrics that are useful for acceptance testing. [12M]

(OR)

- (b) Briefly explain how syntactic constructs and structure metrics are useful to measure complexity [12M]

- 5(a) How can Chidamber and Kemerer (CK metrics suite) be used as an object-oriented design and complexity metric? Explain. [12M]

(OR)

- (b) Explain about measuring process improvement at different activity levels. [12M]

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M.Tech. II Semester Regular Examinations, August/September, 2011

**ADAPTIVE SIGNAL PROCESSING  
(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

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- 1(a) With relevant diagrams and necessary theory discuss the performance function gradient, and minimum mean square error w.r.t adaptive filter combiner. **[12M]**

(OR)

- (b) Write about the characteristics, applications and examples of an adaptive filter. **[12M]**

- 2(a) Derive the wiener-Hopf equation and obtain an expression for the minimum squared error  $J_{\min}$ . obtain the conical form of representation for  $J_{\min}$ . **[12M]**

(OR)

- (b) In the wiener filtering problem, the correlation matrix  $R$  of the tap input vector  $U(x)$  is

$$R = \begin{bmatrix} 1.1 & 0.5 \\ 0.5 & 1.1 \end{bmatrix}$$

The cross correlation vector between the tap-1 input vector  $U(x)$  and the desired response  $d(x)$  is

$$P = [0.5 \quad -0.4]^T$$

The variance of the desired signal is 1.0 and that of additive white noise is 0.1.

- (i) Evaluate the tap weights of the wiener filter.  
(ii) What is the minimum mean square error produced by this wiener filter.  
(iii) Formulate a representation of the wiener filter in terms of the eigen values of matrix  $R$  and associated eigen vectors. **[4+4+4M]**



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- 3(a) Explain the steepest descent algorithm.  
(b) Discuss the stability of the algorithm and derive the condition for the step sign parameter  $\mu$ . **[5+7M]**

(OR)

- (c) Derive the necessary and sufficient condition for the overall stability of the LMS algorithm.  
(d) Compare LMS and steepest descent algorithm. **[8+4M]**

- 4(a) With the help of signal flow graph representation explain LMS algorithm **[12M]**

(OR)

- (b) Clearly explain about the adaptive beam framing application in adoptive signal processing. **[12M]**

- 5(a) Compare kalman filter with LMS algorithm.  
(b) Explain in-detail the approach based on kalman fitter theory that led to development of adaptive filters. **[5+7M]**

(OR)

- (c) With the help of block diagram explain the kalman filtering. **[12M]**

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M.Tech. II Semester Regular Examinations, August/September, 2011

**INSTRUMENTATION, MEASUREMENTS AND EXPERIMENTS IN FLUIDS**  
(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Explain about turbulence management system in wind tunnels [12M]  
(OR)
- (b) What is the need to do performance test for an engine? Justify with your answer?
- (c) Explain about wind tunnel balance? [6+6M]
- 2(a) Write the classification of flow visualization techniques?
- (b) Why flow visualization is needed explain? [6+6M]  
(OR)
- (c) Write the limitations of Hot-wire anemometer.
- (d) Draw the schematic of hot-wire flow-measurement circuit and state how to compute heat transfer rate from the wire. [5+7M]
- 3(a) Write about linear variable differential transformer characteristics and its working principle.
- (b) Describe the Hydraulic Analogy. [8+4M]  
(OR)
- (c) What is a pitot tube? And write classification of pitot tube. [6M]
- (d) Write the following  
(i) Electrolytic tank. (ii) Hydraulic jumps. [3+3M]
- 4(a) What particular flow-measurement situations are adopted to the hot-wire anemometer.
- (b) What is the primary advantage of the laser anemometer. [8+4M]  
(OR)



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- (c) An open-ended tube probe is yawed at an angle of  $30^\circ$  from the flow direction in an airstream at 0.827 bar and  $4.4^\circ\text{C}$  having a free-stream velocity of 24.38 m/s. Calculate the pressure indicated by the probe.
- (d) What is the relationship between velocity and mach number in pressure measurement.  
[6+6M]
- 5(a) How can an uncertainty analysis help to reduce overall experimental uncertainty?
- (b) Calculate the temperature sensitivity for thermistor at  $100^\circ\text{C}$ . Express the result in Ohm-centimeters per degree Celsius. Take  $\beta = 4120^\circ\text{K}$  at  $100^\circ\text{C}$ .

[8+4M]

(OR)

- (c) The resistance of a certain size of copper wire is given as

$$R = R_0 [1 + \alpha(T - 20)]$$

Where  $R_0 = 6\Omega \pm 0.3$  percent is the resistance at  $20^\circ\text{C}$ ,

$\alpha = 0.004^\circ\text{C}^{-1} \pm 1$  percent is the temperature coefficient of resistance and the temperature of the wire is  $T = 30 \pm 1^\circ\text{C}$ . Calculate the resistance of the wire and its uncertainty.

- (d) Describe the temperature measurement of resistance temperature detector?

[6+6M]

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**OBJECT ORIENTED SOFTWARE ENGINEERING**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Define the following terms.  
(i) Software (ii) Software Process (iii) Software Development Process
- (b) Identify the phases of waterfall model. Indicated the input and output of each phase. Explain the strength and weaknesses of waterfall model. [6+6M]

(OR)

- (c) Compare and contrast structured and OO paradigms software developments with respect to following aspects.  
(i) Cost (ii) Quality (iii) Maintenance. [12M]

- 2(a) What should be the components of project management plan. Explain.  
(b) Distinguish between product and process metrics. [6+6M]

(OR)

- (c) Explain COCOMO model of software cost estimation.  
(d) What is a CASE tool? Explain the architecture and components of a CASE tool. [6+6M]

- 3(a) Define the following terms:  
(i) Cohesion (ii) Coupling.  
(b) Explain the different levels of cohesion and coupling of objects. [4+8M]

(OR)

- (c) Define the following terms  
(i) Portability (ii) Inter-operability  
(d) Explain the steps to be taken during the software development process to ensure portability and Inter-operability. [4+8M]



- 4(a) Explain the phases of Rapid prototyping method.  
(b) What should be the components and characteristics of software requirements specification document? Explain. [6+6M]

(OR)

- (c) Develop a use case model for library information system. State your assumptions. [12M]

- 5(a) What is meant by module integration? Distinguish between Bottom-up and Top-down integration techniques.  
(b) Explain the importance of maintainability of software. [6+6M]

(OR)

- (c) Explain how object oriented approach helps in the following aspects.  
(i) Software maintenance (ii) Module integration. [12M]

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**DISTRIBUTED DATABASES SYSTEMS**

(Software Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Explain the reference architecture of distributed database  
(b) Explain different levels of distribution transparency. **[6+6M]**

(OR)

- (c) Give an example for distributed database application. Explain the advantages of organizing it as a distributed system.  
(d) What is an integrity constraint? Give an example of integrity constraint that is applicable for distributed database. **[6+6M]**

- 2(a) What is database fragmentation? Explain the difference between Horizontal and vertical fragmentation.  
(b) Explain how cost can be computed in the case of horizontal fragmentation. **[6+6M]**

(OR)

- (c) Discuss top-down and bottom-up approach to the design of data distribution. **[12M]**

- 3(a) Explain the importance of query optimization in distributed database.  
(b) Explain the process of reduction of relations using semi-joins with an example. **[6+6M]**

(OR)

- (c) Explain the catalog management in distributed database. **[12M]**

- 4(a) What is a distributed transaction?  
(b) Explain how atomicity can be insured in distributed database. **[6+6M]**

(OR)

- (c) Explain 2-phase commit protocol.  
(d) Discuss the applicability of 2-phase locking protocol for concurrency control in distributed database. **[6+6M]**

- 5(a) Distinguish between pessimistic and optimistic concurrency control mechanisms. **[12M]**

(OR)

- (b) Explain how a deadlock can occur in distributed database.  
(c) Explain deadlock recovery mechanism. **[6+6M]**



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M.Tech. II Semester Regular Examinations, August/September, 2011

**SPEECH PROCESSING**  
**(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Describe the digital model for production of speech signal.  
(b) Explain the difference between the production of voiced and unvoiced speech sounds. **[8+4M]**

(OR)

- (c) Explain the theory of speech production using the concatenation of tubes of different lengths and diameters.  
(d) What is Vowel triangle? **[8+4M]**
- 2(a) What are the advantages and disadvantages between short-term energy and short-term magnitude functions.  
(b) Explain the pitch period estimation using auto correlation function. **[6+6M]**

(OR)

- (c) What is short-term average magnitude difference function?  
(d) The short-time energy of a sequence  $x(n)$  is defined as.

$$E_n = \sum_{m=-\infty}^{\infty} [x(m)w(n-m)]^2$$

For the particular choice  $w(m) = a^m \quad m \geq 0$   
 $= 0 \quad m < 0$

Find a difference equation that expresses  $E_n$  in terms of  $E_{n-1}$  and the input  $x(n)$  **[6+6M]**

- 3(a) Prove that if time domain signal is train of impulses, cepstrum is also train of impulses.  
(b) Explain the Levinson-Durbin's recursive algorithm for the LPC parameters. **[6+6M]**

(OR)

- (c) How we can find out the formants using LPC parameters.  
(d) Explain the method to detect the pitch using cepstrum **[6+6M]**

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- 4(a) Explain the spectral subtraction method to remove the background noise in the speech signal
- (b) What is Dynamic Time Warping? **[6+6M]**

**(OR)**

- (c) Explain why the automatic speech recognition is becoming most challenging problem.
- (d) Explain any method for extracting the features for automatic speech recognition. **[6+6M]**
- 5(a) How the stochastic variability of the duration of speech sounds is represented in the Hidden Markov models. (by which probability or parameter)
- (b) If there are 50 monograms, mathematically how many trigrams are possible? **[6+6M]**

**(OR)**

- (c) List out the Hidden Markov Model parameters for ASR.
- (d) What is bigram and Trigram. **[8+4M]**



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M.Tech. II Semester Regular Examinations, August/September, 2011

**NON-CONVENTIONAL SOURCES OF ENERGY**

(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Write briefly about Non-Conventional Energy sources available in India?  
(b) Explain how-power is generated by using solar photo voltaic cell. [6+6M]

(OR)

- (c) State the expression for hour angle and day length?  
(d) What are the differences between the active and passive solar water heating systems and which is more efficient? [6+6M]
- 2(a) What do you know about Indian wind power program?  
(b) How can Geo-thermal energy be utilized for electricity generation? [6+6M]

(OR)

- (c) State the different parts of internal structure of earth?  
(d) Write about lift and drag mechanics of wind machines? [6+6M]
- 3(a) State the practical considerations for ocean thermal energy? [12M]

(OR)

- (b) A 2m wave has a 6s period and occurs at the surface of water 100m deep. Find the energy and power densities of the wave. Take water density =  $1025 \text{ kg/m}^3$   
(c) Write briefly about wave energy conversion devices. [6+6M]

- 4(a) Write the principle of biogas generation by anaerobic digestion process? And also describe a bio-gas plant? [12M]

(OR)

- (b) State the various biomass conversion technologies? And draw a schematic diagram to explain various conversion technologies and products. [12M]

- 5(a) Calculate the open-circuit voltage, the maximum work and thermal efficiency of a  $H_2-O_2$  fuel cell operating at  $25^\circ C$  and 1.013 bar. The product  $H_2O$  is in liquid state. Determine the power output in reversible and actual processes and overall cell efficiency when performance factor is 0.7. The hourly hydrogen consumption is 1.3 kg/hr. [12M]

(OR)

- (b) For a MHD Faraday generator, the specific resistance is  $0.08 \Omega m$  and magnetic field density is  $3.8 Wb/m^3$ . The electrode area is  $1.2 m^2$ , plasma velocity is  $950 m/s$  and the distance between the electrodes is  $0.9m$ . Determine the net power output and conversion efficiency.
- (c) Draw a line diagram of combined solar-wind power plant and explain briefly. [8+4M]



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M.Tech. II Semester Regular Examinations, August/September, 2011

**DISCRETE MATHEMATICAL STRUCTURES**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

1(a) Prove that  $\left[ \left( P \wedge \bar{q} \right) \rightarrow r \right] \rightarrow [P \rightarrow (q \vee r)]$  is a tautology

(b) Briefly describe the any six methods of proof. **[6+6M]**

**(OR)**

(c) Suppose that the 10 integers 1,2,.....,10 are randomly positioned around a circular wheel show that the sum of set of 3 consecutively positioned numbers is atleast 17.

(d) Prove (or) disprove the validity of the following argument some dogs are animals some cats are animals therefore, some dogs are cats. **[6+6M]**

2(a) Prove by mathematical induction that  $n(n^2+5)$  is an integer multiple of 6.

(b) How many 9-letter words can be formed that contain 3,4,or 5 vowels.  
(i) Allowing repetition of letters (ii) Not allowing repetition. **[6+6M]**

**(OR)**

(c) Define permutations and combinations

(d) How many ways can 7 women and 3 men be arranged in a row if the 3 men must always stand next to each other.

(e) Find the number of 5-combinations and 5-permutations of {5.a, 3.b, 2.c, 3.d, 2.e} **[2+6+4M]**

3(a) Define recurrence relation give example

(b) Solve the recurrence relation  $a_n = a_{n-1} + f(n)$  for  $n \geq 1$  by substitution.

(c) Find the solution to

$$a_n - 7a_{n-1} + 12a_{n-2} = 0 \text{ for } n > 2 \text{ using characteristic roots. } \mathbf{[2+6+4M]}$$

**(OR)**

(d) Write about the four methods to solve recurrence relations.

(e) Find a generating function to count the number of integral solutions to

$$e_1 + e_2 + e_3 = 10 \text{ if for each } i, 0 \leq e_i \mathbf{[6+6M]}$$

- 4(a) Let A be a set with n elements.  
 (i) Prove that there are  $2^n$  unary relations on A  
 (ii) Prove that there are  $2^{n^2}$  binary relations on A  
 (b) Name five situations (Games, activities, real-life problems etc..) that can be represented by means of graphs. Explain the vertices and the edges denote. **[6+6M]**

(OR)

- (c) Let  $A = \{\epsilon, a\}$ ,  $B = \{a, b\}$ . List the elements of the following sets.  
 (i)  $A^2$       (ii)  $B^3$       (iii) AB      (iv)  $A^+$   
 (d) Prove that  $R_1 \wedge R_2$  is an equivalence relation, if  $R_1$  and  $R_2$  are equivalence relations on a set A. **[6+6M]**

- 5(a) Define the following  
 (i) Spanning tree      (ii) Hamiltonian cycle  
 (c) Directed and undirected graph      (iv) Multi graph.  
 (b) Prove that the number of simple paths of length 2 in a graph G is  $d_1^2 + d_2^2 + \dots + d_n^2$ , where  $d_1, d_2, \dots, d_n$  is the degree sequence for G **[6+6M]**

(OR)

- (c) Derive all possible spanning trees for the graph shown below in Figure1.

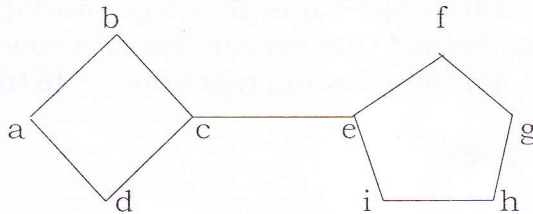


Fig 1

- (d) Determine the different non-isomorphic spanning tree for the graph shown in figure 2

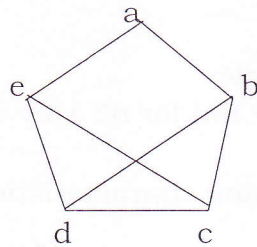


Figure 2

**[6+6M]**



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M.Tech. II Semester Regular Examinations, August/September, 2011

**INFORMATION SECURITY**

Time: 3 hours

Max. Marks: 60

Answer all the questions.

All questions carry equal marks

1. a) Explain the Fiestel proof of DES algorithm. (6+6)  
b) Explain the basic uses of Hash functions.  
(or)  
c) Explain advanced encryption standard algorithm (AES) briefly. (6+6)  
d) Explain the cipher block feedback mode of operation.
2. a) What are the principles of public key cryptography, explain. (6+6)  
b) Write about X.509 Authentication service  
(Or)  
c) Explain Kerberos. (6+6)  
d) Explain digital signature concept using Message Digest Algorithm (MD-5). (6+6)
3. a) Explain email security using Pretty good privacy (PGP).  
b) Explain the architecture of IP Security Protocol.  
(Or)  
c) Explain the ESP (Encapsulating Security payload) of IP security protocol. (6+6)  
d) Explain the key management of IP Sec.
4. a) Explain about intruders ? (6+6)  
b) Discuss Transport Layer Security (TLS) in detail.  
(Or)  
c) Explain IP Security architecture. (6+6)  
d) Explain Dual Signature mechanism of SET?
5. a) Discuss firewall design principles in detail? (6+6)  
b) Explain the functionality of Intrusion Detection Systems.  
(Or)  
c) Explain how a trusted system defends Trojan horse attacks? (6+6)  
d) Explain about Viruses.

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M.Tech. II Semester Regular Examinations, August/September, 2011

**SOC ARCHITECTURES  
(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Describe 3 stage pipelining ARM organization with a neat sketch.  
(b) Why does r15 give PC+8 in the first cycle of an instruction and PC+12 in subsequent cycles on an ARM 7? **[6+6M]**

**(OR)**

- (c) Describe the principle features of the ARM architecture.  
(d) Show a typical ARM data path timing for a 3-stage pipeline with a neat sketch. **[6+6M]**
- 2(a) How does the ARM processor responds to an exception entry? What is an exception return?  
(b) Mention the privileged operating modes of ARM along with order of priority.  
(c) Differentiate between pre-indexing and post-indexing modes used during single data transfer ARM instructions. **[4+4+4M]**

**(OR)**

- (d) Enumerate the various multiply instruction supported by ARM along with assembler formats.  
(e) Explain the normal use of memory in ARM with reference to the standard ARM C program address space model. How is data alignment taken care of by the ARM C compiler. **[6+6M]**
- 3(a) Show and explain the organization of a two-way set associated cache with a neat block diagram.  
(b) What is the need for memory management? Explain the working of segmented memory management scheme. **[6+6M]**

**(OR)**

- (c) Distinguish between unified cache and Harvard cache along with their merits and demerits.  
(d) Explain the operation of a translation Look aside buffer with a neat sketch. **[6+6M]**



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- 4(a) Show the interfacing of a basic ARM memory system with a neat sketch. What are the functions of the memory control logic?
- (b) What is the need for Hardware system prototyping tools? Explain about the operation of 'Rapid Silicon Prototyping' development system. **[6+6M]**

**(OR)**

- (c) Draw and explain advanced microcontroller Bus architecture.
- (d) Explain the working of ARM debug hardware and the role of an embedded ICE. **[6+6M]**
- 5(a) Describe the major functions performed by an operating system.
- (b) Explain about ARM MMU architecture. **[6+6M]**

**(OR)**

- (c) Explain about ARM protection unit with block diagram.
- (d) Explain the following terms.
- (i) Process synchronization
  - (ii) Context switching. **[6+6M]**

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M.Tech. II Semester Regular Examinations, August/September, 2011

**REFRIGERATION AND AIR CONDITIONING**  
(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

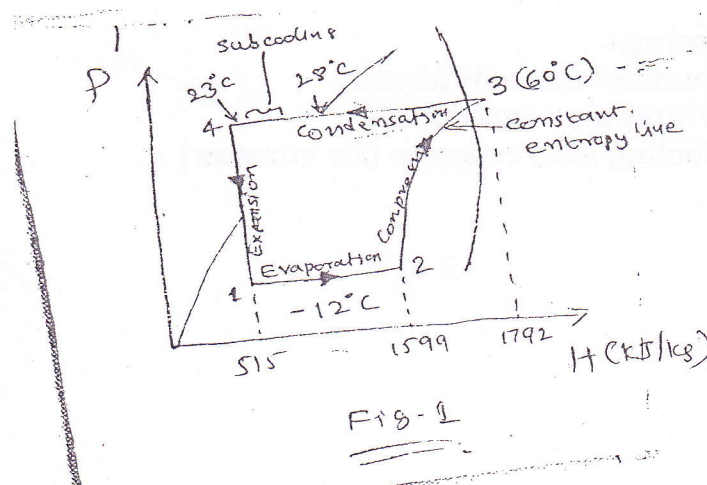
- 1(a) Write the classification of Refrigerants  
(b) What are the important parts of a refrigerating system. [6+6M]

(OR)

- (c) Describe the Boot-strap air craft refrigeration system with help of schematic and as well as T-S diagram. [12M]  
2(a) What are the factor affecting performance of vapour compression system explain in detail. [12M]

(OR)

- (b) A Refrigeration system of 10 ton capacity at an evaporator temperature of  $-12^{\circ}\text{C}$ , needs a condenser temperature of  $+28^{\circ}\text{C}$ . The refrigerant  $\text{NH}_3$  is sub-cooled by  $5^{\circ}\text{C}$  before entering the expansion valve. The vapour is 0.95 dry when it leaves the evaporator. Using the PH chart (fig 1) supplied for  $\text{NH}_3$  Find.  
(i) Conditions of vapour at the outlet of compressor.  
(ii) Condition of vapour at entrance of evaporator.  
(iii) COP  
(iv) Power required.



- 3(a) With the help of a sketch, explain water/lithium bromide absorption system.
- (b) Draw flow diagram and explain the working of a simple absorption system. [6+6M]

(OR)

- (c) Draw a neat sketch of steam jet refrigeration system. Explain its working.
- (d) Why a vortex tube is noiseless, and draw a sketch of vortex tube refrigeration. [6+6M]

- 4(a) The DBT = 35°C, WBT = 23°C, Atmosphere pressure = 736 mm Hg, partial pressure of water vapour = 15.18 mm Hg  
Find (1) Saturation pressure of vapour of DBT  
(2) Relative humidity  
(3) Sp. Humidity  
(4) Dew point temperature  
(5) Density of Air  
(6) Density of water vapour  
(7) Total density of moist air.  
(8) Enthalpy of moist air. [12M]

(OR)

- (b) What is a psychrometric chart. What information the chart conveys.
- (c) Enlist the various loads working on an air-conditioner. [6+6M]
- 5(a) What do you know about sensible and latent heat loads working on the conditioner
- (b) Draw heat pump circuit and explain its working principle. [6+6M]

(OR)

- (c) Write the following.
- (i) Summer air-conditioning  
(ii) Winter air-conditioning  
(iii) Cooling load estimate (for summer) [4+4+4M]



07/09/11

Code: MCS204

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**  
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**OPERATING SYSTEMS**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Distinguish between user and Kernel modes of operations of operating system.  
(b) Define the following terms:  
(i) Multi-programming (ii) Multi-tasking (iii) Time-sharing [6+6M]

(OR)

- (c) Explain how an operating system can be organized using layered approach.  
(d) What are system calls? Explain how open ( ) system call gets executed. [6+6M]
- 2(a) What is a process? Draw process state diagram for a multi programmed and time-sharing operating system.  
(b) Distinguish between preemptive and non-preemptive scheduling algorithms.  
(c) Assume that the following jobs are to be executed on a single processor system.

JOB ID	CPU Bust time
p	4
q	1
r	8
s	1
t	2

The jobs assumed to have arrived at time 0 and in the order p,q,r,s,t calculate departure time (completion time) for job P if scheduling strategy used is round robin with time slice 1 [4+4+4M]

(OR)

- (d) Explain how a process is created using for k ( ) system call.  
(e) Distinguish between process and thread. What are the advantages of using multi-threading [6+6M]

**Code: MCS204**

- 3(a) What is a critical section? Explain how a semaphore can be used to solve critical section problem.
- (b) Enumerate the necessary conditions for a deadlock to occur. Explain briefly how resource-allocation graph can be used to detect deadlock. **[6+6M]**

**(OR)**

- (c) What is a monitor? Explain the implementation of producer consumer problem using monitor.
- (d) Explain Banker's algorithm of deadlock avoidance. **[6+6M]**
- 4(a) Explain the hardware required for implementation of Demand paged memory management.
- (b) What is Belady's anomaly? Explain the working of the following page replacement algorithms.
- (i) LRU (ii) FIFO (iii) Optimal. **[6+6M]**

**(OR)**

- (c) What is a file system? Explain the organization of unix/Linux file system
- (d) Explain Indexed allocation of space for files. **[6+6M]**
- 5(a) Write short notes on  
(i) Disk structure (ii) Disk Scheduling
- (b) Distinguish between blocking and non-blocking I/O **[6+6M]**

**(OR)**

- (c) Distinguish between Access control list and capability list
- (d) What are the various program and system threads? Briefly explain each of them. **[6+6M]**



07/09/11

Code: MIT204

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**SOFTWARE TESTING & QUALITY ASSURANCE**

(Software Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) What are the three categories belonging to McCall's "factors of quality model". What are the software quality factors included in each of the categories. Briefly explain. [12M]

(OR)

- (b) What are the goals of the SQA infrastructures? Explain how the use of various components is useful in building it. [12M]
- 2(a) Enlist the "built-in difficulties to carry out a large-scale contract review and the steps that should be taken to make a large-scale contract review feasible. [12M]

(OR)

- (b) Explain the objectives and elements of the quality plan for a project [12M]
- 3(a) Differentiate between faults, failure and error. How can they be measured? Explain using suitable project based examples. [12M]

(OR)

- (b) What are the different types of testing? What is their focus and scope? Explain specifically why each of them is useful. [12M]
- 4(a) How can equivalence partitioning be used for generating test cases. Explain using suitable examples. [12M]

(OR)

- (b) What types of test cases can be framed for conformance testing. What types of metrics are needed to interpret the results. [12M]
- 5(a) What is regression testing? Explain the process and the importance of regression testing, using suitable examples. [12M]

(OR)

- (b) In performing regression testing, how can the test selection be done using execution trace and by using dynamic slicing? What is the difference in these approaches. [12M]



07/09/11

Code: MEC204

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**CODING THEORY AND TECHNIQUES  
(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) A transmitter produces three symbols A,B and C which are related with joint probabilities as below.

P(i)	i	P(J/i)		
9/27	A	J		
16/27	B	A	B	C
2/27	C	A	B	C
		B		
		C		

Find

- (i) Entropy considering the inter symbol influence.  
(ii) Entropy considering without inter symbol influence.
- (b) Show that the minimum distance of a linear block code is equal to the minimum weight of any non-zero word in the code. **[8+4M]**

(OR)

- (c) For a (6,3) systematic linear block code, the three parity check digits are  
 $C_4 = d_1 + d_2 + d_3$   
 $C_5 = d_1 + d_2$   
 &  $C_6 = d_1 + d_3$

Where  $d_1, d_2$  &  $d_3$  are the message digits

- (i) Draw the encoder and construct generator matrix.  
(ii) Decode the received code word  $R = 101100$ .

- (d) What is average information? Mention its properties. **[8+4M]**

- 2(a) The generator polynomial of a (15,11) cyclic code is

$$g(x) = 1 + x + x^2 + x^3 + x^4$$

Find the generator matrix G.

- (b) Explain syndrome calculation and decoding for (n,k) cyclic codes. **[4+8M]**

(OR)

- (c) The generator polynomial of a (15,5) cyclic code is

$$g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$$

- (i) Find the parity check polynomial of this code.

- (ii) Is  $C(x) = 1 + x^4 + x^6 + x^8 + x^{14}$  a code polynomial? If not, find the syndrome of  $C(x)$ . [6+6M]

- 3(a) Define the following terms.

- (i) Constraint length (ii) Branch metric (iii) Path metric. [6M]

- (b) The impulse response of a convolutional encoder are given by

$$g_1 = [100], g_2 = [101], g_3 = [111]$$

- (i) Find the output for the data input 1 0 1

- (ii) Find the transfer function of the code. [2+4M]

(OR)

- (c) A convolutional code is generated by the generator polynomials.

$$g_1(D) = 1 + D + D^2 \text{ and } g_2(D) = 1 + D^2$$

Draw the encoder and find the output for the message polynomial

$$m(D) = 1 + D^3 + D^4$$

- (d) Explain Viterbi decoding algorithm with a suitable example. [4+8M]

- 4(a) Briefly explain the decoding of single burst error correcting cyclic codes with diagram.

- (b) A (15,9) cyclic code is generated by  $g(x) = 1 + x^3 + x^4 + x^5 + x^6$

- (i) Find the burst length (ii) Find burst error correcting efficiency. [6+6M]

(OR)

- (c) What are inter leavers? With neat diagram explain convolutional inter leaver/de-inter leaver.

- (d) Explain the various properties of Galois field. [6+6M]

- 5(a) Find the minimal polynomial of  $\alpha^5$  in  $Gf(2^3)$

- (b) For a double error correcting (15,7) BCH code the received code word is

$$r(x) = x^9 + x^8 + x^6 + x^4 + 1$$

Use a suitable decoding algorithm to decode the code word. [4+8M]

(OR)

- (c) Find the generator polynomial of a (15,7) double error correcting BCH code [use  $Gf(2^4)$  generated by  $P(x) = 1 + x + x^4$ ]

- (d) Distinguish between BCH codes and cyclic codes. [6+6M]



- (b) A triple effect evaporator with parallel feed to the three stages is required to produce distilled water from a source of feed water at 10atm pressure and a temperature of 215°C. One kg/sec of hot saturated steam is available at a pressure of 20atm and a temperature of 180°C. The system must operate above atmospheric pressure throughout. What is the rate of flow of distilled water produced? [12m]
- 4(a) The cooling tower the water flow to the tower is 1000 Kg/s. The air flow through the tower is induced by natural draft by employing a tower 60m high above the packing. What diameter tower would be required to meet this duty? Pressure losses in the inlet, spray, and drift eliminator regions are assumed small compared to the pressure loss in the packing

Table: values of K for various types of Tower packing K-value [1/m]

Type of packing	$\dot{m}_L=1.35$		$\dot{m}_L=2.7$	
	$\dot{m}_a=1$	$\dot{m}_a=2$	$\dot{m}_a=1$	$\dot{m}_a=2$
Triangular slats	6.6	5.6	8.5	6.9
Rectangular slats	8.2	6.2	10.2	8.9
Corrugated slats	14.1	10.2	16.7	11.8

[12m]

(OR)

- (b) What are the cooling towers. Write the analysis of counter flow cooling towers. [12m]
- 5(a) Pentium V computer has a processor core – duo, for such computer how to find cooling load explain
- (b) Natural convection discuss for air cooling in a computer. [8+4m]

(OR)

- (c) How to select a cooling fan for personal computer?
- (d) Describe heat conduction in printed circuit boards. [6+6m]



Code: MCS205/4

09/09/11

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**ADVANCED COMPUTER ARCHITECTURE**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Define throughput, Execution time and Speed up.  
(b) Write how Amdahl's law is used to measure the performance.  
(c) Discuss the features of first generation and second generation computers. **[3+3+6M]**

**(OR)**

- (d) What are the factors that leads to improve the performance of the processor. Discuss  
(e) Explain the characteristics of fourth generation computers based on technology trends. **[6+6M]**
- 2(a) Explain the instruction. Set architectures for signal processing applications.  
(b) (i) Define opcode and operand.  
(ii) Explain the two address and three address instruction formats. **[6+1+5M]**

**(OR)**

- (c) Write the importance logical and arithmetic instruction in reduced. Instruction set architecture.  
(d) Explain with examples about register-reference and memory-reference instructions. **[6+6M]**
- 3(a) Explain the RAW and WAR Hazards. Give examples.  
(b) Why register forwarding is used to improve the performance of a processor **[6+6M]**

**(OR)**

- (c) Discuss the speculation methods used to resolve the control Hazards.  
(d) Describe the in-order execution and out-of-order execution merits and de-merits. **[6+6M]**

**Code: MCS205/4**

- 4(a) Compute the memory latency, if 80% of hit rate for L1-cache with 100ns and 10% hit rate of L2-cache with 1000ns and with 5000ns main memory latency.
- (b) Differentiate the associate mapping method with set-associative mapping and direct mapping method. **[4+8M]**

**(OR)**

- (c) Illustrate the importance of virtual memory. Discuss.
- (d) Explain the inclusive and exclusive cache policies in detail. **[6+6M]**
- 5(a) What is cache coherence? Explain how snoopy-based protocols resolves coherence problem.
- (b) Evaluate the memory consistency problems using write serialization with example. **[10+2M]**

**(OR)**

- (c) Differentiate shared memory architectures and distributed architectures.
- (d) Briefly explain about update-based coherence protocols. **[6+6M]**

**2 of 2**



09/09/11

Code: MIT205/2

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**EMBEDDED SYSTEMS**

(Software Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.

All questions carry equal marks

\*\*\*\*\*

- 1(a) Define microprocessor, microcontroller, embedded system, microcode.  
(b) Draw the block diagram of 8051 micro controller with explanation.  
(c) Write the design principles of embedded system. [2+6+4M]  
(OR)  
(d) What is timer? How does a counter perform timer functions.  
(e) Explain about the software and hardware components required for an embedded systems. [6+6M]
- 2(a) Write an assembly-language program to perform the addition of two BCD-numbers for 8051 instruction set.  
(b) Explain the various data transfer instructions used to refer to string operations. [6+6M]  
(OR)  
(c) Write an 8051 assembly language program to perform the masking operations using logical operations.  
(d) Compare the instructions of 8051 to general purpose processor. Explain. [6+6M]
- 3(a) What are interrupts? How interrupts handled in 8051 microcontroller.  
(b) Differentiate between synchronous and asynchronous data transmission. Give examples. [6+6M]  
(OR)  
(c) Write an assembly language program to display the message through serial communication.  
(d) Write about the successive approximation method used for digital-to-analog/Analog - to - Digital converter. [5+7M]
- 4(a) How are tasks scheduled in an embedded application? Explain  
(b) Write how semaphores are used to synchronize the communication operations. [6+6M]  
(OR)  
(c) Write short notes on mailboxes and pipes.  
(d) Write advantages of Broad-based commercial RTOS [8+4M]
- 5(a) Write the usage of queues for a network? Explain  
(b) Write the design issues in system development process of embedded system design. [6+6M]  
(OR)  
(c) Explain the working principle of automatic chocolate vending machine.  
(d) Write the advantages and dis-advantages of Hard-time scheduling policies compared to soft-time scheduling. [4+8M]

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram - 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**CPLD & FPGA ARCHITECTURES AND APPLICATIONS  
(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Describe the structure of programmable read only memory (PROM)  
 (b) Draw the neat sketch of lattice CPLD and explain its architecture. [4+8M]

(OR)

- (c) Give the basic architecture and applications of CPLD  
 (d) Explain the architecture and features of MAX 7000 series CPLDs [4+8M]
- 2(a) What are the critical issues in the design life cycle of an FPGA?  
 (b) Describe clearly an LUT based FPGA [6+6M]

(OR)

- (c) What is placing and routing?  
 (d) Compare the features of Actel, Altera and Xilinx FPGA. [4+8M]

- 3(a) Draw the state diagram for the following one hot equations.

$$\left. \begin{array}{l} D_a = a \bar{x} \bar{y} + C \\ D_b = a \bar{x} \bar{y} + b y \\ D_c = a x + c x \end{array} \right\} \text{and} \left\{ \begin{array}{l} CLRREG = LDCNT = a \\ STDLY = b \\ FIN = C \\ RES = c y \end{array} \right.$$

- (b) Explain the realization of state machine chart using microprogramming [5+7M]

(OR)

- (c) What is a linked state machine?  
 (d) Explain the petunet model with the help of a traffic light control [4+8M]

- 4(a) What are the tools provided by mentor graphics for simulation and synthesis of digital design using FPGA? Discuss. [12M]

(OR)

- (b) Mention various digital tools for designing ASICS. [12M]

- 5(a) Describe a case study for the implementation of a parallel controller. [12M]

(OR)

- (b) Explain the implementation of a multiplexer using FPGA. [12M]

09/09/11

Code: MME205/1

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**THERMAL AND NUCLEAR POWER PLANTS**

(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) What are the different types of power plants where electricity is produced in large quantities?  
(b) Write the method for extracting gas from coal? **[6+6M]**

(OR)

- (c) In an oil fired boiler the fuel had an analysis by mass: carbon 84%, hydrogen 10%, Sulphur 3.2%, Oxygen 1.6% remainder incombustible. The analysis of dry flue gas by volume gave: Combined  $\text{CO}_2 + \text{SO}_2$  15.72%,  $\text{O}_2$  1%, there being no CO or  $\text{SO}_3$ , Calculate per kg of fuel  
(1) Mass of air supplied  
(2) Percentage excess air supplied  
(3) Mass of dry flue gas formed  
(4) Mass of water vapour formed. **[12M]**

- 2(a) What are the factor to be considered for an ash disposal system?  
(b) What are the basic objectives of feed water treatment? **[6+6M]**

(OR)

- (c) A 15m high down corner – rise circuit operates at 160 bar. The riser receives uniform heat flux and saturated water. The exit quality is 50 percent calculate the pressure head developed due to natural circulation. Take the slip factor as 1.2 **[12M]**

- 3(a) What are the advantages of combined cycle power generation? **[12M]**

(OR)



- (b) A gas turbine plant with an exhaust heat exchanger has the following data:

Turbine and compressor pressure ratio 10.0

Minimum cycle temperature 300K

Maximum cycle temperature 1500 K

Flow rate through turbine and compressor 10 Kg/s.

Thermal ratio of the heat exchanger 0.8

Turbine efficiency 85%

Compressor efficiency 82%

The mass flow of the fuel can be ignored. The properties of air and gas are about the same

$$C_p = 1.005 \text{ kJ/Kg K}, \gamma = 1.4$$

Determine:

- (1) Power developed                      (2) Thermal efficiency of the plant  
 (3) Efficiency of the ideal joules cycle with heat exchange and Carnot's cycle.  
 Recalculate (i) and (ii) when the thermal ratio of the heat exchanger in units.

[12M]

- 4(a) Explain about Nuclear stability and binding energy.

[12M]

(OR)

- (b) A reactor is fuelled with 100 tonnes of natural uranium (atomic mass 238.05) in which the average thermal neutron (2200m/s) flux is  $10^{13}$  neutrons/cm<sup>2</sup>, The 2200 m/s cross-section of U-235 (atomic mass 235.04) are  $\bar{\sigma}_f = 579$  barns and  $\bar{\sigma}_c = 101$  barns. The energy release per fission is 200 MeV and 0.715% of natural uranium is U - 235. Calculate (i) The rating of the reactor in MW/tonne. (ii) the rate of consumption of U-235 per day.

[12M]

- 5(a) A generating unit of 10MW capacity supplies the following loads.

- (1) Domestic consumers with a maximum demand of 6MW at a load factor of 20%  
 (2) Small industrial load with a maximum demand of 3.6MW at a load factor of 50%  
 (3) Street-light load with a maximum demand of 400 KW at 30% load factor.

Find the overall cost of energy per KWh for each type of consumer using the following data:

Capital cost of the plant = Rs 10,000 per KW Total running cost = Rs 36,00,000 per year Annual rate of interest and depreciation on capital cost = 10%.

[12M]

(OR)

- (b) Classify the temperature measurement instruments in detail.

[12M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram -521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**MOBILE COMPUTING**

Time: 3 hours

Max.Marks: 60

Answer all the questions.  
All questions carry equal marks

Code No: MCS206/4

- 1(a) Illustrate the hidden terminal problem. [6+6 M]  
(b) What is multipath propagation? What are its effects?  
(OR)  
(c) Describe amplitude and frequency modulation. [6+6 M]  
(d) Differentiate DSSS and FHSS
- 2 (a) Describe various multiplexing techniques. Explain why a given bandwidth is [6+6 M]  
used most efficiently in CDMA  
(b) Explain DHCP in detail.  
(OR)  
(c) State the reasons for reverse tunneling in mobile IP [6+6 M]  
(d) Explain the need for mobile IP. Explain the following mechanisms of Mobile IP.  
i. Agent advertisement  
ii. Registration  
iii. Tunneling
- 3(a) Explain mobile TCP . How does a supervisory host send TCP packets to the [6+6 M]  
mobile node and to a fixed TCP connection? Give the advantages and  
disadvantages of mobile TCP  
(b) Explain in direct TCP.  
(OR)  
(c) Explain the impact of slow start algorithm of TCP in wireless networks. [6+6 M]  
(d) Explain the features of CODA file systems that support mobility.
- 4(a) What are the services provided in a GSM system? Explain the architecture of [6+6 M]  
GSM.  
(b) Describe the process of Localization in satellite systems.  
(OR)  
(c) What are the different control channels of GSM? what are their functions? [6+6 M]  
(d) what are the functions of the following databases of GSM?  
i. HLR  
ii. VLR  
iii. Auc
- 5(a) Explain CSMA/CA protocol. Justify the relationship: SIFS<PIFS<DIFS. [6+6 M]  
(b) What is FHSS? Why is it used in Bluetooth network?  
(OR)  
(c) Distinguish between infrastructure based and Adhoc mobile networks. [6+6 M]  
(d) Differentiate proactive and reactive routing in MANETS.



12/09/11

Code: MIT206/4

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**DISTRIBUTED OPERATING SYSTEMS**

(Software Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) How is the design of multithreaded clients and multithreaded servers beneficial in modern distributed system. [12M]  
(OR)
- (b) How are software agents designed using the agent technology. [12M]
- 2(a) One of the largest distributed naming services in use is the internet Domain name system (DNS) Explain the organization of the DNS name space information stored in its nodes and actual implementation of DNS. [12M]  
(OR)
- (b) How can simple reference counting and advanced reference counting be used when trying to solve the problem of unreferenced entities? Explain. [12M]
- 3(a) Explain and compare the three mutual exclusion algorithms-centralized, distributed and token ring algorithms with their advantages and disadvantages. [12M]  
(OR)
- (b) Differentiate between the various approaches for propagating the updates in replicas. Bring out the criteria for selection, advantages and disadvantages in each of the protocols selected. [12M]
- 4(a) When trying to reach agreement in faulty systems, show that agreement is possible only if more than two-thirds of the processes are working properly (assume that communication between the processes is perfect, but processes are not). [12M]  
(OR)
- (b) For a distributed transaction, involving the participation of a number of processes each running on a different machine explain the steps and phases of the two – phase commit protocol (ZPC.) [12M]
- 5(a) Discuss the prominent features of – CORBA and DCOM distributed object based systems. [12M]  
(OR)
- (b) Discuss the various issues in implementation of CODA file system with suitable examples for each issues. [12M]

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12/09/11

Code: MEC206/1

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**WIRELESS NETWORKS**  
**(Systems and Signal Processing)**

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

- 1(a) Prove that for a hexagonal geometry, The co-channel reuse ratio is given by  $Q = \sqrt{3N}$   
Where the symbols have usual meaning.
- (b) Explain the frequency reuse mechanism and discuss the various considerations in such a structure. **[6+6M]**

**(OR)**

- (c) Explain in detail about paging and cordless systems.
- (d) Briefly explain adjacent channel and co-channel interference. **[6+6M]**
- 2(a) Explain CSMA protocol in detail
- (b) Explain capture effect in packet radio. **[6+6M]**

**(OR)**

- (c) Explain special features of pure ALOHA and slotted ALOHA
- (d) Explain the implementation of spread spectrum multiple access scheme with special emphasis on CDMA **[6+6M]**
- 3(a) Explain with neat block diagram the operation of CDPD.
- (b) Compare ISDN, BISDN and ATM. **[6+6M]**

**(OR)**

- (c) Explain common channel signaling (CCS)
- (d) Explain the features of advanced radio data information system. **[6+6M]**
- 4(a) Briefly explain about  
(i) Co-located address (ii) Registration (iii) Tunneling.
- (b) Draw the IEEE 802 protocol architecture and explain its functioning **[6+6M]**

**(OR)**

- (c) Explain about infrared Lans and spread spectrum Lans.
- (d) Explain briefly about WAP architecture. **[6+6M]**
- 5(a) Explain mobile application protocol.
- (b) Explain Adhock wireless internet. **[6+6M]**

**(OR)**

- (c) Explain the special features of GPRS in mobile data networks.
- (d) Explain MAC Protocol. **[6+6M]**



12/09/11

Code: MME206/3

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram - 521 230 :: Krishna Dist.

M.Tech. II Semester Regular Examinations, August/September, 2011

**ADVANCED OPTIMIZATION TECHNIQUES**

(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

Answer all the questions.  
All questions carry equal marks

\*\*\*\*\*

1(a) Using simplex method solve:

(i) Minimize  $Z = x_1 - 2x_2 - 3x_3$ ,

Subject to :  $-2x_1 + x_2 + 3x_3 = 2$ ,

$2x_1 + 3x_2 + 4x_3 = 1$ ,

and  $x_1, x_2, x_3 \geq 0$

(ii) Maximize  $Z = 4x_1 + 3x_2 + 6x_3$ ,

Subject to  $2x_1 + 3x_2 + 2x_3 \leq 440$

$4x_1 + 3x_3 \leq 470$

$2x_1 + 5x_2 \leq 430$

$x_1, x_2, x_3 \geq 0$

**[6+6M]**

(OR)

(b) Using Big - M method to solve,

Maximize  $Z = x_1 + 2x_2 + 3x_3 - x_4$ ,

$x_1 + 2x_2 + 3x_3 = 15$ ,

$2x_1 + x_2 + 5x_3 = 20$ ,

$x_1 + 2x_2 + x_3 + x_4 = 10$

**[12M]**

2(a) Four different jobs can be done on four different machines. The setup and Take-down time costs are assumed to be prohibitively high for changeovers. The matrix below gives the cost in rupees of producing job 'i' on machine 'j'

Jobs \ Machines	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
	J <sub>1</sub>	5	7	11
J <sub>2</sub>	8	5	9	6
J <sub>3</sub>	4	7	10	7
J <sub>4</sub>	10	4	8	3

How should the jobs be assigned to the various machines so that the total cost is minimized? Also formulate the mathematical model for the problem. **[12M]**

(OR)

- (b) Solve the following Non-linear programming problem using Kuhn-tucker conditions:

$$\text{Maximize } Z = 7x_1^2 + 6x_1 + 5x_2^2$$

$$\text{Subject to } x_1 + 2x_2 \leq 10,$$

$$x_1 - 3x_2 \leq 9,$$

$$x_1, x_2 \geq 0$$

[12M]

- 3(a) Starting from the initial total solution  $(x_1, x_2) = (0,0)$ , iteratively apply two iterations of the gradient search procedure to the following two-variable unconstrained problem. Also determine the exact solutions by solving  $\nabla f(x) = 0$

$$\text{maximize } f(x) = 8x_1 - x_1^2 - 12x_2 - 2x_2^2 + 2x_1x_2$$

[12M]

(OR)

- (b) Use the nelder - mead algorithm to find the minimum of

$$f(x, y) = x^2 - 4x + y^2 - y - xy. \text{ start with the three vertices}$$

$$V_1 = (0,0), V_2 = (1.2, 0.0) \text{ and } V_3 = (0.0, 0.8)$$

[12M]

- 4(a) Suppose a genetic algorithm uses a chromosomes of the form  $x = a b c d e f g h$  with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual 'x' be calculated as:

$$f(x) = (a + b) - (c + d) + (e + f) - (g + h),$$

and let the initial population consists of four individuals with the following chromosomes.

$$X_1 = 6 5 4 1 3 5 3 2$$

$$X_2 = 8 7 1 2 6 6 0 1$$

$$X_3 = 2 3 9 2 1 2 8 5$$

$$X_4 = 4 1 8 5 2 0 9 4$$

- (a) Evaluate the fitness of each individual, showing all your workings, and arrange them in order with the fittest first and the least fit last.
- (b) Perform the following crossover operations
- Cross the fittest two individuals using one - point crossover at the middle point.
  - Cross the second and third fittest individuals using a two-point crossover (points based f)
  - Cross the first and third fittest individuals (ranked 1<sup>st</sup> and 3<sup>rd</sup>) using a uniform crossover.

[12M]

(OR)

- (b) (i) What is a genetic algorithms? Describe the various steps involved in GA with an example.
- (ii) What two requirements should a problem satisfy in order to be suitable for solving it by GA. also discuss the limitations of GA.

[8+4M]

- 5(a) (i) Describe the various applications of optimization in design and manufacturing systems.
- (ii) What is graphical optimization, what are its limitations.

[6+6M]

(OR)

- (b) Explain the procedure of optimization of path synthesis of a four-bar mechanisms.

[12M]