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06EC71

Seventh Semester B.E. Degree Examination, December 2012
Computer Communication Networks

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Describe the ISO OSI reference model of a computer Network. Discuss the function of each layer. (10 Marks)
- b. Describe the SS7 service and its relation to the telephone network. (05 Marks)
- c. Distinguish between a DSL modem and a DSLAM. (05 Marks)
- 2 a. Differentiate between character stuffing and bit stuffing with examples. (05 Marks)
- b. Explain different HDLC frames. (05 Marks)
- c. What are sliding window protocols? Explain Go-Back-N protocol for Noisy channel. (10 Marks)
- 3 a. Compare pure ALOHA with slotted ALOHA. What are the reasons for poor channel utilization in ALOHA systems? How the same is improved in CSMA. (08 Marks)
- b. Discuss the concepts of
i) 1 – persistent CSMA ii) Non-persistent CSMA. (06 Marks)
- c. Explain the working of CSMA/CD. Suppose a point to point link is set up between earth and a rover on MARS. The distance from earth to mars is approximately 55 Gm and data travels over the link at a speed of light 3×10^8 m/s. calculate the minimum round trip propagation time. (06 Marks)
- 4 a. Compare the data rates for standard Ethernet, fast Ethernet, Gigabit Ethernet and Ten Gigabit Ethernet. (04 Marks)
- b. What is the difference between a unicast, multicast, and broad cast address? Define the type of the following destination addresses:
i) 4A : 30 : 10 : 21 : 10 : 1A
ii) 47 : 20 : 1B : 2E : 08 : EE
iii) FF : FF : FF : FF : FF : FF (08 Marks)
- c. Explain the following with respect to FAST Ethernet:
i) Implementation ii) Encoding iii) 100 BASE-TX iv) 100 BASE-FX. (08 Marks)

PART – B

- 5 a. Explain the following connecting devices:
i) Repeater ii) Bridge iii) Router iv) Gateway. (08 Marks)
- b. What is spanning tree? Explain with suitable example. (08 Marks)
- c. What is VLAN? Explain. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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- 6 a. Explain the address formats for IPV4 and IPV6 address? (08 Marks)
b. List the classes in classful addressing and define the application of each class. (08 Marks)
c. What is NAT? How can NAT help in address depletion? (04 Marks)
- 7 a. What is the difference between a direct and an indirect delivery? (04 Marks)
b. List and explain three forwarding techniques. (08 Marks)
c. Explain dynamic routing table. (08 Marks)
- 8 a. Compare the TCP header and the UDP header. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence. (08 Marks)
b. What are the three domains of domain name space? Explain. (08 Marks)
c. How does recursion resolution differ from iterative resolution? (04 Marks)

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06EC72

Seventh Semester B.E. Degree Examination, December 2012
Optical Fiber Communication

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. List the disadvantages of copper wire at the optical frequency range. (06 Marks)
b. Explain the ray theory of the optical fiber, with the help of a neat sketch. (08 Marks)
c. A silica glass fiber has a core refractive index of 1.5 and the cladding refractive index of 1.45. Calculate (i) critical angle for the core-cladding interface, (ii) the NA of the fiber and (iii) percentage of light collected by the fiber. (06 Marks)
- 2 a. Describe the attenuation mechanisms in an optical fiber. (10 Marks)
b. Derive the equation for material dispersion in the optical fiber. (06 Marks)
c. An optical signal at a specific wavelength has lost 55% of its power, after traversing 7 km of fiber. What is the attenuation in dB/km of this fiber. (04 Marks)
- 3 a. What are the characteristic requirements of an optical source? With the help of diagram, describe the operation of surface emitting LED. (10 Marks)
b. Which are the noise types affecting the optical detector. (03 Marks)
c. Describe the PIN diode performance, using the diagram. (07 Marks)
- 4 a. Derive an equation for power coupling to the step index fiber and graded index fiber. (10 Marks)
b. What is equilibrium numerical aperture of a fiber? With the help of diagrams, explain the lensing schemes for coupling improvement. (10 Marks)

PART – B

- 5 a. Discuss the error sources in the optical signal detection. (07 Marks)
b. Derive an equation for optical receiver sensitivity. (10 Marks)
c. Calculate the PIN diode receiver sensitivity, if the gain of the photo detector is 1, its noise figure is 1 and bandwidth of the receiver is assumed to be half of the bit rate. Note the BER is 10^{-12} and data rate is 100 Mb/s. (03 Marks)
- 6 a. Write the diagram and explain the radio over fiber links. (10 Marks)
b. What is link power budget? With an example, explain the link power budget calculation. (10 Marks)
- 7 a. With the help of neat diagram, explain the operation of WDM. (08 Marks)
b. Describe the principles of working of isolators, circulator and ADM using suitable diagrams. (12 Marks)
- 8 a. What are the optical amplifiers? Describe with the help of a sketch the semiconductor laser amplifier. (10 Marks)
b. Describe the SONET optical network working with reference to suitable diagram. (10 Marks)

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06EC73

Seventh Semester B.E. Degree Examination, December 2012
Power Electronics

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. What is power electronics? Give two applications of P.E. (06 Marks)
- b. What is the difference between thyristor and a TRIAC? (04 Marks)
- c. What are the peripheral effects of power electronics equipments? (10 Marks)
- 2 a. What is a bipolar transistor and explain how many types are there and what are their three region operations? (10 Marks)
- b. What are pinch of voltage, threshold voltage and transconductance of MOSFET? (06 Marks)
- c. Compare BJT, MOSFET and IGBTs. (04 Marks)
- 3 a. What is the difference between SCR and a TRIAC? Explain its characteristics? (08 Marks)
- b. The input voltage of Fig.Q3(b) is $V_s = 200V$ with load resistance of $R = 5\Omega$. The load and stray inductance are negligible and the thyristor is operated at a frequency of $f_s = 2 \text{ kHz}$. If the required dV/dt is $100 \text{ V}/\mu\text{s}$ and the discharge current is to be limited to 100 A . Determine i) the value of R_s and C_s , ii) the scrubber loss and iii) the power rating of scrubber resistor. (08 Marks)

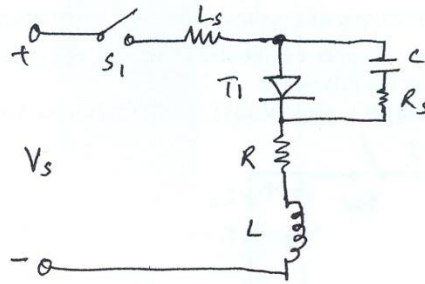


Fig.Q3(b)

- c. What is the common technique for voltage sharing and serial connected thyristor? (04 Marks)
- 4 a. With a neat diagram and waveforms, explain the principle of single phase full converters purely resistive load. Derive the expression for voltage o/p voltage and rms o/p voltage. (10 Marks)
- b. What are the advantages and disadvantages of series converters? (06 Marks)
- c. How do you classify phase control converters? Explain. (04 Marks)

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PART - B

- 5 a. Draw a circuit diagram and associated waveforms, explain the operation of a single phase bi-directional AC voltage controller with resistive load, obtain the rms output voltage. (10 Marks)
- b. An ac voltage controller in Fig.Q5(b) has a resistive load of $R = 10\Omega$ and the root-mean-square (rms) input voltage is $V_s = 120V$, 60 Hz. The thyristor switch is on for $n = 25$ cycles and is off for $m = 75$ cycles. Determine i) the rms output voltage V_o , ii) the input power factor (PF) and iii) the average and rms current of thyristors. (07 Marks)

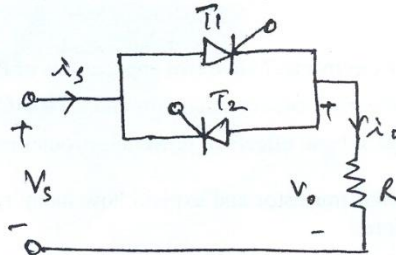


Fig.Q5(b)

- c. What are the advantages and disadvantages of ON-OFF control? (03 Marks)
- 6 a. What is an inverter? Explain its principle of operation (any one) with a neat diagram and waveforms. (08 Marks)
- b. What are the performance parameters of inverters? (06 Marks)
- c. How to differentiate 1ϕ and 3ϕ inverters? (06 Marks)
- 7 a. What is the principle of stepdown operation of chopper? (04 Marks)
- b. The stepdown chopper circuit shown in Fig.Q7b(i) & (ii), having resistive load. Derive an expression for the following:
 i) Average output voltage $V_o(av)$ ii) rms output voltage V_o (rms). (08 Marks)

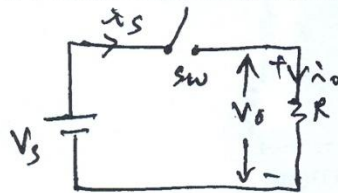


Fig.Q7b(i)

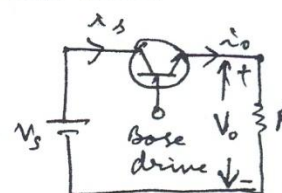


Fig.Q7b(ii)

- c. A chopper circuit is operating on TRC at a frequency of 2 kHz on a 460 V supply of the load voltage of 350V. Calculate the conduction period of the thyristor in each cycle. (08 Marks)
- 8 Write short notes on : (20 Marks)
- Communication techniques
 - Difference between ON-OFF control and phase control
 - Static induction transistor (SIT's)
 - Performance parameters of rectifier.

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06EC74

Seventh Semester B.E. Degree Examination, December 2012
DSP Algorithms and Architecture

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. What is digital signal processing? What are the important issues to be considered in designing and implementing a DSP system? Explain in detail. (09 Marks)
 b. Why signal sampling is required? Explain the sampling process. (05 Marks)
 c. Define decimation and interpolation process. Explain them using block diagrams and equations. (06 Marks)
- 2 a. Give the structure of a 4×4 Braun multiplier, explain its concept. What modification is required to carry out multiplication of signed numbers? Comment on speed of the multiplier. (10 Marks)
 b. Explain guard bits in a MAC unit of a DSP. Consider a MAC unit whose inputs are 24-bit numbers. How many guard bits should be provided if 512 products have to be added in the accumulator to prevent overflow condition? What is the overall size of the accumulator required? (10 Marks)
- 3 a. What is the function of an address generation unit? Explain with the help of a block diagram. (08 Marks)
 b. Why circular buffers are required in DSP processors? How they are implemented? (02 Marks)
 c. Explain the barrel shifter of the TMS320C54XX processor with the help of a functional diagram. (05 Marks)
 d. Explain the direct addressing mode of the TMS320C54XX processor with the help of a block diagram. (05 Marks)
- 4 a. A digital signal processor has a circular buffer with the start and end addresses as 0200h and 0310h. What is the circular buffer size? What would be the new values of address pointer of the above buffer if, in the course of address computation, it gets updated to, i) 0336h ii) 0192h. (06 Marks)
 b. Show the pipeline operation of the following sequence of instructions if the initial value of AR3 is 80 and the values stored in the memory locations 80, 81, 82 are 1, 2, 3 respectively.
 LD *AR3+, A
 ADD # 1000h, A
 STL A, *AR3+ (08 Marks)
 c. Give the logical block diagram of timer circuit. Explain its operation. (06 Marks)

PART – B

- 5 a. Determine the value of each of the following 16-bit numbers represented using the given Q-notation:
 i) 4400h as a Q0 number.
 ii) 4400h as a Q15 number.
 iii) 4400h as a Q7 number
 iv) 4400h as a Q1 number. (04 Marks)
 b. With the help of a block diagram explain the implementation of an FIR filter in TMS320C54XX processor. Show the memory organization for the filter implementation. (08 Marks)
 c. What is the drawback of using linear interpolation for implementing interpolation filter? Explain a scheme that overcomes this drawback. (06 Marks)
 d. How do you obtain the product of two 16 bit Q15 numbers in Q15 representation? (02 Marks)

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- 6 a. Why zero padding is done before computing the DFT? (02 Marks)
b. What minimum size FFT must be used to compute a DFT of 220 points in radix-2 algorithm? Determine the number of butterfly structures needed for this algorithm and thereby determine number of complex multiplications and additions needed. (04 Marks)
c. What do you mean by bit-reversed index generation and how it is implemented in TMS320C54XX DSP assembly language? (08 Marks)
d. Write a subroutine program to find the spectrum of the transformed data using TMS320C54XXDSP. (06 Marks)
- 7 a. Design a data memory system with address range 7FF800-7FFFFFFh for a C5416 processor. Use $2K \times 8$ SRAM memory chip. (10 Marks)
b. Discuss in detail the interrupt handling in the C54XX processor. (10 Marks)
- 8 a. Explain briefly the building blocks of a PCM3002 CODEC device. (08 Marks)
b. What do you understand by a DSP based biotelemetry receiver? (04 Marks)
c. With the help of block diagram, explain JPEG algorithm. (08 Marks)

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06EC751

Seventh Semester B.E. Degree Examination, January 2013
Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the goals of an operating system. (06 Marks)
b. List the common task performed by operating system. (06 Marks)
c. Explain the features and special techniques of distributed operating system. (08 Marks)
- 2 a. What are the problems surfaced in operating system with monolithic structure. (04 Marks)
b. Explain:
i) Layered structure of O.S.
ii) Kernel based O.S. (16 Marks)
- 3 a. List the different types of process interaction and explain them in brief. (08 Marks)
b. Describe the components of the process environment. (06 Marks)
c. List the events that occur during the operation of operating system. (06 Marks)
- 4 a. Describe the features of static and dynamic memory allocation. (05 Marks)
b. Write a note on contiguous memory allocation. (07 Marks)
c. Explain about slab allocator of solaris 2.4 system. (08 Marks)

PART – B

- 5 a. Explain the important concepts in the operation of demand paging. (12 Marks)
b. Write a note on page replacement policies. (08 Marks)
- 6 a. Describe the different operations performed on files. (10 Marks)
b. Explain UNIX file system. (10 Marks)
- 7 a. With neat block diagram, explain about the event handling and scheduling. (08 Marks)
b. Explain the scheduling in UNIX. (08 Marks)
c. Summarize the main approaches to real time scheduling. (04 Marks)
- 8 Write short notes on:
a. Buffering of interprocess messages. (08 Marks)
b. Mail boxes. (07 Marks)
c. Interprocess communication in UNIX. (05 Marks)

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06EC756

Seventh Semester B.E. Degree Examination, January 2013
Image Processing

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

1.
 - a. What is digital image processing? Explain the use of DIP in any two applications. (06 Marks)
 - b. What are the fundamental steps in DIP? Explain the working of each stage, with block diagram. (10 Marks)
 - c. Write a short note on brightness adoption and discrimination. (04 Marks)

2.
 - a. Explain the adjacency, connectivity, regions and boundaries between pixels, with examples. (08 Marks)
 - b. Let $V = \{1, 2\}$ and compute the D4 and D8 distances between p and q for the image segment. Indicate the shortest path with double line. (08 Marks)

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

- c. Develop an algorithm for converting a one – pixel thick, 8 connected path to a 4 connected path. (04 Marks)

3.
 - a. Explain the properties of unitary transforms and give 4 important unitary image transforms. (08 Marks)
 - b. Calculate the transformed image V and the basis images for orthogonal matrix A and image U

$$A = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, U = \begin{pmatrix} 2 & 3 \\ 1 & 2 \end{pmatrix}.$$
 (06 Marks)
 - c. Discuss the properties of 2 dimensional DFT. (06 Marks)

4.
 - a. Explain Haar transformation with its properties, compute the Haar transformation of 2×2 image $F = \begin{bmatrix} 3 & -1 \\ 6 & 2 \end{bmatrix}$. (08 Marks)
 - b. Define Hadmard transform, and generate Kernel for $N = 4$. (06 Marks)
 - c. Discuss the advantages and applications of the following transformations
 i) Cosine ii) Sine iii) Slant iv) KL. (06 Marks)

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PART – B

- 5 a. Explain the image enhancement in spatial domain with log transformation and bit plane slicing techniques. (06 Marks)
b. Derive the equation for histogram equalization and mention its satisfied conditions. (08 Marks)
c. Explain the use of arithmetic and logical operations for image enhancement. (06 Marks)
- 6 a. Explain the different types of low – pass spatial filters. (08 Marks)
b. Explain the homomorphic filters for image enhancement. (06 Marks)
c. What is the purpose of image restoration? Explain the image degradation and restoration, with suitable model. (06 Marks)
- 7 a. Explain any 4 noise probability density functions. (08 Marks)
b. What are the different types of mean filters used for noise. Reduction and explain in brief. (06 Marks)
c. Explain the use of inverse filtering and minimum mean square error (wiener) filtering for handling noise. (06 Marks)
- 8 a. Convert the RGB colour model into HSI color model. (08 Marks)
b. Explain the pseudo color image processing and draw the intensity slicing curve for gray levels to 4 colours. (06 Marks)
c. List three main properties of a median filter. (03 Marks)
d. How many minute would it take to transmit a 1024×1024 image with 256 gray levels, using 56 kbps modem? (03 Marks)

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06EC762

Seventh Semester B.E. Degree Examination, January 2013
Real Time Systems

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Differentiate:
 - i) Real time and non real time programming. (09 Marks)
 - ii) Hard and soft real time with example. (08 Marks)
 - iii) Clock based and event based tasks. (03 Marks)
- b. Define the term “time constraint”. How are RTS classified based on time constraint? Explain them with appropriate equations. (08 Marks)
- c. Why real time programming is more difficult to verify than non-real time programming? (03 Marks)
- 2 a. What is a DDC? What are the advantages of DDC over analog control? Discuss PID control algorithm. (10 Marks)
- b. Compare batch processing and continuous processing. (04 Marks)
- c. List out the responsibilities of a control engineer in designing the suitable computer system. (06 Marks)
- 3 a. Consider a printer interfaced for polling data from the computer. Assuming the data is being transferred to a printer at 40 character/sec. The computer finds the device is ready once every 25 msec. The 3 instructions involved in performing the test will take approximately 5 μ sec. Find the time for each character transfer and percentage of spending time of computer for checking the device is ready for every character. (05 Marks)
- b. Why is memory protection important in real time system? What methods can be used to provide memory protection? (05 Marks)
- c. Mention the features of specialized processors and explain MIMD, with a neat diagram. (10 Marks)
- 4 a. What are the major requirements of CVTCLASS? Explain. (08 Marks)
- b. List and explain the various requirements in programming languages used for real time applications. (12 Marks)

PART – B

- 5 a. 3 tasks A, B and C are required to run at 1ms, 6ms and 25ms intervals [corresponding to 1 tick, 2 tick and 4 tick, if the clock interrupt rate is set at 20 ms]. If the task priority order is set as A, B and C with A has highest priority and also calculate the delay required to invoke task A at every 4th invocation. Consider the tasks are in cyclic manner. (08 Marks)
- b. What are functions of attack management module? Explain various tasks states, with the help of state diagram. (12 Marks)

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- 6 a. List the set of functions and primitives for RTOS. (10 Marks)
- b. Consider the system whose outline diagram is shown in Fig.Q.6(b). It is assumed that the "control", "display" and "operator" i/p program are to be run as separate tasks with priorities 1, 10, 20 respectively. The "control" task has to run at 40 ms intervals and the "display" update task at 55 intervals. The system clock is set at 20ms and "control" task has to run every 2 system ticks. The operator run at 10 S intervals. Write the outline structure of the system. (10 Marks)

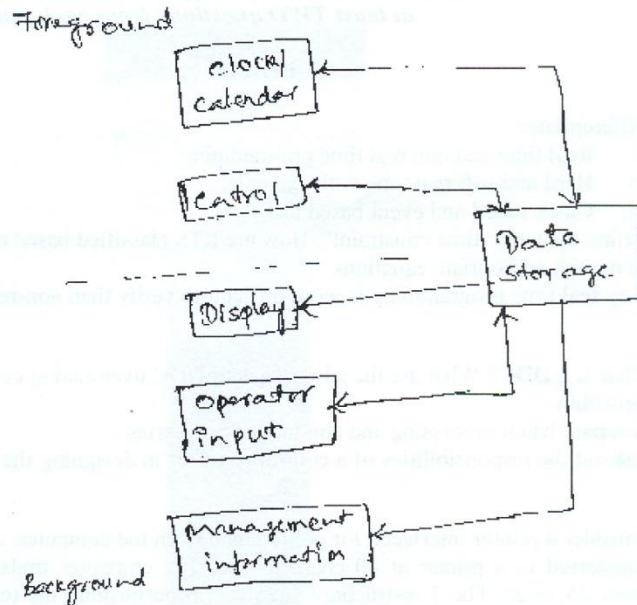


Fig.Q.6(b)

- 7 a. Explain software design for RTS using software module. (10 Marks)
- b. How data will be shared with common memory. (05 Marks)
- c. Mention the importance of conditions flag and binary semaphores. (05 Marks)
- 8 a. Explain Yourdon methodology. (04 Marks)
- b. Write short notes on:
- PSPECs and CSPECs
 - Ward and Mellor method. (16 Marks)

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06EC767

Seventh Semester B.E. Degree Examination, January 2013
Human Resource Management

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Define HRM. Explain the functions and objectives. (10 Marks)
b. Define strategic management. Explain the strategic management process. (10 Marks)
- 2 a. What is human resource planning? What are the factors affecting HRP? Explain any three of them. (10 Marks)
b. What is job analysis? Explain its process and specify the methods of collecting job data. (10 Marks)
- 3 a. Define recruitment. Bring out the factors which influence recruitment. (10 Marks)
b. Define selection. Explain the selection process. (10 Marks)
- 4 a. Define the term "Training and development". Bring out the steps in the training and development process. (10 Marks)
b. What do you understand by employee remuneration? Explain the factors influencing employee remuneration. (10 Marks)

PART – B

- 5 a. Explain the different types of incentive schemes. (10 Marks)
b. Define fringe benefits. Explain the administration of fringe benefits. (10 Marks)
- 6 a. Define labour welfare. Explain the approaches to labour welfare. (10 Marks)
b. What is safety? Explain the principles and safety process. (10 Marks)
- 7 a. Bring out the parties and their roles in industrial relations. (06 Marks)
b. Explain any two approaches to IR. (04 Marks)
c. Define trade union. What are the factors leading to unionization? (10 Marks)
- 8 a. Define the term ethics. Explain the various HR ethical issues. (10 Marks)
b. What is HRM evaluation? Explain the benchmarking process. (06 Marks)
c. Explain the contemporary issues in HRM. (04 Marks)

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06TE73

Seventh Semester B.E. Degree Examination, December 2012
Wireless Communication

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. With a neat block diagram, discuss the structure of PSTN. (07 Marks)
- b. What is the need for SS7? Explain its working, with a neat block diagram. (08 Marks)
- c. Discuss briefly the characteristics of 1G, 2G and 3G. (05 Marks)
- 2 a. Explain wireless cellular system components with a neat block diagram. (10 Marks)
- b. Explain in detail, the steps involved in mobile originated call operations. (07 Marks)
- c. How is IMSI number formed? (03 Marks)
- 3 a. Explain in detail, the various capacity expansion techniques in cellular system. (10 Marks)
- b. Discuss the concepts of power management as applied to wireless cellular communication system. (07 Marks)
- c. Determine the frequency reuse distance, if cell radius is 5 kms and cluster size of 7. (03 Marks)
- 4 a. With suitable diagrams, explain the GSM channel concept. (10 Marks)
- b. Explain the GSM traffic and control signal burst. (10 Marks)

PART – B

- 5 a. List different call setup operations. Explain any two operations with flow diagrams. (10 Marks)
- b. Explain GSM inter-MSC handover operation with a neat diagram. (10 Marks)
- 6 a. With a neat block diagram, explain the generation of CDMA synchronization channel. (10 Marks)
- b. Describe in detail, the process of soft handoff in CDMA. (10 Marks)
- 7 a. List the various diversity technique used in mitigate the effects of signal fading in wireless communications. Explain any two. (10 Marks)
- b. What is the received power in dBm for a signal in free space with a transmitting power of 1W, frequency of 1900 MHz and distance from the receiver of 1000 mts, if the transmitting antenna and receiving antenna both use dipole antennas with gains of approximately 1.6? What is the path loss in dB? (04 Marks)
- c. Write a note on multipath and Doppler effects specific to air interface for wireless mobile systems. (06 Marks)
- 8 a. Write a note on wireless LAN security. (06 Marks)
- b. Discuss the details of IEEE 802.15.1 physical layer. (08 Marks)
- c. Describe the typical wireless MAN deployment scenario. (06 Marks)

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