

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1609
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Non-Linear Control Theory
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any two questions from each section
 - ii) Figures to the right indicate full marks
 - iii) Assume suitable data, if necessary

Section A

- Q.1 a) Explain singular point with general time invariant system by the state equation 10
 b) Explain stability analysis using DF method. 10

- Q.2 a) A linear second-order servo is described by the equation 12

$$\ddot{e} + 2\xi w_n \dot{e} + w_n^2 e = 0$$

$$e(0) = 1.5, \xi = 0.15, w_n = 1, \dot{e}(0) = 0$$

Determine the singular points. Construct the phase trajectory using the method of isocline?

- b) Derive the describing function of dead-zone non-linearity. 08

- Q.3 a) Give the lyapunov stability criteria with a suitable example. Also state the conditions for asymptotic and global asymptotic stability 15
 b) Explain the concept of feedback linearization 05

Section B

- Q.4 a) Explain in detail the concepts of negative definite /semi definite, indefinite functions 10
 b) Derive expression for krasovskii's method and explain how the stability of the system is determined. 10

- Q.5 a) Determine stability of the system described by the following equation 10

$$\dot{x} = AX, A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$$

- b) Determine whether the following quadratic form is negative definite 10
 $-Q = x_1^2 + 3x_2^2 + 11x_3^2 - 2x_1x_2 + 4x_2x_3 + 2x_1x_3$

- Q.6 a) Write a lyapunov function for the system 10

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 1 \\ 2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Determine the stability of the origin of the system.

- b) Explain nonlinear control design of feedback linearization? 10

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1705
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Elective-II: Intelligent Instrumentation
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
 (1) Q.No.1 and Q.No.6 are compulsory. Attempt any two questions from the remaining in each section.
 (2) Figures to the right hand side indicates full marks.

Section A

- Q.1 Answer any four of the following 16
- (a) With a suitable example, explain the discrete I/O systems.
 - (b) What is a RTU? Explain its utility
 - (c) Explain the architecture of IEC 61850 SCADA system
 - (d) What are open standard communication protocols ? Explain any one.
 - (e) List the advanced features of PLC.
- Q.2 Draw the ladder diagram programming of PLC for traffic light control systems. 12
- Q.3 List out the SCADA system components and explain any one architecture of SCADA. 12
- Q.4 Discuss the various wired and wireless methods of communication for interconnected systems. 12
- Q.5 Write short notes on any two 12
- (a) Technical Specification of PLC of any make
 - (b) SCADA Server
 - (c) Intelligent electronic devices

Section-B

- Q.6 Answer any four of the following 16
- (a) Explain the concept of interconnected power systems?
 - (b) List some utility applications of SCADA.
 - (c) How the data highways and field buses are used in DCS.
 - (d) Define simulations exercises. Give its importance.
 - (e) List the technical specifications of SCADA of any one make.
- Q.7 Discuss the application of SCADA systems in transmission and distribution. 12
- Q.8 Bring out the differences between centralized and distributed control system. 12

- Q.9 Discuss the various displays used in DCS system. 12
- Q.10 Write Short notes on any two 12
- (a) Multiplexers and Remote sensing terminal units in DCS.
 - (b) Importance of system security in interconnected power system.
 - (c) Monitoring analysis and improvement using SCADA.

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1808
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Intelligent Control System
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

- N.B Please check whether you have got the right question paper.
- i) Solve any two questions from each section.
 - ii) Do not write anything on the question paper.
 - iii) Assume suitable additional data; if necessary.
 - iv) Figures to the right side indicate full marks.

Section A

- | | | |
|-----|---|----|
| Q.1 | a. Explain the learning and training algorithm of perception. | 10 |
| | b. Explain in brief different learning method. | 10 |
| Q.2 | a. Explain error Back propagation algorithm. | 10 |
| | b. Explain in detail the selection | 10 |
| | i. Learning rate | |
| | ii. Momentum factor | |
| | iii. Hidden layer Neurons | |
| Q.3 | a. Explain NN based model predictive control. | 10 |
| | b. Illustrate how NN is helpful in control system. | 10 |

Section B

- | | | |
|-----|--|----|
| Q.4 | a. Compare classical relation and fuzzy relations. | 10 |
| | b. Explain the tolerance and equivalence relation w.r.t. both classical and fuzzy. | 10 |
| Q.5 | a. Explain the structure of FKBC. | 10 |
| | b. Explain the concept of inference engine. | 10 |
| Q.6 | a. Explain fuzzy based temperature control. | 10 |
| | b. Give the comparison of NN and fuzzy logic controllers for air craft landing. | 10 |

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1829
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CSE/SE)
EI-1 Advanced Computer Architecture
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Solve any two questions from each section
 2. Assume suitable data if necessary.
- Section A**
- Q.1 a) Explain in brief cache memory organization. 10
b) Explain bus systems. 10
- Q.2 a) Explain different approaches of scalability analysis 10
b) Explain Arithmetic pipeline design. 10
- Q.3 a) Write a short note on super pipeline design. 10
b) Explain SIMD inter connection network. 10
- Section B**
- Q.4 a) Write a note on compound vector processing. 10
b) Write a short note on three generation of multicomputer. 10
- Q.5 a) Explain the parallel algorithms for array processor. 10
b) Explain the multiprocessor scheduling strategies. 10
- Q.6 a) Explain performance enhancement methods for SIMD Array processor. 10
b) Explain the role of compiler in parallel programming. 10

Total No. of Printed Pages:01

SUBJECT CODE NO: H-1830
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CSE/SE)
El- 1 Real Time Systems
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Attempt any Two questions from each section.
 - 2) Assume suitable data if necessary.

SECTION – A

- | | | |
|-----|--|----|
| Q.1 | a) What are the characteristics of real time system? Draw Architecture of typical RTS. | 10 |
| | b) What is difference between design general purpose system & RTS? | 10 |
| Q.2 | a) Explain Resource management in real time system. | 10 |
| | b) Explain features of RT Linux. | 10 |
| Q.3 | a) Explain various programming Languages for real systems. | 10 |
| | b) What is difference between monolytic O.S. & Modular O.S. | 10 |

SECTION – B

- | | | |
|-----|--|----|
| Q.4 | a) What is memory database system? Explain its design issues. | 10 |
| | b) What are various RT Communication issues? | 10 |
| Q.5 | a) Explain various scheduling properties & Scheduling metrics? | 10 |
| | b) Explain VTCSMA Protocol in RTS? How it is different than CSMA in GPS. | 10 |
| Q.6 | Write short note on:- | 20 |
| | i) RTDB transaction | |
| | ii) V_x Works OS. | |
| | iii) Need for Real time communication | |
| | iv) Real time scheduling. | |

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1799
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CSE/SE)
Computer Network Protocol Design (EL-1 on SE)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Attempt any two questions from each Section.
 - 2) Assume suitable data wherever necessary.
 - 3) Be specific to every answer.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What is Probability Density Function? Explain its use. | 10 |
| | b) What is random process? Explain deterministic and non-deterministic processes. | 10 |
| Q.2 | a) Derive Markov Chain Transition Matrix. Give its properties. | 10 |
| | b) Explain Discrete time Markov Chains. Write a note on Eigen value and Eigen vector. | 10 |
| Q.3 | a) What are Queue Performance parameters? Explain performance parameters of M/M/1 Queue. | 10 |
| | b) Model M/M/1/B Queue. | 10 |

Section B

- | | | |
|-----|---|----|
| Q.4 | a) Explain stop and wait ARQ protocol. | 10 |
| | b) Give token bucket algorithm for single arrival single departure model. | 10 |
| Q.5 | a) What are flow traffic Models? Explain memory less Poisson Process. | 10 |
| | b) Describe on-off model. Write a note on autoregressive model. | 10 |
| Q.6 | a) Explain Weighted Round Robin Scheduler (WRR). | 10 |
| | b) What are various scheduler design issues? | 10 |

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1738
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CSE/SE)
Elective-II: Information Security
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Attempt any two questions from each section.
 - 2) Figures to the right indicate full marks.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain the design cycle for secure computing systems. | 10 |
| | b) What is Public key cryptography? With an appropriate example, explain RSA algorithm. | 10 |
| Q.2 | a) What is the need for security? Explain various aspects of security in detail. | 10 |
| | b) Explain Bell-Lapadula Model. Also discuss the controversy over the model. | 10 |
| Q.3 | a) Explain the method of achieving message authentication using digital signatures. | 10 |
| | b) What are hybrid policies? Explain Chinese wall model in detail. | 10 |

Section B

- | | | |
|-----|--|----|
| Q.4 | a) Explain the following models in detail. | 10 |
| | i. NIST Model | |
| | ii. ISO 17799/BS7799. | |
| | b) With an appropriate example explain the static anti-virus detection techniques. | 10 |
| Q.5 | a) Explain the following. | 10 |
| | i. Honey Pots and Honey Nets. | |
| | ii. Padded Cell Systems. | |
| | b) Explain the three dimensional cellular attack taxonomy. | 10 |
| Q.6 | a) State and explain different Security challenges posed by mobile devices. | 10 |
| | b) Explain anti emulation in detail. | 10 |

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1690
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CSE/SE)
Elective-II: Object Oriented System & Design
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Assume suitable data wherever required
 2. Solve any two questions from each section.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) What is software complexity? What are the types of decomposition to overcome it? | 10 |
| | b) What is object oriented S/W development? Differentiate between structured analysis and object oriented analysis. | 10 |
| Q.2 | a) Explain with example components of UML class diagram & relationships among classes. | 10 |
| | b) What is a use case diagram? Explain depicting relationships among use cases with example. | 10 |
| Q.3 | a) Analyze and design super market system | 15 |
| | i) Identify classes & relationships among classes. | |
| | ii) Use case diagram | |
| | b) Explain components of object diagram with example. | 05 |

Section B

- | | | |
|-----|---|----|
| Q.4 | a) Consider a Railway Reservation system Identify classes & objects. Draw sequence diagram. | 12 |
| | b) Explain in detail state Machine diagram (with example) | 08 |
| Q.5 | a) Explain in detail modeling use case flow of events using an activity diagram. | 10 |
| | b) Explain communication diagram with example. | 10 |
| Q.6 | a) Explain creational design patterns in detail. | 10 |
| | b) Explain with example how to model a design pattern. | 10 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1781
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
Mobile & Personal Communication
(REVISED)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

- N.B
- i. Q.No.1 & 06 are compulsory.
 - ii. Attempt any two questions from the remaining questions for each section.
 - iii. Assume suitable data if necessary.

Section A

- | | | |
|-----|---|----------|
| Q.1 | Attempt any two
A. Radio propagation characteristic
B. Doppler spread
C. Frequency Reuse & Roaming
D. Digital modulation for mobile radio | 10 |
| Q.2 | A. What are different models for path loss and free space propagation model?
B. Draw the structure of Cellular system & List out its advantages & disadvantages. | 08
07 |
| Q.3 | A. What is multiplexing? Tabulate the difference between TDM, FDM.
B. What are different diversity techniques? Explain Feedback or Scanning diversity. | 08
07 |
| Q.4 | A. How handoff done in mobile communication? What are different factors influencing handoffs?
B. How channel allocation done in mobile communication? | 07
08 |
| Q.5 | A. What is time diversity? Explain RAKE Receiver with diagram.
B. What is Erlang capacity? | 08
07 |

Section B

- | | | |
|-----|---|----------|
| Q.6 | Attempt any two
A. Multiple Access Techniques
B. Equalization
C. ISM band
D. PACS | 10 |
| Q.7 | A. What is spread spectrum communication? And explain in brief spread spectrum Multiple Access techniques.
B. Working of cordless telephone. | 08
07 |
| Q.8 | A. What are speech codes?
B. What are different mobile radio standards? Explain PHS in details. | 08
07 |

- Q.9 A. What are different Satellites used for personal communication? 08
- B. What are adaptive Equalization? 07

- Q.10 A. What is RAKE demodulator? 08
- B. What is channel coding? Explain Block Codes with example. 07

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1800
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
RF MEMS
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Answer any two questions from each section.
- ii) Each question carries equal marks.
- iii) Assume suitable data, if any.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Explain the dynamics of the switching operation. | 10 |
| | b) Explain various techniques to improve quality factor of MEMs inductors & capacitors. | 10 |
| Q.2 | a) What are the tuning methods of MEMs capacitors? Explain various gap tuning techniques. | 10 |
| | b) What is Micro machining? What are its types? Explain how this technique helps in improving performance of planar passive. Components. | 10 |
| Q.3 | a) Explain various actuation mechanisms of RF MEMs switches. | 10 |
| | b) Explain photolithography and MEMs Etching process in detailed. | 10 |

Section B

- | | | |
|-----|--|----|
| Q.4 | a) Mention phase shifter types and their limitations. Compare all types of phase shifter. | 10 |
| | b) Explain switched delay line phase shifters. Explain the applications of phase shifters. | 10 |
| Q.5 | a) Explain micromechanical transmission lines. Explain losses in transmission losses. | 10 |
| | b) Give the design procedure of microstrip & Cpw lines. Compare these two lines. | 10 |
| Q.6 | Write a short note on followings. | 20 |
| | i) Reconfigurable antennas | |
| | ii) Electrostatic congh drive | |
| | iii) Micro machined mixer | |
| | iv) Mechanical filters modeling | |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1833
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
El-1Genetic Algorithm & Application
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Que. 5 & Que. 10 is compulsory.
 - ii. Attempt any two questions from remaining question from section A & B. respectively.

Section A

- Q.1 A) What are different reproduction elements of Genetic Algorithm? 08
- B) Give the comparison of Genetic Algorithm & Traditional search methods. 07
- Q.2 a) Explain steady state algorithm. 08
- b) Compare standard & micro – GA. 07
- Q.3 a) Explain Dominance operator. 08
- b) What is optimization and explain use of Genetic algorithm in optimization. 07
- Q.4 a) Explain the concept of fixed point coding discretization. 08
- b) Explain diploidy & abeyance operator. 07
- Q.5 Write a short note of on any two. 10
- i) Basic structure of Genetic algorithm
 - ii) traditional optimization
 - iii) micro – operator in Genetic algorithm

Section B

- Q.6 a) Explain Genetic algorithm in scientific models & theoretical foundations. 08
- b) What are the applications of Genetic algorithm? 07
- Q.7 a) Explain low – level operator and knowledge based techniques in GA. 08
- b) Explained MulHlevelved optimization. 07

- Q.8 a) What are the applications of Genetic based learning machine. 08
- b) Explain applications of GA in parallel processor. 07
- Q.9 a) Explain the concept of constrained optimization. 08
- b) Explain Natural evolution simulated annealing. 07

Write a short note on any two.

- a) Genetic operators & parameters
- b) Fixed point coding
- c) Concept of crossover

10

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1834
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
EI-1 Telecommu. Switching Systems
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
1. Ques. No. 5 and Question No. 10 are compulsory and answer any two from rest of each Section.
 2. Assume suitable data if necessary.
 3. Figure to the right indicate full marks.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What are the basic structure of Butcher sorting network and explain with three phase algorithm. | 07 |
| | b) What are different signalling techniques? Explain briefly. | 08 |
| Q.2 | a) Discuss on digital timeslot inter change switch. Explain how is advantages over conventional switches. | 07 |
| | b) Briefly describe ISDN architecture. | 08 |
| Q.3 | a) Briefly explain buffering strategies for ATM switches and also explain parallel iteration matching algorithm to resolve contention for output parts in the input buffers. Give example. | 10 |
| | b) Compare STS and TST switches. | 05 |
| Q.4 | a) Explain different signaling point in SS7. | 07 |
| | b) Explain the working principle of wireless ATM briefly. | 08 |
| Q.5 | Write short note on:- (Any two) | 10 |
| | a) Starlite Switch | |
| | b) Digital Cross-Connect | |
| | c) Knock out Switch | |

Section B

- Q.6 a) Explain reconfigurable wavelength add-drop multiplexing using MEMS mirrors. 07
 b) Explain the working ROADM with suitable diagram. 08
- Q.7 a) Explain OPS and OBS in brief. 07
 b) What is optical switching? Explain different optical switching. 08
- Q.8 a) Explain photonic GMPLS router characteristics and architecture. 07
 b) What are the advantages of GMPLS over MPLS? 08
- Q.9 a) Briefly describe MEMS approach for optical switching. 07
 b) Explain variable length packet switching in optical systems. 08
- Q.10 Write short notes on:- (Any Two) 10
 a) LOBS
 b) Optical cross-connect
 c) GOS and congertions

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1685
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
Elective-II: Microwave Integrated Circuits
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

1. Q.No.5 & Q.No.10 are compulsory.
2. Solve any two Q.No.1 to 4 and 6 to 9.
3. Assume suitable data if necessary.

Section A

- Q.1 a) Explain coplanar wave guide. 08
- b) What do you mean by a strip line? Explain the construction, field configuration and different types of losses occurring in a strip line. 07
- Q.2 a) Explain micromachining for performance improvement of CPW lines. 08
- b) Explain the transistors for MICs. 07
- Q.3 a) Explain how design of lumped elements for MICs can be done? 08
- b) What is Bethe Hole coupler? Explain in detail. 07
- Q.4 a) What is directional coupler? 08
- b) Describe micro stripe line in detail. 07
- Q.5 Write shorts notes on any two 10
- a) Ring Hybrid
 - b) Slot line
 - c) Analysis of CPW line

Section B

- Q.6 a) Explain Microwave Tunnel diode. 08
- b) Describe BARITT diode in detail. 07
- Q.7 a) Explain Double step tuning. 08
- b) What are Chebyshev matching transformers? 07

- Q.8 a) Explain planar capacitor film fabrication process. 08
- b) Give the fabrication steps for hybrid integrated circuit. 07
- Q.9 a) Explain Transferred Electron devices. 08
- b) What is Constant K filter? 07
- Q.10 Write shorts notes on any two 10
- a) PIN diode
- b) IMPATT
- c) Microwave transistor

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1684
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
Elective- II: Simulation of Communication Sys. & N/W
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i. Que. 5 & Que. 10 is compulsory.
 - ii. Attempt any two questions from remaining question from section A & B respectively.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What are different analog channel model explain in detail. | 08 |
| | b) Explain non-linear sequence in detail. | 07 |
| Q.2 | a) What are the different channel model & explain gilbert model of busty channels. | 08 |
| | b) Explain the concept of Noise & fadding. | 07 |
| Q.3 | a) Explain transformation of random variable. | 08 |
| | b) Explain light wave system model. | 07 |
| Q.4 | a) Explain univariate & multivariate model. | 07 |
| | b) Explain pseudo Noise sequence. | 08 |
| Q.5 | Write short note on any two | 10 |
| | i) Switched Telephone channel | |
| | ii) Bounds & approximation | |
| | iii) Troposcatter & satellite channel | |

Section B

- | | | |
|-----|--|----|
| Q.6 | a) Explain M/G/I queue in detail | 07 |
| | b) Explain quality of an estimator. | 08 |
| Q.7 | a) What are different random process model & explain Morkov ARAM sequence model. | 07 |
| | b) Explain sampling rate for simulation. | 08 |
| Q.8 | a) What are different probability density functions | 08 |
| | b) Explain estimation of power spectral density of process. | 07 |
| Q.9 | a) Explain Embedded Morkov chain analysis of TDM system | 08 |
| | b) Explain computer generation & testing of random number. | 07 |

Q.10

Write a short note on any two

10

- i) M/M/I & M/M/I/N queue
- ii) Burke's theorem
- iii) BER of digital communication
- iv) Polling

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1638
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Digital Communication)
Digital Signal Compression
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt any two questions from each section
 - ii) Assume suitable data if required
- Section A**
- Q.1
- a) Explain evolution of data compression. 10
 - b) A discrete memory less source has five symbols x_1, x_2, x_3, x_4 & x_5 with probabilities 0.4, 0.19, 0.16, 0.15 & 0.15 respectively attached to every symbol. 10
 - i) Construct a Shannon fano code for source and calculate code efficiency 'n'.
 - ii) Repeat i) for Huffman code compare two techniques of source code.
- Q.2
- a) The channel matrix is given by $\begin{bmatrix} 0.9 & 0.1 \\ 0.2 & 0.8 \end{bmatrix}$ 10
 Draw channel diagram & determine the probabilities associated with outputs assuming equiprobable input. Also find mutual information $I [x, y]$ for the channel
 - b) Explain evaluation technique of source coding. 10
- Q.3
- a) Explain Adaptive Huffman coding with example in detail. 10
 - b) Write note on vector quantisation & structure quantization 10
- Section B**
- Q.4
- a) What is the difference in between Dm, Pcm & DPcm. 10
 - b) Explain speech compression in detail. 10
- Q.5
- a) What is JPEG? Explain JBIG standard. 10
 - b) Explain DVI real time Compression. 10
- Q.6
- a) Design filter banks for wavelet based compression. 10
 - b) Express motion estimation & Compensation techniques. 10

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1683
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/CE/DC)
Elective-II: Wireless Communication Networks
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

- i) Q.5 & Q.10. Are compulsory.
- ii) Solve any two questions from Q 1,2, 3, & 4 in section A.
- iii) Solve any two questions from Q 6,7, 8, & 9 in section B
- iv) Figures to the right indicate full marks.

Section A

- | | | |
|-----|--|----------|
| Q.1 | a) Discuss channel Assignment strategies.
b) Explain co- channel and Adjacent channel interference in detail. | 08
07 |
| Q.2 | a) Explain methods of improving coverage and capacity in cellular systems.
b) With the help of a neat diagram explain IMT-2000 | 08
07 |
| Q.3 | a) Discuss Protocols for Network access.
b) Discuss wireless data services. | 08
07 |
| Q.4 | a) What is IEEE 802.11 standard? Give architecture of the same? Compare Adhoc and Infrastructure based networks.
b) Discuss 1G, 2G, 3G wireless networks. | 08
07 |
| Q.5 | Write short notes (any two)
1. MAC Management
2. 802.11 b
3. CCS | 10 |

Section B

- | | | |
|-----|--|----------|
| Q.6 | a) Explain Bluetooth Architecture in detail.
b) Explain Radio layer, baseband layer and link manager protocol. | 08
07 |
| Q.7 | a) Explain traditional TCP? Discuss TC improvements techniques.
b) Discuss MAC layer Scheduling in detail. | 08
07 |
| Q.8 | a) Discuss the mobile adhoc network routing techniques.
b) Discuss different mobile IP in detail. | 08
07 |
| Q.9 | a) What are the different resource allocation schemes discuss them.
b) Discuss different queuing models in detail | 08
07 |

- Q.10 Write short notes (any two)
- 1) Teletraffic models.
 - 2) Snooping TCP
 - 3) 802.15

10

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1680
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT)
Elective-II: Pattern Recognition
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q.5 & Q.10 are compulsory
 - ii) Attempt any two questions from remaining questions from section A & B respectively

Section A

- | | | |
|-----|--|----------|
| Q.1 | a) What is pattern recognition? Explain
b) Briefly explain design principles of pattern recognition system | 07
08 |
| Q.2 | a) Explain and derive the overall risk function using Bayesian decision theory
b) What is discriminant function? Discuss in detail | 08
07 |
| Q.3 | a) Explain normal density discriminant function for normal density Bayesian decision theory
b) What do you mean by dimensionality reduction? How to estimate the error rate | 08
07 |
| Q.4 | a) Describe design principles of pattern recognition systems with an example
b) Pattern recognition approaches. Discuss in detail | 08
07 |
| Q.5 | Attempt <u>any two</u> of the following
a) Mean & covariance, chi-square test in pattern recognition
b) Baye's decision theory
c) Parameter estimation:- The mean of normal density | 10 |

Section B

- | | | |
|-----|---|----------|
| Q.6 | a) Explain the Parzen window approaches for density estimation
b) Explain the concept of K-Nearest neighbor estimation | 08
07 |
| Q.7 | a) Explain generalized linear discriminant functions
b) What is mean by minimum squared error procedures? Explain | 08
07 |
| Q.8 | a) Explain unsupervised learning in detail
b) Explain the concept of criteria functions for clustering | 08
07 |
| Q.9 | a) What is mean by cluster validation? Explain in detail
b) Discuss the application areas of fisher's linear discriminant analysis | 08
07 |

Q.10 Write short note on any two

- a. Clustering Vs. classification
- b. Parzen window
- c. Ho-Kashayp procedures

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1656
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/CE)
Image & video Processing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Q.No.1 & 5 are compulsory.
 2. Solve any two questions from the remaining questions from each section.
 3. Figures to the right indicate full marks.
 4. Assume suitable data wherever necessary.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain Linear ideal low pass filter for Image Enhancement. | 05 |
| | b) Explain Block truncation coding algorithm | 05 |
| Q.2 | a) Given window size 5 for weighted median smoother the weight $w = \{0.1, 0.1, 0.2, 0.2, 0.1\}$ and $x(n) = \{12, 6, 4, 1, 9\}$. Perform smoothing operation & comment on result. | 08 |
| | b) Describe computational model for early Human Vision. | 07 |
| Q.3 | a) Explain steps in Huffman coding & perform on following data set. $\{5, 5, 5, 3, 3, 3, 3, 2, 2, 2, 2, 6, 6, 6, 6, 6, 6, 4, 4\}$ | 08 |
| | b) Explain JPEG compression for image. | 07 |
| Q.4 | a) Explain image statistics for segmentation. | 08 |
| | b) Explain morphological filters for image enhancement. | 07 |

Section B

- | | | |
|-----|--|----|
| Q.5 | a) Explain MPEG1 video compression. | 05 |
| | b) Explain video sampling & interpolation | 05 |
| Q.6 | a) Explain motion estimation models. | 08 |
| | b) Explain object based video coding | 07 |
| Q.7 | a) Explain finger print matching techniques. | 08 |
| | b) Explain Half toning in detail. | 07 |
| Q.8 | a) Explain MPEG-4 standard with block diagram. | 08 |
| | b) Explain Human perception and image quality. | 07 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1761
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES)
Advanced Digital Communication System
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Q.no.5 from section A & Q. no.10 from section B are compulsory.
 2. Solve any two questions from remaining question in each section.
 3. Assume suitable data, wherever required .

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain the complex base band representation of a signal. | 08 |
| | b) Explain simplex signal wave forms . | 07 |
| Q.2 | What is non – coherent detection? Explain in detail. | 15 |
| Q.3 | a) What is necessity of filters? Discuss matched filter. | 08 |
| | b) Explain square law detection . | 07 |
| Q.4 | a) With the help of neat block diagram, explain the working of PPM. | 08 |
| | b) Explain symbol error rate for coherent and non coherent schemes. | 07 |
| Q.5 | Write a short note on (any two) | 10 |
| | a) M – ary orthogonal signal | |
| | b) BER | |
| | c) Bit error rate | |

Section – B

- | | | |
|-----|---|----|
| Q.6 | a) Define nyquist rate. Explain nyquist pulse method. | 07 |
| | b) Explain Viterbi algorithm. | 08 |
| Q.7 | Explain the following related to synchronization. | 15 |
| | i) Early gate synchronization | |
| | ii) ML synchronization | |

- Q.8 a) Explain the performance of receiver on average SNR. 08
- b) Explain the characteristics of fading channel. 07
- Q.9 Explain receiver performance related to arrange SNR, average bit P & symbol error rate and amount of fading. 15
- Q.10 Write a short note on (any two) 10
 - a) Rayleigh channel
 - b) Duobinary pulses
 - c) Symbol by symbol detection

Total No. of Printed Pages:02

SUBJECT CODE NO: H-1741
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/CE/DC/ES)
Advanced Digital Signal Processing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Solve three questions from each section.
 - ii) Q.1 and Q.6 are compulsory.
 - iii) Assume suitable data if necessary.
 - iv) Draw neat diagram wherever required.

SECTION - A

- Q.1 a) Define periodogram? State disadvantages 05
- b) Why are FIR filters used in communication. 05
- Q.2 Describe in detail. 07
- i) Polyphase structures 07
 - ii) Digital sine cosine generators. 08
- Q.3 a) If the derived unit sample response is $hd(n) = 2\left(\frac{1}{2}\right)^n u(n)$ determine the parameters of the filter with system function $H(z) = \frac{b_0 + b_1 z^{-1}}{1 + a_1 z^{-1}}$ using pade approximation technique. 09
- b) Define inverse system with example. 06
- Q.4 a) Design a sample rate converter that increases the sampling rate by a factor of 2.5. 08
- b) Explain tunable IIR digital filter. 07
- Q.5 Write short notes (on any two) 07
- a) Lattice structures 08
 - b) Least square design method 07
 - c) Multistage implementation of multi – rate systems. 07

SECTION – B

- Q.6 a) What is principle of steepest decent adaptive filter? 05
 b) State the advantages of parametric methods in power spectrum estimation. 05
- Q.7 a) Discuss Blackmann and Tukey method for smoothing the periodogram. 08
 b) Explain the operation of backward linear predictor with analysis. 07
- Q.8 a) Compare AR, MA, Models with respect to complexity. 08
 b) Explain IIR wiener filter 07
- Q.9 a) Derive the expressions for LMS adaptive algorithms. 08
 b) With suitable example explain time – variant structures. 07
- Q.10 Write short notes (on any two)
- a) IIR filter design method 08
 b) Algebraic stability test 07
 c) Yule walker method 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1818
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/CE/ES)
VLSI Design
(EI-I on EC/ECT/CE)
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

N.B Please check whether you have got the right question paper.

- 1) Attempt any two questions from each section.
- 2) Assume suitable data wherever necessary.

Section A

- Q.1 a) Describe power dissipation in CMOS inverter and what is effect of threshold voltage on power loss. 10
- b) Describe following terms for CMOS inverter. 10
- i) DC characteristics
 - ii) Noise margins
 - iii) Inverter switching point
 - iv) Dynamic power dissipation of point.
- Q.2 a) Design CMOS logic gates for following. 10
- i) $Y = \overline{(A + B)C + D}$ ii) $Y = \overline{AB + CD}$
- b) What are static & dynamic power dissipation in CMOS circuit? Derive expression for total power dissipation in CMOS inverter circuit. 10
- Q.3 a) Write short notes on:- 10
- i) BICMOS circuit
 - ii) Sense amplifier.
- b) What are the signal integrity issues in dynamic design? Explain it. 10

Section B

- Q.4 a) Explain multiplexer based latches with neat diagram in details. 10
- b) Explain non-bistable sequential types in details. 10

- Q.5 a) Explain power speed trade off in data path structure in details. 10
- b) Explain Manchester. Carry chain adder logarithmic look ahead adder concept. 10
- Q.6 a) Describe CMOS-SRAM read & write operation. 10
- b) What is role of sense amplifier in memory circuit? Explain in detail. 10

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1679
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/ES)
Elective-II: Embedded Sys. Design (Comp.on Embd)
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q.1 and Q.6 are compulsory
 - ii) Answer any three from each section

Section A

- Q.1 Write short notes on any one 10
- a) Programming model of ARM7
 - b) ASIPs
 - c) Timers, counters and watch dog timers
- Q.2 Draw and explain ARM7 TDMI processor architecture with its features 15
- Q.3
- a) Draw and explain superscalar architecture 08
 - b) Explain design challenges and tradeoffs of embedded system 07
- Q.4
- a) Explain branch and load-store instructions of ARM7 with examples 08
 - b) Explain VART and RTC 07
- Q.5
- a) Explain interfacing of stepper motor controller with ARM7 08
 - b) Explain ARM7 register set 07

Section B

- Q.6 Write short notes on any one 10
- a) IrDA
 - b) Bluetooth protocol
 - c) Serial peripheral interface
- Q.7
- a) Explain different memory types used in embedded system 08
 - b) Explain advance RAM 07
- Q.8
- a) What is bus arbitration? Explain daisy chain arbitration 08
 - b) Explain IEEE802.11 protocol 07
- Q.9 Enlist the features of ARM with specification of LPC314x 15
- Q.10
- a) Explain memory hierarchy and cache 08
 - b) Explain error detection and correction 07

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1679
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/ES)
Elective-II: Embedded Sys. Design (Comp.on Embd)
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q.1 and Q.6 are compulsory
 - ii) Answer any three from each section

Section A

- Q.1 Write short notes on any one 10
- a) Programming model of ARM7
 - b) ASIPs
 - c) Timers, counters and watch dog timers
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- a) Draw and explain superscalar architecture 08
 - b) Explain design challenges and tradeoffs of embedded system 07
- Q.4
- a) Explain branch and load-store instructions of ARM7 with examples 08
 - b) Explain VART and RTC 07
- Q.5
- a) Explain interfacing of stepper motor controller with ARM7 08
 - b) Explain ARM7 register set 07

Section B

- Q.6 Write short notes on any one 10
- a) IrDA
 - b) Bluetooth protocol
 - c) Serial peripheral interface
- Q.7
- a) Explain different memory types used in embedded system 08
 - b) Explain advance RAM 07
- Q.8
- a) What is bus arbitration? Explain daisy chain arbitration 08
 - b) Explain IEEE802.11 protocol 07
- Q.9 Enlist the features of ARM with specification of LPC314x 15
- Q.10
- a) Explain memory hierarchy and cache 08
 - b) Explain error detection and correction 07

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1679
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (EC/ECT/ES)
Elective-II: Embedded Sys. Design (Comp.on Embd)
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q.1 and Q.6 are compulsory
 - ii) Answer any three from each section

Section A

- Q.1 Write short notes on any one 10
- a) Programming model of ARM7
 - b) ASIPs
 - c) Timers, counters and watch dog timers
- Q.2 Draw and explain ARM7 TDMI processor architecture with its features 15
- Q.3
- a) Draw and explain superscalar architecture 08
 - b) Explain design challenges and tradeoffs of embedded system 07
- Q.4
- a) Explain branch and load-store instructions of ARM7 with examples 08
 - b) Explain VART and RTC 07
- Q.5
- a) Explain interfacing of stepper motor controller with ARM7 08
 - b) Explain ARM7 register set 07

Section B

- Q.6 Write short notes on any one 10
- a) IrDA
 - b) Bluetooth protocol
 - c) Serial peripheral interface
- Q.7
- a) Explain different memory types used in embedded system 08
 - b) Explain advance RAM 07
- Q.8
- a) What is bus arbitration? Explain daisy chain arbitration 08
 - b) Explain IEEE802.11 protocol 07
- Q.9 Enlist the features of ARM with specification of LPC314x 15
- Q.10
- a) Explain memory hierarchy and cache 08
 - b) Explain error detection and correction 07

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1824
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (ECT/CE)
El-1 Digital Signal Compressing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Attempt any two questions from each section
2. Assume suitable data if required.

Section A

- Q.1 a) Explain evolution of data compression. 10
 b) A discrete memory less source has five symbols $x_1, x_2, x_3, x_4, & x_5$ with probabilities 0.4, 0.19, 0.16, 0.15 & 0.15 respectively attached to every symbol. 10
 i) Construct a Shannon Fano code for source & calculate code efficiency ' η '
 ii) Repeat i) for Huffman code compare two techniques of source code
- Q.2 a) The channel matrix is given by 10

$$\begin{bmatrix} 0.9 & 0.1 \\ 0.2 & 0.8 \end{bmatrix}$$
 Draw channel diagram & determine the probabilities associated with output assuming equiprobable input. Also find mutual information I [X,Y] for the channel.
 b) Explain evaluation techniques of source coding. 10
- Q.3 a) Explain Adaptive Huffmann coding with example in detail. 10
 b) Write note on vector quantization & structure quantization. 10

Section B

- Q.4 a) What is the difference in between DM, PCM & DPCM 10
 b) Explain speech compression in detail. 10
- Q.5 a) What is JPEG? Explain JBIG standard. 10
 b) Explain DVI real time compression. 10
- Q.6 a) Design filter banks for wavelet based ampression. 10
 b) Express motion estimation & compensation techniques. 10

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1682
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Communication)
Elective-II: Microwave Integrated circuits.
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Question. No. 1 and Question. No.6 are compulsory.
 - ii. Solve any two questions Q.2, Q.3, Q.4 and Q.5.
 - iii. Solve any two questions Q.7, Q.8, Q.9 and Q.10.
 - iv. Assume suitable data wherever necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | Write short notes on following (any one) | 10 |
| | a) Microstrip discontinuities | |
| | b) Branch line couplers | |
| Q.2 | Explain in detail Hybrid Mode analysis of micro strip. | 15 |
| Q.3 | Explain phase shifters in MIC' sin detail. | 15 |
| Q.4 | Explain Even & Odd mode analysis in detail. | 15 |
| Q.5 | Explain Ferromagnetic substrates & inserts in detail. | 15 |

Section B

- | | | |
|------|---|----|
| Q.6 | Write short notes on following (any one) | 10 |
| | a) Future trends in MIC | |
| | b) Dielectric substances | |
| Q.7 | Explain PIN diode & Avalanche diode in detail. | 15 |
| Q.8 | Explain Impedance Transformers & filters in MIC. | 15 |
| Q.9 | Explain Encapsulation & monitoring in MIC. | 15 |
| Q.10 | Explain filters and oscillators in MMIC technology. | 15 |

Total No. of Printed Pages:02

SUBJECT CODE NO: H-1694
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
Elective-II: Graph Theory
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.
 1) Solve any two questions from each section.
 2) Assume suitable data if necessary state clearly.

SECTION – A

- Q.1 a) Explain matching and covers Algorithms. Give its applications. 10
 b) Define the following terms with examples: 10
- i) Bipartite Graph
 ii) Ring sum of graph
 iii) Walk
 iv) Path
 v) Cycle and Trails
- Q.2 a) Explain about fundamental cut set and fundamental circuit in a graph with examples. 10
 b) Show that a Hamiltonian path is a spanning tree. Give applications of planar graph. 10
- Q.3 a) Prove that a graph is bipartite if it has no odd cycle. 10
 b) Explain optimization and trees with example. 10

SECTION – B

- Q.4 a) Explain vertex colourings and upper Bounds. 10
 b) Explain Euler digraph. 10
- Q.5 a) Explain planar Graphs and characterization of planar graphs. Give parameters of planarity. 10
 b) Explain Ramsey Theorem for numbers and give its properties. 10

- a) Explain two – color Ramsey number with example 10
- b) Explain Line Graphs and Edge – Colouring with Example. 10

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1801
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
UNIX Network Programming
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

- N.B
- Please check whether you have got the right question paper.
- i) Attempt any two questions from each sections
 - ii) Assume suitable data, if necessary

Section A

- | | | |
|-----|---|----|
| Q.1 | a. Explain in detail UNIX file system. How does device file help in accessing device? | 10 |
| | b. Explain in brief TCP/IP communication protocol? | 10 |
| Q.2 | a. Write a program that creates, write to and read from PIPE. | 10 |
| | b. Explain IPC. Discuss the following types in detail | 10 |
| | i. Message queues | |
| | ii. Semaphores | |
| Q.3 | a. Draw and explain different TFTP packet format | 12 |
| | b. Explain in detail vi editor in Unix file system? | 08 |

Section B

- | | | |
|-----|--|----|
| Q.4 | a. Explain the functions rcmd and rexec in detail, with a neat diagram. Explain the sequence of 10 steps to establish rshd connection? | |
| | b. Explain asynchronous I/P and I/O multiplexing w.r.t. sockets? | 10 |
| Q.5 | a. With neat diagram for list steps performed in receiving file using TFTP from server? | 10 |
| | b. Explain the application protocol HTTP in detail. | 10 |
| Q.6 | a. Write short notes on | 20 |
| | i. Pseudo terminal | |
| | ii. rloginid server | |
| | iii. Steam pipe | |
| | iv. Terminal nodes | |

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1835
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
EI-1 Advanced Problem Solving
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Solve any two questions from each section.
 - 2) Assume suitable data if necessary, state clearly.

Section A

- Q.1
- a) What does the following recurrence relation evaluates to
 $T(0) = 1, T(n) = T(n - 1) + 3^n$
 Discuss Queue and circular queue with example. 10
 - b) Explain any 3 types of heaps and their insertion. 10
- Q.2
- a) Differentiate Binary trees and Multi way Trees. Give recurrence relation in general for computing complexity of divide and conquer algorithm. 10
 - b) Explain linear search and binary search with example. 10
- Q.3
- a) What do you mean by time and space complexity? Among quick sort, Insertion sort and Heap sort which algorithm is best to sort data and why? Define Basic terminology of trees. 10
 - b) Explain how merging and splitting operations is done on a Splay Tree. 10

Section B

- Q.4
- a) Explain DFS and BFS traversals with suitable examples. 10
 - b) Discuss with example single source shortest path problem. 10
- Q.5
- a) Explain traveling sales person problem with Backtracking. 10
 - b) Discuss Linear List representation and Skip list representation with suitable example. 10
- Q.6
- Write an algorithm for
- a) Sorting the vertices of a directed graph in topological order. Illustrate with example. 10
 - b) Explain packet routing and computational model algorithms. 10

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1836
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
El-1: Grid Computing
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B 1. Solve any two questions from each section.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Define grid computing & who will use the grid with examples? | 10 |
| | b) With a neat diagram explain the Grid Architecture in detail. | 10 |
| Q.2 | a) Explain in detail about virtual organization. | 10 |
| | b) Discuss in detail about service life cycle in OGSi. | 10 |
| Q.3 | a) Discuss in detail about OGSA services & schema. | 10 |
| | b) Explain in detail about management of Adaptive Grid infrastructure (MAGI) | 10 |

Section B

- | | | |
|-----|---|----|
| Q.4 | a) With a neat diagram explain the Ganglia monitoring tool in detail. | 10 |
| | b) Explain Globus Mentoring and Discovery System (MDS) with a neat diagram. | 10 |
| Q.5 | a) Explain Daemons in a SGE cluster. | 10 |
| | b) Discuss in detail about job management in LSF (Load Sharing Facility) | 10 |
| Q.6 | a) Explain federation services in detail. | 10 |
| | b) Discuss data management challenges in detail. | 10 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1661
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
Soft Computing
(REVISED)

[Time: Three Hours]

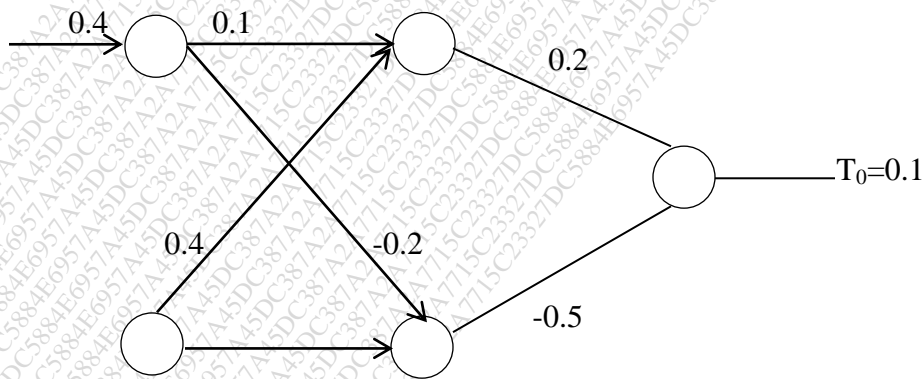
[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B 1. Solve any two from each section

Section A

- Q.1 a) Explain 3 basic operator's of genetic algorithm? 08
- b) Explain Back propagation network algorithm? 12
- Q.2 a) Consider fuzzy set defined on set $\{1,3,5\} \times \{1,3,5\}$ 10
 $R = \{ (x, y) \mid y = x+2 \}$ $S = \{ (x,y) \mid x < y \}$
 Determine relation matrices R, S and RoS
- b) What is Hybrid system? Describe 3 basic hybrid systems? 10
- Q.3 Consider that problem training set (0.4, - 0.7) Desired O/P is 0.1 neural net is given below 20



Apply back propagation algorithm find desired O/P.

Section B

- Q.4 a) Explain Biological structure neuron? 10
- b) 8 chromosomes randomly generated gene (0-7)= (84321, 4623, 78901, 32104, 42689, 63421, 46421& 87640) 10
Determine extracted weight from above 8 genes.
- Q.5 What is mean by defuzzification? Discuss different methods of defuzzifications? 20
- Q.6 a) What are components of soft computing? Explain basic operators used in genetic algorithm? 10
- b) Explain with suitable example GA based weight determination? 10

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1744
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Net. & Engg.)
Advanced Digital Communication
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Solve any TWO full questions from each section.
 - ii. Assume suitable data if necessary.
 - iii. Figures to the right indicate full marks.

Section A

- Q.1
- a) What is information? Explain the digital representation of information. Mention the advantages of digital communication. 06
 - b) Explain the fundamental limits on digital transmission. 06
 - c) Discuss polynomial and standardized polynomial codes with suitable example. 08
- Q.2
- a) Explain 06
 - i. Robust quantization
 - ii. Companding.
 - b) Explain delta modulation scheme in detail. Show that it is equivalent to one bit DPCM. Also explain how problems associated with DM can be solved in ADM. 10
 - c) Discuss on zero forcing algorithms. 04
- Q.3
- Write short note on 20
- i. The LMA algorithm.
 - ii. MODEM.
 - iii. ADPCM.
 - iv. Internet checksum.

Section B

- Q.4
- a) Explain coherent binary FSK scheme and derive expression for error probability. 12
 - b) Explain the Nyquist criteria for distortionless band limited transmission system. 08
- Q.5
- a) Explain how M-ary modulation formats viewed in the lights of the channel capacity. 08
 - b) Explain bandwidth efficiency for M-ary FSK and PSK systems taking suitable values of M. 08
 - c) Explain the use of eye patterns in ISI. 04

Q.6

Write short note on

- i. Error probability in PCM
- ii. Adoptive equalization
- iii. 2-D parity check
- iv. Line coding

20

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1660
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Data Mining & Big Data
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Solve any two questions from each section
2. Figures right indicates full marks
3. Assume suitable data if necessary

Section A

- Q.1 a) What are outliers? Describe any two methods of outlier detection 10
 b) What is a closely related model of a social Network? Give any two examples of scale- free networks 10
- Q.2 a) What is constraint based association mining? What are the types of constraints? 10
 b) What is correlation analysis? The following contingency table summarizes transaction data. Find the correlation between A and I using lift and cosine measures. 10

	A	B
I	400	350
\bar{I}	300	50

- Q.3 a) What is spatial mining? Describe any one application which is based on it 10
 b) The daily expenditures on food (X1) and clothing (X2) of five persons are shown below: given data is – (a,1,1) , (b,1.5,1.5) , (c, 5, 5) , (d, 3, 4) , (e, 4, 4) (f, 3, 3.5) plot observations on a scatter diagram. How many clusters are formed visually? Calculate how the clusters will be formed using single linkage method and complete linkage method. Use the Euclidean distance measure draw the diagram in each case. 10

Section B

- Q.4 a) What are the characteristics of Big Data? What are its challenges? 10
 b) Distinguish clearly between- Mapreduce and Parallel DBMS technology. 10
- Q.5 a) Explain in brief the process of how the application of ‘Spreadsheet’ got enriched to ‘dashboard’. 10
 b) Describe Apache Hadoop Architecture. How data access can be improved with HBase, Sqoop, and Flume. 10

- Q.6 a) Describe Apache Hadoop Architecture. What is the use Oozie, Zookeeper and Mahout 10 tools?
- b) How will you apply drivetrain approach for recommender system? Design and explain the 10 steps.

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1691
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Elective-II: Wireless Comm. & Mobile Computing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B 1. Solve any two questions from each section.
- Section A**
- Q.1 a) What is CDMA technology? Explain direct sequence spread spectrum. 10
b) Explain WiFi and WiMax technology in detail. 10
- Q.2 a) Explain wireless LAN security issues. And also explain a hidden and exposed terminal problem in wireless LAN. 10
b) Explain ALOHA and CSMA techniques of medium access in detail. 10
- Q.3 a) Draw and explain GPRS architecture. 10
b) What is frequency Reuse? Explain frequency allocation in GSM. 10
- Section B**
- Q.4 a) Describe context aware computing? What are different context types used in context aware computing. 10
b) Explain various features of mobile database in detail. 10
- Q.5 a) Explain the architecture of palm OS along with its features. 10
b) Describe Linux operating system used for mobile devices. 10
- Q.6 a) Explain security issues and security models used in mobile environment. 10
b) Describe mobile Ad-hoc networks. Discuss characteristics and limitations of it. 10

Total No. of Printed Pages:02

SUBJECT CODE NO: H-1743
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Machine Learning
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i) Solve any two questions from each section.
- ii) Assume suitable data if necessary and state clearly.

SECTION – A

- Q.1 a) Discuss Find –s algorithm along with its application. 10
- b) What do you mean by a well-posed learning problem? Explain the important features that are required to well – define a learning problem. 10
- Q.2 a) Explain decision tree learning method with tree representation. Enlist few problems that can be solved using decision tree learning. 10
- b) Explain hypothesis space search in decision tree learning. 10
- Q.3 a) What is multilayer perceptron? Explain Perceptron rule & Delta Rule. 10
- b) How to estimate hypothesis accuracy. 10

SECTION – B

- Q.4 a) Explain prior probability, likelihood and marginal likelihood in context of Naive Bayes algorithm. 10
- b) Explain EM algorithm. 10
- Q.5 a) Explain K – nearest neighbour learning algorithm with example. 10
- b) Explain :- 10
- I) Radial Basis Functions
 - II) Case – Based Reasoning.

- Q.6 a) Explain Bayes optimal classifier with example. 10
- b) Explain following models of Evolution and learning. 10
 - i) Lamarckian Evolution
 - ii) Baldwin Effect

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1762
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Advanced Database Management System
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

N.B Please check whether you have got the right question paper.

- i) Solve any two questions from each section.
 ii) Assume suitable data, if necessary.

Section A

- Q.1 a) Explain in detail the parallel database architecture with neat diagram. 10
 b) Explain transaction processing monitors in detail. 10
- Q.2 a) Explain data fragmentation and its types. 10
 b) Explain the architecture of transaction server in detail. 10
- Q.3 a) What do you mean by I/O parallelism? What are partitioning techniques explain in detail. 10
 b) What are the main software modules of DDBMS? Discuss the main functions of these modules in context to client server architecture. 10

Section B

- Q.4 a) List the basic operations of the following built in interfaces of the ODMG object model: object, collection, iterator, set and list. 10
 b) What is the difference between persistent and transient objects? How persistence is handled in typical OO database systems? 10
- Q.5 a) What is the difference between attributes and elements in XML? List some of the important attributes used to specify elements in XML schema. 10
 b) Discuss the various type constructors. How they are used to create complex object structures. 10
- Q.6 a) Explain various mobile transaction modals in detail. 10
 b) Explain MMDBMS architecture in detail. 10

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1780
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Advanced Algorithm
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.
 Attempt any two questions from each section.

Section A

Q.1 a) Solve the following rod cutting problem using dynamic programming for a rod of length:4 10

Length	1	2	3	4	5	6	7	8
Price	1	5	8	9	10	17	17	20

b) Write an algorithm to sort elements using radix sort and compute the complexity of the algorithm. 10

Q.2 a) Explain divide & conquer strategy for quick sort and sort the following element using quick sort 30,50,20, 40, 60, 10, 80, 20,30. 10

b) Solve the following recurrence relation using master method 10
 $T(n) = 4T\left(\frac{n}{2}\right) + n^2$

Q.3 a) Explain Activity Selection Problem with suitable example. 10
 b) Explain maximum sub array problem using divide and conquer method 10

Section B

Q.4 a) Draw a Hamiltonian Circuit for following Boolean expression 10
 $(x_1 + x_2 + x_3), (\overline{x_1} + x_2 + \overline{x_3}),$

$(x_1 + \overline{x_2} + \overline{x_3})$
 b) Explain polynomial multiplication and division with suitable example 10

Q.5 (a) Explain Robin-Karp algorithm with an example. 08
 (b) Explain vertex cover problem 06
 (c) Find GCD (99,78) using extended Euclidean algorithm. 06

Q.6 a) Prove that Feedback edge set problem is Np Complete. 06
 b) Draw a state transition diagram for the string matching automata Where P=ababaca and text T= ababa ba caba. 08
 c) Discuss iterative FFT 06

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1832
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
El-1 Remote Sensing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- 1) Attempt any two question from each section.
- 2) Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Explain RGB and CMY color modes in detail. | 10 |
| | b) Explain electromagnetic Spectrum in detail. What is the use of EMS in remote sensing? | 10 |
| Q.2 | a) Explain different types of resolution of a sensor system. | 12 |
| | b) Differentiate between sun – synchronous and Geo – stationary orbits. | 08 |
| Q.3 | a) Explain thermal sensing with example. | 08 |
| | b) What is multispectral and hyper spectral sensing? Explain with application. | 12 |

Section B

- | | | |
|-----|--|----|
| Q.4 | a) What are the different types of remote sensing image interpretation? | 08 |
| | b) Explain image enhancement. Explain different operations for image enhancement. | 12 |
| Q.5 | a) How do you classify digital image? Explain the methods for classification of image. | 12 |
| | b) Explain fuzzy classification. | 04 |
| | c) What is band ratio and use band ratio. | 04 |
| Q.6 | a) Explain different techniques to measure errors in classified images. | 10 |
| | b) Explain application of remote sensing. | 04 |
| | c) What are spectral vegetation indices? How they are useful in remote sensing. | 06 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1603
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp. Sci. & Engg.)
Internal of Operating System
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Solve any two questions from each section.
 2. Assume suitable data if necessary.

Section A

- | | | | |
|-----|-----------------------------|---|----|
| Q.1 | a) | Explain memory management in windows? | 10 |
| | b) | Explain thread lifecycle? How threads are managed in windows? | 10 |
| Q.2 | a) | What is inode in Linux? What is maximum file size supported by Linux and how it is decided? | 06 |
| | b) | How interprocess communication is carried out in Linux? | 07 |
| | c) | Explain scheduling in Linux? | 07 |
| Q.3 | Write short note: (any two) | | 20 |
| | i) | Windows Azure Architecture | |
| | ii) | Fabric controller Availability | |
| | iii) | Azure Hypervisor | |

Section B

- | | | | |
|-----|----|---|----|
| Q.4 | a) | What is multicore technology? Explain multi micro Kernel OS for multicore? | 10 |
| | b) | Describe shared memory management in multiprocessor system with neat diagram. | 10 |
| Q.5 | a) | What is OS security? Describe different criteria used for trusted computer system evaluation. | 07 |
| | b) | Describe different components of Linux security? | 07 |
| | c) | Write short note on windows auditing mechanism. | 06 |

Q.6 Write short note (any two)

- i) RT Linux Kernel Vs Linux Kernel
- ii) Design issues of EOS
- iii) QNX
- iv) Windows CE

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1837
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp.Net & Engg.)
El-1 Network Processor
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B 1. Solve any two questions form each section.
- Section A**
- | | | |
|------------------|---|----|
| Q.1 | a) Explain basic packet processing Algorithms. | 10 |
| | b) Explain switching Fabrics. | 10 |
| Q.2 | a) Explain Traffic Managers. | 10 |
| | b) Explain Multi – Chip pipelining | 10 |
| Q.3 | a) Explain scalability issues. | 10 |
| | b) Explain Design Tradeoff and consequences. | 10 |
| Section B | | |
| Q.4 | a) Explain intra thread and inter thread communication? | 10 |
| | b) Explain register formats. | 10 |
| Q.5 | a) Explain Embedded EISC processor. | 10 |
| | b) Explain bus Interface. | 10 |
| Q.6 | a) Explain in detail about IP routing | 10 |
| | b) Explain in detail about mobile IP. | 10 |

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1692
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp.Net. & Engg.)
Elective-II: Discrete-Event Sys. Simulation
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Answer any two questions from each sections.
 - 2) Assume suitable data if any.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain simulations of queuing system with suitable examples? | 10 |
| | b) Explain with suitable example, discrete & continuous systems? | 10 |
| Q.2 | A) Explains Time – Advance algorithm with suitable example. | 10 |
| | B) Explain Empherical distribution with suitable example in detail? | 10 |
| Q.3 | Write short notes. | 20 |
| | a) M/G/I queue model | |
| | b) Networks of queue | |
| | c) Pseudo – random numbers | |
| | d) Verification & validation | |

Section B

- | | | |
|-----|--|----|
| Q.4 | a) Explain in detail calibration & validation of models. | 10 |
| | b) Explain output analysis for steady stats simulations? | 10 |
| Q.5 | a) Explain Goodness of fit tests with suitable examples? | 10 |
| | b) Explain multivariate & Time – Series input models? | 10 |
| Q.6 | Write short notes on | 20 |
| | a) Simulation tools | |
| | b) High – level computer – system simulation | |
| | c) Data link layer | |
| | d) CPU simulation | |

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1642
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Comp.Net. & Engg.)
Network Routing Algorithms
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Answer any two questions from each section.
 - 2) Assume suitable data if any.

Section A

- | | | |
|-----|--|----------|
| Q.1 | A) Explain routing information protocol (RIP) in detail?
B) Explain Bellman ford Algorithm & write a program for it. | 10
10 |
| Q.2 | A) Explain in detail AG & MWPQ with suitable example?
B) Explain in detail core based tree routing? | 10
10 |
| Q.3 | A) Explain light path migration and wavelength rerouting in optical WDM routing network?
B) Explain classification of RWA algorithm & explain Fairness & Admission control. | 10
10 |

Section B

- | | | |
|-----|---|----------|
| Q.4 | A) How does DSDV differ from AODV? Explain in detail with suitable, example?
B) Compare & explain MIP & mobile, IPv6 protocols? | 10
10 |
| Q.5 | A) Explain the working procedure of intra domain mobility management protocol with example?
B) Explain Hybrid routing with zone based routing (ZRP) with neat figure & examples? | 10
10 |
| Q.6 | Write notes on
a) DVMRP
b) IDMP
c) MBONE
d) DLSR | 20 |

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1626
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Advance Digital Control System
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q.1 and Q.6 are compulsory.
 ii) Attempt any two questions from the remaining questions in each section.

Section A

- Q.1 Attempt any two. 10
- i) Zero order hold (ZOH)
 - ii) Jury stability criterion
 - iii) Sampling Theorem
 - iv) Bilinear Transformation
- Q.2 Find $\phi(K)$ for 15
- i) $A = \begin{bmatrix} 0 & -3 \\ 1 & -4 \end{bmatrix}$
 - ii) $A = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix}$
- Q.3 What is multivariable system? Explain by giving suitable example. 15
- Q.4 Explain Digital control system with the help of block diagram, explain each block in detail. Also compare Digital control system with continuous control system. 15
- Q.5 Find transfer function from state equation 15
- $$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -3 & -9 \end{bmatrix}$$
- $$B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$
- $$C = [1 \quad 0 \quad 0]$$

Section B

- Q.6 Attempt any two. 10
- i) BIBO stability
 - ii) Digital PID controller
 - iii) Compensator design
 - iv) Zero input stability
- Q.7 With the help of neat diagram. Explain Digital temperature control system. 15
- Q.8 Explain Deadbeat control by state feedback and Deadbeat observer. 15
- Q.9 Describe full state observer for 15
- $$A = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$$
- $$B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$
- $$C = [1 \quad 1]$$
- With $z_1 = 0.2$ and $z_2 = 0.5$
- Q.10 Explain controllability and observability Determine whether the following system is controllable & observable. 15
- $$A = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix}$$
- $$B = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$
- $$C = [0 \quad 1]$$

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1646
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
System Identification & Adaptive Control
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B i) Solve two questions from each section.

Section A

- | | | |
|-----|---|----|
| Q.1 | a. Explain line identification of process model. Give the calculation of frequency response curve G (JW) from pulse test data. | 10 |
| | b. Explain in detail system identification procedure. | 10 |
| Q.2 | a. Explain ARX transfer function mode in detail. | 10 |
| | b. What is adaptive control? What are its types? Explain gain scheduling adaptive control with examples. | 10 |
| Q.3 | a. Derive an expression for transfer function model of linear time invariant system. | 10 |
| | b. Derive first order & second order plus dead time process transfer function model using single step test data & also explain direct sine wave testing in brief. | 10 |

Section B

- | | | |
|-----|---|----|
| Q.4 | a. Explain the effect of process variation on linear feedback control system. | 10 |
| | b. Obtain the state space model for LTI type DC servo motor. | 10 |
| Q.5 | a. Describe minimum degree pole placement (MDPP) method. | 10 |
| | b. Describe & write algorithm of direct self-tuning regulator. | 10 |
| Q.6 | a. Show that the model structure M is a differentiable mapping from a connected open subsystem D_m of R^d to model set M. | 10 |
| | b. Discuss in detail auto tuning techniques. | 10 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1668
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Optimal Control
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Attempt three questions from each Section.
 - 2) Q. No. 1 from Section A & Q. No. 6 from Section B are compulsory.

Section A

- Q.1 Answer in brief any two: 10
- a) What is optimal control system? How it is different from conventional control system.
 - b) Explain Servomechanism.
 - c) How the Lyapunov function is written for Linear System.
- Q.2 Explain with suitable example. State variable approach in control system. 15
- Q.3 Explain with flow chart dynamic programming of optimal control system. 15
- Q.4 Discuss & formulate continuous time tracking problem in optimal control system. 15
- Q.5 Explain in detail with optimal control problem related with transfer function approach in continuous & discrete domain. Discuss how the desired system performance is translated in to appropriate performance Index. 15

Section B

- Q.6 Answer in brief:- 10
- a) Explain discrete time linear quadratic regulator.
 - b) What is constrained state feedback comp. Explain.
- Q.7 Explain in detail optional state regulator. 15
- Q.8 Suppose that the system 15
- $$X_1(t) = X_2(t)$$
- $$X_2(t) = u(t)$$
- is to be constructed to minimum the performance measure
- $$J(x, u) = \frac{1}{2} \int_0^2 u^2 dt$$
- Find the set of necessary conditions for optional control.

Q.9 Consider the system described by the equation 15

$$X_1(K + 1) = 2X_1(t) + 0.5 X_2(K) - 5$$

$$X_2(K + 1) = 0.8X_2(K) + 2$$

Investigate the stability of the equilibrium using Lyapunov equation.

Q.10 Explain in detail sub optimal feedback gain. Why it is employed in optimal control problem. 15

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1706
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Elective-II: Robust Control System
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt any two questions each from section A & section B.
 - ii) Figure to right indicate full marks
 - iii) Assume suitable data if necessary

Section A

- | | | |
|-----|--|----|
| Q.1 | A) Explain Jordan canonical forms and its one of the property | 10 |
| | B) What is mean by structural decomposition? Explain in brief with example | 10 |
| Q.2 | A) Explain existence condition of H_∞ sub optimal controllers | 10 |
| | B) What is mean by mapping of bilinear transformations? Explain same with continuous time system | 10 |
| Q.3 | A) Explain solution to General DARE with the help of one of the theorem | 10 |
| | B) What is $H - \infty$ DARE explain? | 10 |

Section B

- | | | |
|-----|---|----|
| Q.4 | A) Explain H_∞ optimization in discrete time with full information feedback case | 10 |
| | B) Explain plants with imaginary axis zero/ unit circle zeros | 10 |
| Q.5 | A) What is the order output feedback and how to reduced order output feedback | 10 |
| | B) Explain in details full state feedback | 10 |
| Q.6 | A) Explain Robust and perfect tracking of continues time system | 10 |
| | B) How to measurement of feedback case is possible in case of Discrete time systems | 10 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1749
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Advance Control Theory
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

i) Attempt any two questions from section A & section B.

iii) Assume suitable data if required

Section A

- Q.1 a. Define following terms: 10
- i. Dimension of linear space
 - ii. Linear operators
 - iii. linear dependence
 - iv. vector space
 - v. range space
- b. T is a linear transformation. Find the standard matrix of T; if $T: R^2 \rightarrow R^2$ rotates points e_1 and e_2 about the origin through 3π radians counter clockwise where $e_1 = (1,0)$ and $e_2(0,1)$ 10
- Q.2 a. Obtain the state model of the system whose transfer function is given as: 10
- $$\frac{y(s)}{U(S)} = \frac{10}{s^3 + 4s^2 + 2s + 1}$$
- b. Explain the observability of the systems given below using canonical form 10
- $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 11 \\ 1 \\ -14 \end{bmatrix} u \text{ and } y = [-3 \quad 5 \quad -2] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$
- Q.3 a. Determine the rank of the matrix: 10
- $$\begin{bmatrix} 2 & 5 & -3 & -4 & 8 \\ 4 & 7 & -4 & -3 & 9 \\ 6 & 9 & -5 & 2 & 4 \\ 0 & -9 & 6 & 5 & 6 \end{bmatrix}$$
- b. Determine whether or not following quadratic function is positive definite 10
- i. $v(x) = 8x_1^2 - x_2^2 + 4x_3^2 + 2x_1x_2 - 4x_1x_3 - 2x_2x_3$

Section B

- Q.4 a. Derive Ackerman's formula for pole placement 10
- b. An observable system is described by 10
- $$\dot{X} = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -1 & 1 \\ 0 & 2 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix} u$$
- $$y = [0 \quad 0 \quad 1]x$$
- Design a state observer so that designed Eigen value are of $-4, -3 \pm j1$
- Q.5 a. What is meant by Matrix-fraction description (MFD) of transfer function? Explain its significance in system controllability and observability 10
- b. Explain the observer based state feedback controller with a neat block diagram 10
- Q.6 a. Explain effect of state feedback on controlling and observability. Also state necessary and sufficient conditions for arbitrary pole placement 10
- b. With an example, explain state space realization from transfer function matrices 10

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1768
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Advanced Process Control
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B

1. Q.5 & Q.10 compulsory.
2. Attempt any two questions from remaining of each section.
3. Figure to the right indicate full marks.

Section A

- | | | |
|-----|---|----|
| Q.1 | Discuss different errors in instrumentation system | 15 |
| Q.2 | Derive a mathematical model for CSTR system and define its state variable and state equations | 15 |
| Q.3 | Discuss dynamics and control of Distillation process | 15 |
| Q.4 | What are the major steps in process control design? Explain with example. | 15 |
| Q.5 | Write short note on
a) Static performance criterion
b) Dynamic first order system | 10 |

Section B

- | | | |
|------|--|----|
| Q.6 | Discuss selection of controlled variable and manipulated variables in process control. | 15 |
| Q.7 | Obtain transfer function of hydraulic type PI controller? | 15 |
| Q.8 | Discuss inherent and installed characteristics of control valve | 15 |
| Q.9 | With an example explain feed forward control strategy | 15 |
| Q.10 | Write short note on
a) Cohen coon Tuning method
b) Transmission lines. | 10 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1787
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
Advanced Digital Signal Processing Systems
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

- N.B Please check whether you have got the right question paper.
- i) Q.No.5 and Q No.10 are compulsory. Solve any two questions from remaining of each section
 - ii) Figures to right indicate full marks
 - iii) Assume suitable data wherever necessary

Section A

- Q.1 What is mean by standard test signals? Explain all the standard test signals in detail 15
- Q.2
 - a. Describe the properties of DFT 07
 - b. Explain 8 point FFT algorithm using decimation in time 08
- Q.3 Design a digital filter using bilinear transformation for following analog transfer function 15
- $$H(s) = \frac{1}{s^2 + \sqrt{2}s + 1}$$
- obtain transfer function H(s) of digital filter assuming 3db cut-off frequency of 150 Hz and sampling frequency of 1.28 KHz
- Q.4
 - a. Explain frequency sampling of FIR filters 08
 - b. Describe the convolution sum 07
- Q.5 Write a short note on (any two) 10
- i. Twiddle factor
 - ii. Exponential & sinusoidal signals
 - iii. Hanning window

Section B

- Q.6
 - a. What are the effects of finite register length in DFT computation? 08
 - b. Explain the effects of round-off noise in digital filters 07
- Q.7
 - a. What is wavelet transform? Explain 08
 - b. Describe multiresolution formulation of wavelet systems 07
- Q.8
 - a. Write a short note on wavelet expansion systems 08
 - b. Explain the various types of structures for realizing FIR system. 07

Q.9 Explain multistage design of decimator and interpolator in detail

15

Q.10 Write a short note on (any two):

10

- i. Haar wavelet
- ii. Parseval's theorem
- iii. Interpolated FIR filter

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1850
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
EI-1 Digital Image Processing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- 1) Q. No.1 and Q. No.6 are compulsory.
 2) Attempt any Two questions from each section from remaining.
 3) Assume suitable data, if necessary.
 4) Figures to right indicate full marks.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What is stereo imaging? | 05 |
| | b) What is Walsh transform? What are the advantages of Walsh transform over Fourier transform? | 05 |
| | OR | |
| | a) What is Haar transform? List its properties | 05 |
| | b) Explain characteristics of image digitizer. | 05 |
| Q.2 | a) What is perspective transformation? | 08 |
| | b) Explain adjacency and connectivity. | 07 |
| Q.3 | a) What is need of image transforms? How DCT is related with DFT? | 08 |
| | b) Explain Gabor and Hotelling transform. | 07 |
| Q.4 | a) Explain operations involved in basic transformation. | 08 |
| | b) Why image filtering is done in frequency domain? | 07 |
| Q.5 | a) Write short note on solid state camera. | 08 |
| | b) Write a short note on the elements of digital image processing systems. | 07 |

Section – B

- | | | |
|-----|--|----|
| Q.6 | a) Explain bit plane coding. | 05 |
| | b) Explain techniques of edge detection. | 05 |
| | OR | |
| | a) What is meant by Lossy and lossless compression? | 05 |
| | b) Discuss regional descriptors. | 05 |
| Q.7 | a) Explain inverse filtering. | 08 |
| | b) List continuous tone file formats and discuss its features. | 07 |

- Q.8 a) Explain lossy compression scheme. 08
b) Write about image degradation model. 07
- Q.9 a) Explain image segmentation using region splitting and merging. 08
b) Discuss boundary descriptors. 07
- Q.10 a) Write short note on lossless predictive coding. 08
b) Write short note on classifiers 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1849
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Control System Engg.)
El-1: Advance Drives & Controls
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Solve any two questions from each Section.
 - 2) Assume suitable data if necessary.
 - 3) Mathematical treatment is required wherever necessary.

Section A

- Q.1
- a) Explain dual converter control scheme of D.C separately excited motor with two fully controlled rectifiers. 10
 - b) Explain with sketches speed torque curves of dc motors for various methods of speed control. Explain field flux control method. 10
- Q.2
- a) Explain regenerative braking & plugging or reverse voltage braking of an induction motor. 10
 - b) Explain with neat sketches speed torque curves of DC motors for various methods of speed control. 10
- Q.3
- a) Explain with neat diagram the operation of brushless dc (or trapezoidal PMAC) motor drive fed from a current regulated voltage source inverter with it's voltage, current and torque waveform. 10
 - b) Explain regenerative braking & pegging or reverse voltage braking of an induction motor. 10

Section B

- Q.4
- a) Explain the convertor circuits used for switched reluctance motor drives. List advantages of switched reluctance motors. 10
 - b) Explain an efficient unipolar & bipolar drive circuits for stepper motors. 10
- Q.5
- a) Why is it necessary to operate a solar panel near the maximum power points? Draw I-V and P-V characteristics of solar panel which motor are suitable for pump drives? 10
 - b) Explain with neat circuit diagram, the operation of dc drive with chopper control for an electric vehicle. Explain advantage of electric vehicles. 10

- Q.6
- a) Derive a relation between principle quantities in trapezoidal & quadrilateral speed limits 10 curves in traction for an electrician.
 - b) Explain dc Traction using semiconductor chopper controlled dc motors. Write about 10 nature of traction load.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1677
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
Soft Computing
(REVISED)

[Time: Three Hours]

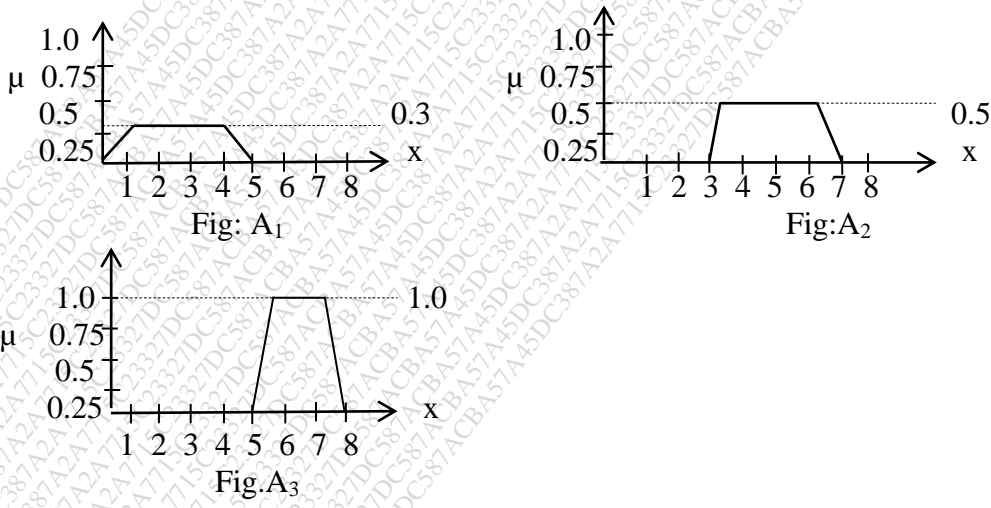
[Max.Marks: 80]

N.B Please check whether you have got the right question paper.
 i. Solve any two from each section
 ii. Assume suitable data if necessary indicate it

Section A

- Q.1 a) Explain single layer perceptron and its disadvantage? 08
 b) Explain the Back propagation in detail. 12
- Q.2 a) What are the components of soft computing? Give the various operator of genetic algorithm. 08
 b) Solve XOR problem using BPN 12
 Given $W_{13}=0.02$, $W_{14}=0.03$
 $W_{12}=-0.02$, $W_{23}=0.01$
 $W_{24}=0.02$, $Q_1=0.1$
 $Q_2=0.01$

Q.3 $A_1 A_2 A_3$ fuzzy sets shown below. Apply defuzzification using all 3 methods? 20



Section B

- Q.4 a) Explain fuzzy inference system? Define following with example 08
 I. Generalized Ponens
 II. Generalized Tollens
 b) Explain with suitable example genetic based weight determination? 12
- Q.5 a) Explain fuzzy ARTMAP? 10
 b) Recall A and B using Fuzzy Hebb FAM consider Fuzzy Set 10
 $A = \{0.3, 0.4, 0.5, .06\}$
 $B = \{0.6, 0.2, 0.1\}$
- Q.6 a) Explain biological neuron structure? 10
 b) What is Hybrid system? Describe 3 basic hybrid systems? 10

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1634
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S.& I.T.)
Information & Network Security
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- N.B i) Attempt any two Questions from each section
 ii) Assume suitable data, if necessary.

Section A

- Q.1 A) What is security? Explain (i) Critical Characteristics of information (ii) NSTISSC security model. 10
- B) What is the objective of RC₄ algorithm? Explain its logical implementation. 10
- Q.2 A) Explain (i) firewall physical Design (ii) Intrusion detection system (IDS) 10
- B) What do you mean by information security maintenance? Explain security management models. 10
- Q.3 Write short notes on the following (Any four) 20
- (i) Information Security terminologies
- (ii) Internet Standards and RFCs
- (iii) Scanning and Analysis tools
- (iv) Challenges in information & network security
- (v) Honey Nets.

Section – B

- Q.4 A) Explain encryption principles; Explain DES algorithm. 10
- B) What is public key cryptography? Explain RSA and RABIN. 10
- Q.5 A) Why there is a need for digital signature? Explain various attacks on digital signature. 10
- B) How pretty good privacy (PGP) is used for electronic mail security? Explain with suitable diagram. 10

- Q.6 Write short notes on the following (Any four)
- (i) Approaches to message authentication
 - (ii) X.509 Directory authentication service
 - (iii) S/M/ME
 - (iv) Web Security requirements
 - (v) Secure hash functions.

20

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1700
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Elective-IV: Digital Manufacturing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Solve any three questions from each section.
 - ii. Assume suitable data if required.

Section A

- | | | |
|-----|---|----|
| Q.1 | A. Discuss evolution of digital manufacturing. | 06 |
| | B. Explain Process simulation and validation in detail manufacturing. | 07 |
| Q.2 | A. Explain throughput simulation and its benefits in digital manufacturing. | 06 |
| | B. Illustrate Robotics simulation and offline programming (OLP) plant design used in digital manufacturing. | 07 |
| Q.3 | a. How Digital manufacturing acts as key element in PLM. | 06 |
| | b. “Digital manufacturing improves value chain”, justify the statement. | 07 |
| Q.4 | A. Present a survey of DES software and their capabilities. | 06 |
| | B. How discrete event simulation acts as a tool for improvement of manufacturing systems. | 07 |
| Q.5 | Write notes on | 14 |
| | A. Ergonomic simulation | |
| | B. Work cell layout design | |

Section B

- | | | |
|-----|---|----|
| Q.6 | A. Discuss the characteristics of OOTB software and functionality enhancement for manufacturing process simulation. | 06 |
| | B. Explain collaborating process planning in digital manufacturing. | 07 |
| Q.7 | A. Explain the key characterizes of reconfigurable manufacturing systems. | 06 |
| | B. Describe how storage & retrieval systems are used in design, deployment of e – manufacturing systems. | 07 |

- Q.8 A. What are the capabilities of reconfigurable manufacturing systems? 06
- B. Explain how simulation – based technologies support digital manufacturing solutions. 07
- Q.9 A. Illustrate use of information sharing using STEP and XML in digital manufacturing. 06
- B. Present the framework for integrated design of mechatronic system in digital manufacturing. 07
- Q.10 Write notes on 14
- A. Challenges of reconfigurable manufacturing systems
- B. XML

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1699
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Elective-IV: Robust Design of Products/Processes
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt any three questions from each section
 - ii) Assume suitable data, if necessary

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What is quality loss function? Explain | 06 |
| | b) Explain p-diagram with neat sketch | 07 |
| Q.2 | a) What are the major quality control activities during the various stages of life cycle of a product in perspective the Robust Design methodology | 06 |
| | b) How do you select optimum factor levels in Robust Design | 07 |
| Q.3 | a) Explain six-sigma with an example | 06 |
| | b) What are task aids and responsibilities in design of experiments? | 07 |
| Q.4 | a) Explain inner-outer arrays design | 07 |
| | b) What is S/N ratio? Explain | 07 |

Section B

- | | | |
|-----|---|----|
| Q.5 | a) Explain use of linear graphs in detail | 06 |
| | b) Give some examples of variable characteristics | 07 |
| Q.6 | a) What is difference between control factors and noise factors? | 06 |
| | b) What orthogonal arrays are appropriate for experimenting with 5 two level factors? | 07 |
| Q.7 | Explain product design with characteristic values with an example | 14 |
| Q.8 | a) Under what conditions would complete randomization typically be used? | 06 |
| | b) Write short note on RSM | 07 |

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1747
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Advanced Machine Design
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any three question from each section
 - ii) Figure to right indicates full marks
 - iii) Assume suitable data if required and state it clearly

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain state of stress at a point | 06 |
| | b) Show that the cross shears are equal | 07 |
| Q.2 | a) What is plane strain condition? Explain with suitable examples | 07 |
| | b) What do you understand by displacement methods? | 06 |
| Q.3 | a) What is deflection of plates? Explain | 06 |
| | b) Derive the expression for the following in case of composite laminate | 07 |
| | i) Extensional stiffness | |
| | ii) Coupling stiffness | |
| Q.4 | What do you mean by single degree of freedom system and multi degree of freedom system? Explain Runge - Kutta method for single degree of freedom system. | 13 |
| Q.5 | Write a short notes on (<u>any two</u>) | 14 |
| | a) Laminated composite plate | |
| | b) Central difference method | |
| | c) Explicite scheme | |

Section B

- | | | |
|-----|--|----|
| Q.6 | a) Explain surface energy | 06 |
| | b) Explain stable and unstable crack growth | 07 |
| Q.7 | a) Explain different kinds of failure | 07 |
| | b) What is brittle fracture? Explain with suitable example. | 06 |
| Q.8 | a) Determine GI for DCB specimen with a load at the end of cantilever considering strain energy of shear force | 07 |
| | b) Why are load tests still popular in industry? | 06 |

- Q.9 a) Why is it difficult to find plate strain K_{IC} of ductile material 06
b) Why do we not use biharmonic equation to solve mode III problem for central crack in an infinite plate? 07

- Q.10 Write short note on (Any two) 14
a) CTOD testing
b) Griffith energy balance
c) Determination of J_{IC}

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1766
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Computer Aided Design
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
- I. Solve any three questions from each section
 - II. Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Explain parametric design in detail. | 07 |
| | b) Explain the product design process in brief. | 06 |
| Q.2 | a) Explain the different solid modeling methods in detail. | 10 |
| | b) Enlist the different ground rules for design of graphic software. | 04 |
| Q.3 | a) Differentiate between surface modeling and solid modeling. | 07 |
| | b) Explain the importance of CAD. | 06 |
| Q.4 | Explain homogeneous representation with an example. | 13 |
| Q.5 | Write short notes on <u>any two</u> . | 13 |
| | a) Human factors in design. | |
| | b) Function of graphic software. | |
| | c) Scaling transformation. | |
| | d) Solid modeling software. | |

Section B

- | | | |
|-----|---|----|
| Q.6 | a) Explain the different data exchange standards in detail. | 07 |
| | b) Explain knowledge based engineering in brief. | 06 |
| Q.7 | a) Explain boundary representation in details. | 07 |
| | b) Explain design by features. | 06 |
| Q.8 | a) Explain tolerance modeling in detail. | 07 |
| | b) What do you mean by constraints in solid modeling? | 06 |
| Q.9 | a) Explain design information systems. | 07 |
| | b) Explain curve representation in brief. | 06 |

Q.10 Write short note on any two.

14

- a) Open GL.
- b) Sweep representation.
- c) octree representation.
- d) Modeling by Boolean operation.

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1785
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Concurrent product Design
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Solve any three questions from each section.
 - ii. Figures to the right indicates full marks.
 - iii. Draw neat sketch wherever required.
 - iv. Assume suitable data if required.

Section A

- Q.1 Design plays an important role justify the statement also explain different design considerations. 13
- Q.2 With example explain concurrent design model in detail. 13
- Q.3 There is a great role of different tools and software used in selection of material and manufacturing process in design explains. 13
- Q.4 Write short note on any two. 14
- i) Benchmarking and mass customization
 - ii) Axiomatic design
 - iii) Factors affecting material and process selection

Section B

- Q.5 Design for aesthetic and packing are important considerations. Explain them with practical example. 13
- Q.6 In product development approaches and concurrent engineering. How design cost estimation is considered? Explain. 13
- Q.7 With example explain PLM and related software tools in detail. 13
- Q.8 Write short note on any two. 14
- i) Modular product design
 - ii) Design for safety
 - iii) VRML

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1803
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
E1 - 1 Lean Manufacturing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

(i) Solve any three questions from each section.

(ii) Figures to the eight indicate full marks.

Section A

- Q.1 What is the logic behind JIT? How wastes are eliminated in JIT? 13
- Q.2 Discuss the difference between pull and push system of production. Prove how pull system is effective as per Japanese approach? 13
- Q.3 (a) Discuss monthly information and daily information method in Kanban. 09
- (b) Explain mass production. 04
- Q.4 Describe with suitable product application replenish system by Kanban sequenced withdrawal 'P' system. 13
- Q.5 Write short notes:- 14
- (i) Supplier kanban circulation in the paternal manufacturer.
- (ii) Logical limits of mass production.

Section B

- Q.6 Discuss the steps in action plan for installing business system to encourage lean thinking in automobile industry. 13
- Q.7 (a) What are the various elements of lean production? 07
- (b) How geographical spread can be managed in lean enterprise. 06
- Q.8 Discuss the following important parameters related to Education of lead times: 13
- (i) Machine layout
- (ii) Multifunction worker & job rotation.
- Q.9 Explain the practical procedure for reducing setup time. 13

Q.10 Write short notes:-

- (i) Company as community in lean production.
- (ii) Future of lean production.

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1806
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
El - 1 System Dynamics
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
 i) Solve any three questions from each sections.
 ii) Assume suitable data, if required.

Section A

- | | | |
|-----|--|----|
| Q.1 | Explain the business strategies also explain business strategies fail. | 13 |
| Q.2 | Explain the business crises and fluctuating sales. | 13 |
| Q.3 | Explain the reasons of business stagnate | 13 |
| Q.4 | Explain the causal loop diagram. | 13 |
| Q.5 | Explain flow structure of system dynamics. | 14 |

Section B

- | | | |
|------|--|----|
| Q.6 | Explain the dynamics of Stock & flows. | 13 |
| Q.7 | Explain the Growth Strategies | 13 |
| Q.8 | Explain the S shaped growth. | 13 |
| Q.9 | Explain path dependence. | 13 |
| Q.10 | Explain the decision making. | 14 |

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1842
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
El-2 Product Life Cycle Management
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any three questions from each section.
 - ii) Figures to the right indicate full marks.

Section A

- | | | |
|-----|--|----|
| Q.1 | List and describe various activities involved in product development. | 13 |
| Q.2 | Describe the various components of PLM software. | 13 |
| Q.3 | What is the need of PLM? Give the background, overview & benefits of PLM. | 13 |
| Q.4 | What are the key management issues around product data & product workflow? | 13 |
| Q.5 | With the help of suitable example explain company's PLM vision and PLM strategy. | 14 |

Section B

- | | | |
|------|--|----|
| Q.6 | What are the core issues addressed by PLM? | 13 |
| Q.7 | Explain in detail vendors and components for PLM system. Add suitable example. | 13 |
| Q.8 | a) What are the reasons for implementing a PDM system? | 07 |
| | b) What is meant by multiple data definition? | 07 |
| Q.9 | With the help of an example explain PLM in use? | 13 |
| Q.10 | a) Describe the systems in PDM. | 06 |
| | b) How data issues can be resolved? | 07 |

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1841
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
EI-2 Sheet Metal Modeling & Manuf.
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- N.B i) Attempt any four questions from each section.
 ii) Assume suitable data wherever required.

Section A

Q.1 Stress analysis of spacecraft structural members gives the state of stress shown below in fig.1. If the part is made from 7075-76 aluminium alloy with $\sigma_0 = 500\text{Mpa}$, will it exhibit yielding? If not what is safety factor? 10

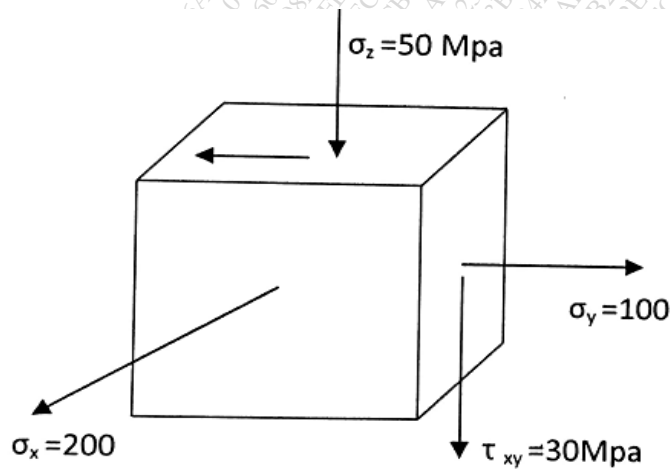


Fig.1

- Q.2 Explain metal deformation by Twinning. 10
- Q.3 Explain the process of unrolling the cylinders and obtain the developed areas. 10
- Q.4 Explain High strength low alloy steels. 10
- Q.5 Explain IGES specifications and its importance. 10
- Q.6 Explain with neat sketch: i) Straight flanging; ii) Stretch flanging iii) Shrink flanging. 10

Section B

- Q.7 Find the cutting force required produce the washer 60 mm outside diameter with 30 mm diameter hole, from 4 mm thick strip, having a shear strength 400 Mpa. Also decide the diameters of punch and die opening. 10
- Q.8 The symmetrical cup work piece shown in fig. 2 is to be made from cold rolled steel 0.8 mm thick. Determine i) Size of the blank, ii) Drawing force. Take $C=0.6$ =constant for bending and friction effect. $\sigma_y = 427\text{Mpa}$. 10

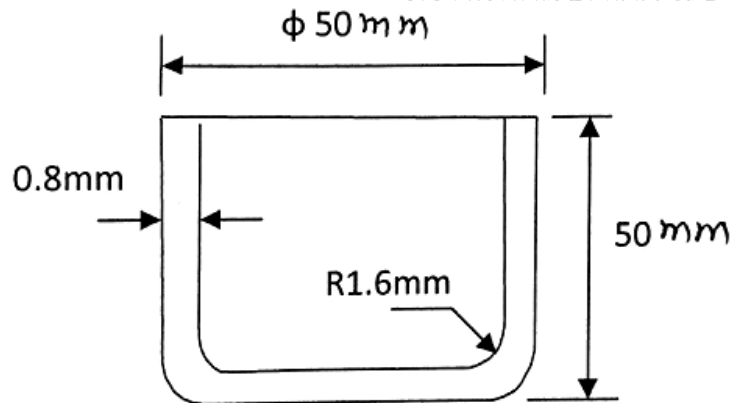


Fig. 2

- Q.9 Determine the developed length of the part as shown in fig.3 10

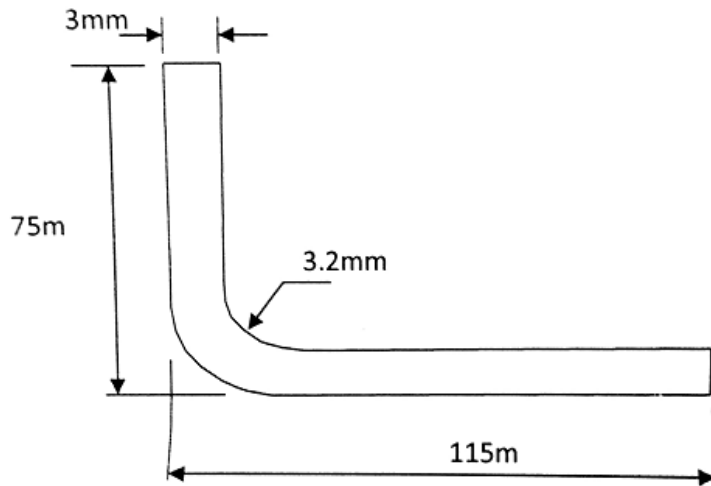


Fig.3

- Q.10 Explain methods of reducing cutting forces in die cutting operations. 10
- Q.11 Explain strippers in die cutting operations. 10
- Q.12 Explain with neat sketch the compound die set. State its applications, merits, demerits. 10

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1843
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
EI-2 Automated Material Handling Systems
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt any three questions from each section.
 - ii) Draw neat labeled sketch wherever necessary.
 - iii) Assume suitable data, if necessary.

Section A

- | | | |
|-----|--|----------|
| Q.1 | a) What are ten principles of material handling system? Enlist material handling equipment's?
b) What are types of automated guided vehicle systems (AGVS)? | 08
05 |
| Q.2 | a) Explain AGVS steering control and routing methods?
b) What are functions of automated storage and retrieval systems? | 08
05 |
| Q.3 | a) Draw with neat sketch the elements of automated storage and retrieval systems?
b) What are key design considerations for an automated storage and retrieval systems? | 08
05 |
| Q.4 | Write short note on <u>any two</u> of the following
a) Bar code in material handling
b) Charting technique in material handling
c) Flexible manufacturing system
d) Monorails and conveyor
e) Vehicle management and safety | 14 |

Section B

- | | | |
|-----|---|----------|
| Q.5 | a) Differentiate with at least five points mobile and fixed robot?
b) Draw neat sketch of robot and explain various elements of pick and place robot? | 05
08 |
| Q.6 | a) What are electric drives used in robot?
b) Describe the application of robot for spray painting and spot welding? | 05
08 |
| Q.7 | a) Explain robot motion planning and trajectory planning?
b) Explain robot sensors and robot vision? | 05
08 |
| Q.8 | Answer <u>any two</u> of the following
a) Robot programming languages
b) Fond effectors
c) Need for using robot
d) Flexible industrial robot
e) Inspection robot | 14 |

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1607
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Computer Aided Analysis
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B i) Answer any three questions from each section

Section A

Q.1 Explain implicit method w.r.to FDM 13

Q.2 Write about the application of FDM to steady state heat conduction 13

Q.3 What are the different FEA software's? Explain briefly 13

Q.4 What is weighted Residual method? Explain 13

Q.5 Write about the applications of boundary condition in FEM 14

Section B

Q.6 What are higher order elements? Explain 13

Q.7 Explain the method of computing elements stiffness matrix in detail 13

Q.8 How rectangular elements are formulated? Explain in detail 13

Q.9 What is CPT? Explain in detail 13

Q.10 Write about the application of FEA to heat transfer 14

Total No. of Printed Pages:1

SUBJECT CODE NO: H-1698
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Elective-IV: Design for 'X'
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any three questions from each section.
 - ii) Assume suitable data if necessary

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Write about the development and implementation of DFX tools | 07 |
| | b) Explain fundamentals of DFX | 06 |
| Q.2 | a) Write about the evaluation for DFMA | 06 |
| | b) Explain design for assembly and disassembly in detail | 07 |
| Q.3 | Explain design for assorted technical requirement/ processes with a case study | 13 |
| Q.4 | Write short notes on <u>any two</u> | 14 |
| | i) Dimensional control | |
| | ii) Heat treatment and coating in DFX | |
| | iii) DFM | |

Section B

- | | | |
|-----|--|----|
| Q.5 | a) What are the benefits of DFX | 06 |
| | b) Explain PLM and enlist its advantages | 07 |
| Q.6 | a) Explain design for inspectability | 06 |
| | b) Explain serviceability and enlist it's advantages | 07 |
| Q.7 | a) Explain design for competitiveness with an example | 06 |
| | b) Explain QFD in brief | 07 |
| Q.8 | Explain optimization of product life cycle with a case study | 14 |

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1663
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Elective-III: Customization of CAD/CAM Software
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B i) Solve any three questions from each section.

Section A

- | | | |
|-----|---|----|
| Q.1 | Write about OLE interfaces in CAD/CAM software. | 13 |
| Q.2 | Explain use of general programming interfaces in CAD/CAM software. | 13 |
| Q.3 | What are the core issues in rapid development? Explain. | 13 |
| Q.4 | Explain the lifecycle planning and customer oriented development of CAD/CAM software. | 13 |
| Q.5 | Write short note on any two.
i) Tools of customization
ii) Visual LISP
iii) Software prototyping | 14 |

Section B

- | | | |
|------|--|----|
| Q.6 | What are the solid modeling algorithms (basic) explain. | 13 |
| Q.7 | Write about design and development of user interfaces in CAD/CAM software. | 13 |
| Q.8 | Write about editing of 2D 3D and solid entities using API. | 13 |
| Q.9 | Write about automated assembly modeling using customization. | 13 |
| Q.10 | Write short note on any two.
i) Euler operations
ii) Creating BOM
iii) Automated Drafting | 14 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1804
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
EI - 1 Data Based Management System
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
1. Solve any three questions from each section.
 2. Figures to right indicate full marks.
 3. Assume suitable data, if necessary and state them clearly.
- Section A**
- Q.1 a) Explain different types of database system users and administrators. 06
b) What are the purposes of database management system? 07
- Q.2 Draw an E-R diagram for university database consisting of 4 entities 13
(i) Student
(ii) Department
(iii) Class
(iv) Faculty and convert it to tables
- A student has a unique id; the student can enroll for multiple classes and has at most one major.
 - Faculty must belong to department and faculty can take multiple classes.
 - Every student will get a grade for the class he/she was enrolled.
- Q.3 a) What are views? Discuss the problems encountered in modifying database through views. 07
b) Explain fundamental operations of relational algebra. 06
- Q.4 a) Explain SQL languages and its parts. 06
b) Explain BCNF. 07
- Q.5 Write short notes on any three
a) DDL and DML 05
b) Natural join 05
c) Data type in SQL 04
d) Third Normal Form 04

Section B

- Q.6 a) Compare ordered indexing and Hashing 06
 b) Explain the different concepts of object oriented DBMS. 07
- Q.7 What are parallel Database systems? Discuss in detail the different functions of a parallel Database system. How do they differ from distributed Database system? 13
- Q.8 What is decision support system? Explain issues in storage and retrieval of data for decision support. 13
- Q.9 Discuss the database requirements for shop floor control and factory information system. 13
- Q.10 Write Short notes on any three.
 (a) Object oriented data model. 05
 (b) Client server systems. 05
 (c) Multimedia databases 04
 (d) ODBC (Open Database Connectivity) 04

Total No. of Printed Pages:02

SUBJECT CODE NO: H-1665
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)
Elective-III: Reliability Engineering & Life Testing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any three questions from each section.
 - ii) Assume suitable data, if required.

SECTION – A

- | | | |
|-----|---|----|
| Q.1 | a) Explain the concept of Reliability. | 06 |
| | b) Explain the bath tub curve. | 08 |
| Q.2 | a) Explain the MTTF & MTBF | 06 |
| | b) Explain the failure rate & failure density. | 07 |
| Q.3 | Explain the Reliability logic diagram and fault tree method using suitable example. | 13 |
| Q.4 | Explain the concept of Redundancy and various types of redundancy techniques. | 13 |
| Q.5 | Write short note on (<u>Any two</u>) | 13 |
| | a) Redundancy optimization | |
| | b) Tie Sets & Cut Sets | |
| | c) Failure Mechanism of mechanical components. | |

SECTION – B

- | | | |
|-----|--|----|
| Q.6 | Explain the reliability analysis methods for marine power plant. | 14 |
| Q.7 | a) Explain the different types of Reliability testing & Methodology. | 06 |
| | b) Explain the economics of reliability engineering. | 08 |
| Q.8 | a) Explain the stress combination methods. | 06 |
| | b) Explain the AST models. | 07 |
| Q.9 | a) Explain the Highly accelerated life testing. (HALT) | 06 |
| | b) Explain the data qualification. | 07 |

Q.10 Write short note on (Any two)

- a) Step stress method.
- b) HASS
- c) Objectives of reliability testing.

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1805
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM)

EI – 1: Enterprise Resource Planning
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B (1) Figures to the right indicate full marks.
 (2) Attempt any three questions from Section A and Any three questions from Section B.

Section A

- | | | |
|--------------------|--|----|
| Q.1 | a) What are the reasons for growth of ERP? | 07 |
| | b) Explain Evolution of ERP | 06 |
| Q.2 | a) What are the various modules in ERP? Explain finance and controlling module | 07 |
| | b) Explain Production Planning and Control Module in ERP. | 06 |
| Q.3 | a) What are the differences in discrete and process industries? | 07 |
| | b) Explain plan to produce and make to stock in Business processes. | 06 |
| Q.4 | a) How manufacturing process knowledge acquired in Auto industry. | 07 |
| | b) What is Make to order and Assemble to Order? Give example. | 07 |
| 'Section B' | | |
| Q.5 | a) Explain implementation methodology for ERP Project. | 07 |
| | b) What are the issues during implementation of ERP? | 06 |
| Q.6 | a) What is gap analysis in ERP Project? | 07 |
| | b) What is MIS? | 06 |
| Q.7 | a) Explain ERP Package SAP? | 07 |
| | b) What are the current trends in ERP? | 06 |
| Q.8 | a) Explain Web Enabling Integration of ERP with SCM. | 07 |
| | b) What is Business Process Re-engineering? | 07 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1664
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CAD/CAM/Mech.)
Elective-III: Computational Fluid Dynamics
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Assume suitable data, if required.
 - ii) Question No.5 and Question No.10 are compulsory.
 - iii) Solve any two questions from remaining in each section.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Justify CFD is a research tool. Write and explain the steps involved in CFD process? | 07 |
| | b) Explain the term in detail transition from laminar to turbulent flow? | 06 |
| Q.2 | Derive Navier-Stokes equation for Newtonian Fluid. | 13 |
| Q.3 | Explain the following terms related descriptors of turbulent flow?(any three) | 13 |
| | a) Time average or mean | |
| | b) Variance, R.M.S. and turbulence kinetic energy | |
| | c) Moments of different fluctuating variables | |
| | d) Higher-order moments | |
| | e) Correlation functions-time and space | |
| | f) Probability density function | |
| Q.4 | a) Difference between structured and unstructured grid. | 13 |
| | b) Explain the strong and weak formulations of boundary value problems. | |
| Q.5 | Write short notes on the following.(any two) | 14 |
| | a) Classification of fluid flow equations | |
| | b) The k- ϵ model | |
| | c) Finite volume method for three dimensional diffusion problems. | |

Section B

- | | | |
|-----|---|----|
| Q.6 | a) Explain in detail the steps involved in finite volume method for one-dimensional steady state diffusion? | 07 |
| | b) Explain in detail which parameters are involved in discretization schemes. | 06 |
| Q.7 | Derive an equation for one dimensional steady state convection-diffusion. | 13 |

- Q.8 Explain the terms related to finite volume method for one dimensional steady state diffusions? 13
- Grid generation
 - Discretization's
 - Solution of equations
- Q.9 Derive the three dimensional, unsteady state heat conduction equations with internal heat generation 13 in partial differential form.
- Q.10 Write short notes on the following,(any two) 14
- Central differencing scheme
 - Implementation of inlet boundary condition in one dimensional unsteady heat conduction
 - Implementation of wall boundary condition in one dimensional unsteady heat conduction

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1782
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CNE/CS & IT)
Advanced Computer Networks
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Answer any two questions from each section.
 2. Assume suitable data if any.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Describe ATM cell structure in detail. | 10 |
| | b) Explain least cost path algorithm with example. | 10 |
| Q.2 | a) Describe subnet addressing and masking. | 10 |
| | b) Explain network layer routing in detail. | 10 |
| Q.3 | Write short notes on | 20 |
| | a. IP addressing scheme | |
| | b. Ethernet | |
| | c. Node level multicast algorithms | |
| | d. Inter domain multicast protocols | |

Section B

- | | | |
|-----|--|----|
| Q.4 | a) Explain wireless mesh networks and their applications. | 10 |
| | b) Explain VOIP signaling protocols. | 10 |
| Q.5 | a) Explain various essential optical networking devices. | 10 |
| | b) Give an overview of wireless Ad-hoc networks and routing in wireless Ad-hoc networks. | 10 |
| Q.6 | a) Explain wavelength allocation for networks. | 10 |
| | b) Explain communication energy model. | 10 |

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1693
FACULTY OF ENGINEERING AND TECHNOLOGY
M.E. (CNE/CS & IT)
Elective-II: Storage Area Network
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any two questions from each section.
 - ii) Assume suitable data if necessary.

Section A

- Q.1 a) Explain storage – Centric IT architecture and its advantages in detail. 10
- b) Explain different RAID levels in detail. 10
- Q.2 a) Explain NAS software architecture in detail. 10
- b) Explain shared disk file system in detail 10
- Q.3 a) Define storage virtualization and its implementation considerations. 10
- b) Explain storage virtualizationan file level in detail. 10

Section B

- Q.4 a) Explain application of storage networks in detail. 10
- b) Explain adaptability and Scalability of IT system. 10
- Q.5 a) Explain general conditions for network Backup. 10
- b) Explain Backup of databases in detail. 10
- Q.6 a) Explain property Mechanism in management of storage network. 10
- b) Explain optional aspects of Management of storage network. 10

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1763
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CNE/CS&IT)
Advanced Operating System
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B

- 1) Solve any two from each Section.
- 2) Assume suitable data if necessary indicate it.

Section A

- Q.1 a) Distinguish centralized Vs Distributed system? 05
- b) Explain Banker's algorithm for deadlock detection. 10
- c) What are the Necessary condition to occurs deadlock? 05
- Q.2 a) Consider the following processes with length of CPU Burst time given milliseconds? 10

Process	Burst	Priority	Arrival
P_1	10	3	0
P_2	6	5	0
P_3	2	2	0
P_4	4	1	0
P_5	8	4	0

Find using SJF :- i) Average waiting time.
 ii) Turnaround time

- b) Explain design issues of distributed system? 05
- c) Explain producer/consumer algorithm? 05
- Q.3 a) Explain with suitable example of simple client server procedure in C language? 10
- b) Explain various addressing issues in distributed system? 10

Section B

- Q.4 a) Explain various algorithm of mutual exclusion in distributed system. 10
- b) Explain with suitable diagram one chip memory and bus based multiprocessor? 10

- Q.5 a) Explain ATM Reference Model? 10
- b) Explain paged based distributed memory? 10
- Q.6 a) Explain NUMA Architecture. 10
- b) Explain switched memory. 10

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1604
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (CNE/CS&IT)
Distributed Database
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
 (i) Please check whether you have got the right question paper.
 (ii) Solve any two questions from each section.

Section A

- | | | |
|-----|---|----|
| Q.1 | (a) Explain algebra of qualified relation with suitable example. | 10 |
| | (b) Explain the features of distributed versus centralized database. | 10 |
| Q.2 | (a) Explain transforming Global queries into fragment queries with example. | 10 |
| | (b) Explain optimization of access strategies in distributed database | 10 |
| Q.3 | (a) Explain criterion – 1 and criterion – 2 by taking query. | 10 |
| | (b) Discuss with example the atomicity of Distributed data base. | 10 |

Section B

- | | | |
|-----|--|----|
| Q.4 | (a) Explain concurrency control and Recovery in Distributed databases. | 10 |
| | (b) Explain 2-phase commitment protocol in distributed transaction. | 10 |
| Q.5 | (a) Discuss about check points, Cold Restart and distributed catalogs. | 10 |
| | (b) Explain distributed deadlock detection algorithm? | 10 |
| Q.6 | (a) Explain for join graph of distributed query? | 10 |
| | (b) Explain detection and resolution of inconsistency in DDBMS. | 10 |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1681
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Communication)
Elective-II: Digital Signal Processor Architecture & programming
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Question No.1 and 6 are compulsory.
 2. Answer any two question from remaining questions each from section A and section B.
 3. Numbers shown in right side indicates full marks.

Section A

- Q.1 Answer the following questions in short (any two) 10
- a. Explain how convolution is performed using a single multiplier accumulator unit in DSP processor.
 - b. List status registers bits of TMS320C5X and their functions.
 - c. Give the classification of addressing modes used in TMS320C3X processors.
- Q.2
- a. Explain what is meant by instruction pipelining. Explain with an example, how pipelining increases the throughput efficiency. 07
 - b. Explain the following terms used in C5X: CALU, ARAU, PASR and PAER. 08
- Q.3
- a. Distinguish between the dual-access RAM and single-access RAM used in the on-chip memory of C5X processor. 07
 - b. Draw the internal architecture diagram of TMS320C3X and indicate the various blocks and explain it. 08
- Q.4
- a. Explain why P-DSPs have multiple address and data buses for internal memory and peripherals but have only single address and data bus for the external memory and peripherals? 07
 - b. What are the various addition, subtraction and multiplication instructions supported by TMS320C5X processor? 08
- Q.5
- a. Write a short note on: Memory mapped registers of TMS320C5X. 07
 - b. Explain the typical application program in TMS320C3X. State the application and write the syntax of assembly languages instructions. 08

Section B

- Q.6 Answer the following questions in short (any two) 10
- State different memory architectures in TMS320C62X processor.
 - What are the recent trends in DSP system design?
 - What is meant by program Address generational logic (PAGEN)?
- Q.7 a. Draw and explain architectures in TMS320C6X DSP processor. 07
- b. What are the different peripherals accessible to TMS320C54X processor? Explain with a block diagram. 08
- Q.8 a. Describe the flow for FPGA based system design. Explain the requirement of DSP processor for such application. 07
- b. Write a C54X assembly language program to find sum of series $1+2+3+\dots+1000$. 08
- Q.9 a. What is meant by glueless interface, pipeline operation and EMIF in TMS320C6X DSP processor? 07
- b. How OMAP is used for DSP based system design. Give a typical example in support of your answer. 08
- Q.10 a. Write short note on-Implementations of filter in VLSI USING DSP processor. 07
- b. What do you know about Barrel shifter and exponent encoder in C54X processor? 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1797
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Communication)
Advanced Radiation System
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- N.B
- i) Solve any TWO full questions from each section.
 - ii) Assume suitable data if necessary.
 - iii) Figures to the right indicate full marks.

Section A

- Q.1 (a) Give the design procedure of 10
 (i) Rectangular microstrip antenna (RMSA)
 (ii) Circular microstrip antenna (CMSA)
 (b) Explain various parameters that determine the efficient working of antenna in detail with suitable 10 examples.
- Q.2 (a) What is input impedance of microstrip antenna. How is useful in determining the bandwidth 08
 of microstrip antenna? Explain with suitable expression.
 (b) Explain the various feeding techniques of microstrip antennas. 08
 (c) Explain with suitable examples of CPW Fed planar antenna. 04
- Q.3 Write short notes on 20
 (i) CPW Feed
 (ii) Beamwidth & Directivity
 (iii) Circularly polarized antenna
 (iv) Modeling of microstrip antenna

Section-B

- Q.4 (a) What is array factor? How to calculate total pattern using array factor? Calculate array factor 10
 broadside & endfire array.
 (b) Give the detailed classification of planar arrays. 05
 (c) Explain how thick and airfilled substrates help in bandwidth enhancement of microstrip 05
 antennas.
- Q.5 (a) Design 2×2 CMSA array with 50Ω feeding at the center using following specifications: 12
 $\epsilon_r=4.4$, $h=1.5\text{mm}$, $a=10\text{cm}$, $f=84\text{Hz}$, $R_{\text{edge}} = 150 \Omega$ (ohms).
 (b) Explain the working principle & advantages of coplanar capacitive coupled probe fed 08
 antennas

Q.6 Write short notes on

- (i) Slot antennas
- (ii) Smart antennas
- (iii) Base Station and Handset antennas
- (iv) Fringing effects on microstrip antennas

20

Total No. of Printed Pages:02

SUBJECT CODE NO: H-1823
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Communication)
El-1 Global Positioning System
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- 1) Q.no 5 and Q.10 are compulsory.
 - 2) Answer any two questions from remaining questions from each section.
 - 3) Assume suitable data wherever necessary.

SECTION – A

- Q.1 a) Compare GDOP, VDOP₂ and PDOP? Calculate the ionospheric range delay, given the following parameters. 07
 $F_1 = 1575 \text{ MHz}, \quad F_2 = 1227 \text{ MHz},$
 $P_1 = 20,100 \text{ km}, \quad P_2 = 20,050 \text{ km}.$
- b) Explain the principle of operation and architecture of GPS with the help of a neat diagram? 08
- Q.2 a) The error budget from various sources for a C/A code L_1 user without SA are as follows, 08
 i) Space/ control segment/ References station=3m.
 ii) Ionosphere = 8m
 iii) Troposphere = 1.5m
 iv) Multipath = 2.5m
 v) Receiver noise resolution = 1.5m
 vi) Other = 0.5m
- Calculate the system UERE. Determine the horizontal position error (2drms) if HDOP is 1.6.
- b) Compare ephemeris and receiver clock error? 07
- Q.3 a) Explain the salient features of WGS – 84 and IGS? Also List out the salient features of future 07
 satellite.
- b) Explain in detail about atmospheric errors with relevant mathematical equations. 08
- Q.4 a) Explain position estimation with pseudo range measurement. 08
 b) Explain about C/A and P – codes in detail. 07
- Q.5 Write short notes on 10
 i) Geodetic reference system.
 ii) Time references

SECTION – B

- Q.6 a) Describe the salient features and limitations of LAAS. 07
 b) Compare code based and Carrier based DGPS techniques? List out the limitations of DGPS. 08
- Q.7 a) Explain the integration of GPS and Cellular systems. 07
 b) Compare salient features of GLONASS and Galileo Satellite constellation. 08
- Q.8 a) Discuss GPS applications in Geophysics. 07
 b) Explain air borne GPS. 08
- Q.9 a) Explain GPS application in Ground transportation. 07
 b) Discuss GPS application in Geodesy. 08
- Q.10 Write short notes on 10
 i) New signals and their benefits in GPS Modernisation.
 ii) Integration of GPS/ GIS.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1637
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Communication)
Advanced Satellite & Radar Communication
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

1. Questions No. 5 and Q. No 10 are compulsory.
2. Attempt any two questions from remaining section A and Section B.

Section A

- Q.1 a) Explain the various frequency bands used in satellite communication. Compare the merits and demerits of different bands. 08
 b) Explain the mechanism of launching a satellite in the geostationary orbit. 07
- Q.2 a) What are the factors that affect the uplink and the downlink design in geostationary satellite communication? Discuss in detail. 08
 b) Compare the three multiple access systems, FDMA, TDMA & CDMA. 07
- Q.3 a) Draw and explain the general diagram of telemetry, tracking and command system. 08
 b) What is digital broadcast satellite? Explain. 07
- Q.4 a) What is code division multiple Access? Explain the CDMA advantages and disadvantages. 08
 b) With neat block diagram explains the modulation and multiplexing of voice, data and video in satellite communication? 07
- Q.5 Write notes on (any two) 10
 1) Kepler's I, II and III laws
 2) Satellite antennas
 3) GSM

Section B

- Q.6 a) Draw and explain the radar block diagram and operation. 08
 b) What is F.M.C.W. radar? Explain, state applications. 07
- Q.7 a) What is surveillance radar? Explain the principle of secondary surveillance radar? 08
 b) What is radar jamming? Explain? 07
- Q.8 a) Draw and explain the Cassegrain antenna. State advantage of this antenna. 08
 b) What is tracking radar? Explain the monopulse tracking. 07
- Q.9 a) What is binary phase coding? Explain? 08
 What is main problem in binary phase coding?
 b) Explain with neat diagram, different waveforms in radar. 07

Q.10 Write notes on (any two)

1. Radar clutter
2. Introduction to synthetic aperture radar (SAR)
3. Costas codes.

10

Code No: H – 1827 – 2018**FACULTY OF SCIENCE & TECHNOLOGY
M.E. (Manufacturing Engineering) Examination
DECEMBER, 2018****Technology & Knowledge Management
(Elective – I)**

Time: Three Hours

Max. Marks: 80

“Please check whether you have got the right the question paper”

- N.B. (i) Q.No. 5 and Q.No. 10 are compulsory, Solve any Two questions from each remaining section.
(ii) Figures to the right indicate full marks.

SECTION – A

- | | | | |
|-----|---------------------------------|--|------|
| Q.1 | (a) | Explain the role of decision making in an organization. | 06 |
| | (b) | What is change management in an organization? | 07 |
| Q.2 | (a) | “Knowledge as asset”, Explain in detail. | 06 |
| | (b) | Explain leadership and knowledge management. | 07 |
| Q.3 | (a) | Explain the phases of knowledge development. | 06 |
| | (b) | Explain 5 P’s of knowledge management. | 07 |
| Q.4 | (a) | How to develop strategic knowledge community? | 06 |
| | (b) | Explain in detail the contribution of disciplines to knowledge leadership. | 07 |
| Q.5 | Write short note on (Any Two) : | | 7x2= |
| | (a) | Team Work. | 14 |
| | (b) | Strategic values and corporate culture. | |
| | (c) | Types of Organisation. | |

SECTION – B

- | | | | |
|------|---------------------------------|---|------|
| Q.6 | (a) | Explain the role of motivator in detail. Why motivation is necessary? | 06 |
| | (b) | Explain the roles and responsibilities of self managed team. | 07 |
| Q.7 | (a) | How to recruit and select knowledge leaders? | 06 |
| | (b) | Explain the knowledge culture principles. | 07 |
| Q.8 | (a) | What do you mean by enhancement planning? Explain in detail. | 06 |
| | (b) | What do you mean by performance management? Explain in detail. | 07 |
| Q.9 | (a) | What are the phases of managing core knowledge? | 06 |
| | (b) | Explain the term content authorship. | 07 |
| Q.10 | Write short note on (Any Two) : | | 7x2= |
| | (a) | Pilot testing in organization culture. | 14 |
| | (b) | Maintaining the knowledge culture | |
| | (c) | Mergers, acquisition and downsizing integrated knowledge development. | |

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1790
FACULTY OF SCIENCE AND TECHNOLOGY
M.E (Mechanical)
Advanced I.C. Engines
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- A. Solve any three questions from each section.
 B. Figure to the right indicate full marks.
 C. Assume suitable data, if necessary.
 D. Use of non-programmable calculator is allowed.

Section A

- Q.1 a) Explain with the help of $P - \theta$ diagram, different stages of combustion in SI Engine. 07
 b) Explain the mixture requirements at different loads and speeds for automotive engine. 06
- Q.2 a) What is meant by abnormal combustion? Explain the phenomenon of knock in SI engine. 07
 b) Explain S.I. engine various operating and performance parameters. 07
- Q.3 a) The following readings were taken during the test of a single cylinder 4 stroke oil engine. 13
 Bore = 250 mm, stroke= 400 mm, Gross m.e.p = 7 bar, pumping m.e.p.=0.5 bar, engine speed = 250 rpm, Net load of the brake = 1080N, Diameter of the brake = 1.5 meters, fuel used 10 kg/hr, CV = 44300 kJ/kg. Calculate i) Indicated power ii) Brake power iii) Mechanical efficiency iv) Indicated thermal efficiency.
- Q.4 a) State different combustion chamber used in SI engine. Explain any two with neat diagram. 06
 b) Explain with $P - \theta$ diagram the CI engine combustion. 07

Section B

- Q.5 a) Explain the phenomenon of scavenging in two stroke engines with neat sketch. 06
 b) Discuss effect of supercharging on the following. 07
 i) Fuel consumption
 ii) Volumetric efficiency
 iii) Power output
- Q.6 a) A four cylinder two stroke petrol engine develops 30 kw at 2500 rpm. The mep on each piston is 8 bars and mechanical efficiency is 80%. Calculate the diameter and stroke of each cylinder if stroke to bore ratio is 1.5. Also calculate fuel consumption in kg/hr if brake thermal efficiency is 28%. The calorific value is 43900 KJ/kg. 13
- Q.7 a) Explain CRDI engine. 06
 b) Explain catalytic convertor as after treatment device to control CO, HC, & NO_x 07

- Q.8 Write short note on (any two)
- (a) Biodiesel as alternative fuel
 - (b) Turbo charging
 - (c) Crankcase blow by

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1653
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Fluid Power Automation
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
- 1) Q. No. 1 and Q. No. 6 are compulsory. Attempt any two (02) from remaining questions in each section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume any suitable data if necessary and clearly mention it.

Section A

- | | | |
|-----|---|----------|
| Q.1 | Answer any four (04) of the following:- | 16 |
| | <ol style="list-style-type: none"> a) State the advantages & disadvantages of Hydraulic powered automation systems. b) What are reciprocating pumps? State its characteristics. c) Draw the ISO symbol for fluid power element. <ol style="list-style-type: none"> i) Bidirectional Hydraulic Rotary Actuator. ii) Pressure unloading valve. d) State the selection criteria for pneumatically based power automation system for an application. e) What are Hydraulic pumps? Give its types and explain. | |
| Q.2 | <ol style="list-style-type: none"> a) Discuss the need for Automation in Industries. b) What is the difference between Reservoir & accumulator in fluid power systems. | 06
06 |
| Q.3 | <ol style="list-style-type: none"> a) State the technical specifications of piston pump motor. b) Define an actuator. Give its types. Explain the linear actuation η mechanism. | 06
06 |
| Q.4 | <ol style="list-style-type: none"> a) List the standard circuit symbols used in circuit flow analysis. b) Give the importance of heat dissipation in fluid power system. | 06
06 |
| Q.5 | Write short notes on any two (02) | 12 |
| | <ol style="list-style-type: none"> a) Rotary Actuation mechanism b) Cushioning power packs. c) Pressure control valves. | |

Section B

- Q.6 Answer any four (04) of the following:- 16
- What do you mean by 'sequencing' circuits? Explain.
 - Realize the truth table for logic circuits?
 - Explain the importance of driver circuits for various motors.
 - Explain in brief the Karnaugh map method.
 - Draw the characteristics of spool valves.
- Q.7
- With a components like Relay, Timers and counters realize the Pneumatic circuit. 06
 - State the symbols of basic electrical devices used for control of fluid power systems. 06
- Q.8
- Draw the neat diagram, explain the bidirectional air motor. 06
 - What is the difference between overlapped & underlapped spool valve. 06
- Q.9 Realize the controller using PLC for an application where 2 motor and 3 valves are used. 12
Operate the pneumatic motor for 3 sec each if start is pressed. When stop is pressed the Motor A goes off but Motor B goes off after 1 minute.
- Q.10 Write short on:- any two (02):- 12
- Field buses in circuits
 - Motion controllers
 - Use of PLC in pneumatic applications.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1676
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Industrial Automation
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i. **Question No.1 and 6 are compulsory**
 - ii. Answer any two questions from remaining questions each from Section A and Section B.
 - iii. Numbers shown in right side indicates full marks.

Section A

- Q.1 Answer the following question(Any Two): 10
- a) What are user requirement specifications (URS) for automation?
 - b) What is industrial Ethernet protocol?
 - c) What are advantage and limitations of DCS system?
- Q.2
- a) What are the types of automation? State their merits and demerits. 07
 - b) What is IEC 61131 standard? How this is used in PLC programming? State few examples 08
- Q.3
- a) State any four manufactures of DCS with their model names. Explain any five functions of industrial DCS. 07
 - b) What is meant for hybrid DCS/PLC system? State their need in automation. Explain it with a neat diagram. 08
- Q.4
- a) What are analog controls in process? How these analog controls can be implemented using PLC? 07
 - b) DCS is used as an automation tool to support Enterprise Resource Planning (ERP). Justify with examples. 08
- Q.5
- a) Write a short note on-Control System Audit. 07
 - b) PLC based incineration of hazardous waste in furnace is to be implemented. This process is equipped with start and stop push buttons. This process composed of three steps: a) There are two flame detection sensors. If anyone sensor detects flame, feed the waste to predetermined level. b) Continue the ignition of furnace till temperature inside furnace reaches to 200 degree Celsius and c) activate the suction pump to collect ash deposits in another chamber for next 20 sec. Consider this as batch process and sequential operation. Draw a ladder logic diagram for same explain the elements involved in ladder logic diagram. 08

Section-B

- Q.6 Answer the following question (Any Two) 10
- How pneumatic tape reader is used in numerical control?
 - Explain about the M-code used in CNC.
 - What is PLC scan? Explain it with a typical example.
- Q.7
- Explain contouring system in NC control. State the types of different interpolation methods. 07
 - Explain multi-channel machining concept in context to CNC. 08
- Q.8
- What are the synchronous and asynchronous events occurred in sequential machine control system? How the care is taken to implement the control for such situation? 07
 - What are the design features of NC and CNC machines? 08
- Q.9
- Explain about 2D and 3D integration and programming from CAD models. 07
 - Explain sourcing and sinking of PNP/NPN type devices used as input and output devices to PLC? Draw the circuits in support of your answer. 08
- Q.10
- What are NC words? Explain different NC words based on instructions required in NC programming. 07
 - Explain absolute and incremental encoders with schematic diagram. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1728
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Elective-II: MEMS & Nanotechnology
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- N.B
- i) Attempt any three questions from each Section.
 - ii) Neat diagrams must be drawn wherever necessary.
 - iii) Figures to the right indicate full marks.
 - iv) Assume suitable data, if required.

Section A

- | | | |
|-----|---|----------|
| Q.1 | a) Silicon as a substrate materials, enlist past challenges and current success
b) Briefly explain advances in smart materials for MEMS application. | 08
05 |
| Q.2 | a) Distinguish between chemical vapor and physical vapor deposition techniques
b) Classify sensors based on various working principle. Write a note on pressure and flow sensors, mentioning its working principle, merits and demerits. | 05
08 |
| Q.3 | a) Write a note on considerations in microsystems packaging at device and system levels.
b) Write short notes on any two:
a. Magnetron sputtering b. LIGA Process c. Photolithography | 05
08 |
| Q.4 | a) Explain working principle of mechanical sensors. Briefly enlists advantages and disadvantages
b) Write a note on materials that are used as substrates and wafers in MEMS. | 07
07 |

Section B

- | | | |
|-----|---|----------|
| Q.5 | (a) Compare between scanning electron and transmission electron microscope.
(b) How nanoscale dimensions affects various physicochemical properties like structural, thermal, chemical etc. | 06
07 |
| Q.6 | (a) Write a note on X-ray photoelectron spectroscopy technique mentioning its working principle, advantages and disadvantages.
(b) Write a note on scanning tunneling electron microscopy. Mention its advantages and disadvantages. | 07
06 |
| Q.7 | (a) Write a brief note on atomic force microscopy detailing its working principles, merits and demerits over other techniques.
(b) Explain top down and bottom up approaches used in nanomaterials synthesis with an example. | 06
07 |

- Q.8 Write explanatory notes on any two:
- (a) Nanopositioning systems
 - (b) Raman spectroscopy
 - (c) Transmission electron microscope
 - (d) Classification of nanostructures

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1729
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Elective-II: Computer Integrated Manufacturing
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- (i) All questions are compulsory.
 - (ii) Neat diagrams must be drawn wherever necessary.
 - (iii) Figures to the right indicate full marks.
 - (iv) Assume suitable data, if necessary.
- Q.1 Attempt any two from the following.
- (a) Define CIM and elaborate on the CIM wheel. 08
 - (b) What are the different advantages of concurrent engineering over the sequential engineering? 08
 - (c) Discuss how integrated product development approach is beneficial for the industries. 08
- Q.2 Attempt any two from the following
- (a) How does MRP help organization by providing different output reports? Discuss the benefits of MRP 08
 - (b) Difference between a retrieval CAPP and generative CAPP systems. State the various requirements of a fully generative process planning system. 08
 - (c) Discuss the significance of design for assembly in the context of complex products. 08
- Q.3 Attempt any two of the following:
- (a) Justify the need of design for manufacturing concept in the context of complex manufacturing Industries. 08
 - (b) Where would you suggest applying FMS technology ? Explain your answer in the context of volume and variety of the production. 08
 - (c) Define the term 'cellular manufacturing' Discuss group machine cell with manual handling. 08
- Q.4 Attempt any two from the following:
- (a) Explain how a manufacturing database is created and manipulated. 08
 - (b) What are different network architectures and protocols? Discuss OSI model. 08
 - (c) Enlist various access methods used for local area networks. Explain the carrier sensed multiple access with collision detection method. 08

Q.5 Attempt any four from the following.

16

- (a) Discuss the benefits of CAPP.
- (b) Enlist different principles of networking.
- (c) Brief on FMS workstation
- (d) Describe star networks configuration used in LAN.
- (e) Discuss in short the benefits of lean manufacturing.
- (f) Need of product data management.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1756
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Manufacturing Automation
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Solve any three questions from each section.
 2. Assume suitable data, if necessary.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Explain the different types of production in detail with a suitable example. | 13 |
| Q.2 | <ol style="list-style-type: none"> a) Define automation & enlist the types of the same. b) Differentiate between automation and robotics. | 08
05 |
| Q.3 | <ol style="list-style-type: none"> a) What is line balancing? Why it is required. b) What are the functions of manufacturing? | 08
05 |
| Q.4 | <ol style="list-style-type: none"> a) Explain Break-Even analysis in detail. b) Explain automated flow lines in brief. | 08
05 |
| Q.5 | Write short notes on <u>any three</u> | 14 |
| | <ol style="list-style-type: none"> 1) Partial automation 2) Types of work –in – process 3) Automation for machining operations 4) Flexible manual assembly lines 5) Information processing in manufacturing | |

Section B

- | | | |
|-----|--|----------|
| Q.6 | <ol style="list-style-type: none"> a) Explain carousel storage system in detail. b) What are the different contact inspection systems? Explain any one in brief. | 08
05 |
| Q.7 | <ol style="list-style-type: none"> a) Explain automated storage & retrieval system in detail. b) Explain the role of AGV in automated material handling. | 08
05 |
| Q.8 | <ol style="list-style-type: none"> a) What is the use of CMM in automation? b) Explain machine vision in brief. | 08
05 |
| Q.9 | <ol style="list-style-type: none"> a) How the analysis of material handling systems is done? b) What are the advantages and disadvantages of automation? | 08
05 |

Q.10 Write short notes on any three

14

- 1) Automated material handling
- 2) Statistical Quality Control
- 3) Automated inspection principles
- 4) Automated assembly systems
- 5) Material handling equipments

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1775
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Sensor Technology
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Q.No.1 from section A and Q.No.6 from section B is compulsory.
 2. Solve two questions from remaining questions from section A and B.
 3. Figures on right indicate full marks.
 4. Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Answer following in short. (any four) | 08 |
| | <ol style="list-style-type: none"> a) An electric flow meter gives display in 4-20 mA standard signal for a range of 0-200 litres per min. what is display of flow meter for a flow of 40 litres per min? b) What are different limit switches? c) What is hall effect? d) State working principle of photoelectric tactile sensor. e) Draw neat sketch of inclined tube manometer and label each part. | |
| Q.2 | <ol style="list-style-type: none"> a) What are different types of signals? State their advantages and limitations. b) Explain D.C. Tachogenerator in detail. | 08
08 |
| Q.3 | <ol style="list-style-type: none"> a) What are means of measuring angular displacement of shaft? Explain any one with neat sketch. b) Explain following terms in short – strain, Poisson's ratio gauge factor and piezo resistance coefficient. | 08
08 |
| Q.4 | <ol style="list-style-type: none"> a) What are salient features of bonded, unbonded, metallic and semi-conductor type strain gauges? b) What are methods of torque measurement? Explain any one in details. | 08
08 |
| Q.5 | <ol style="list-style-type: none"> a) State working principles of following types of sensors in short. <ol style="list-style-type: none"> i) Photo electric ii) Photo conductive iii) Photo voltaic iv) Photo emissive Also give their application area. b) Explain displacement measurement using variable inductance and variable capacitance in short. | 08
08 |

Section B

- Q.6 Answer following in short. (any four) 08
- Define static pressure, head pressure.
 - What are materials used for making diaphragms and bellows.
 - What is working principle of vortex flow measurement?
 - What are mechanical and resistive type temperature sensors? Give a list.
 - How is resolver useful in designing sensors in robotics?
- Q.7
- Explain in detail, ionization gauge for vacume pressure measurement. 08
 - Explain design issues of Rotameter for flow measurement. 08
- Q.8
- Explain any one resistance type temperature sensor in detail. 08
 - What are different positive displacement flow sensors? Explain them briefly with neat sketches. 08
- Q.9
- Explain any one proximity as well as one tactile sensor in context of working principle and use in Robots. 08
 - Explain terminology like information coding and integrated sensor in smart sensors. 08
- Q.10
- Write short note on smart sensor. 08
 - Explain synchros and resolvers as robotic sensors with neat sketch. 08

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1795
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Advanced Electrical Drives
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- (i) Attempt any three questions from each Section.
 - (ii) Use of Steam tables, Mollier charts, non-programmable calculator is allowed.
 - (iii) Neat diagrams must be drawn wherever necessary.
 - (iv) Figures to the right indicate full marks.
 - (v) Assume suitable data, if necessary.

Section A

- | | | |
|-----|---|----|
| Q.1 | (a) What do you mean by electrical drives? Give it's classification. | 08 |
| | (b) Explain the dynamics of Electric Drives. | 05 |
| Q.2 | (a) What do you mean by closed loop control Electrical Drives? | 05 |
| | (b) Explain the components of Electrical drives? What are the advantages of DC Drive? | 08 |
| Q.3 | (a) What is LCI fed Induction Motor Drive? | 05 |
| | (b) Explain the single phase fully controlled rectifier controlled DC Drive. | 08 |
| Q.4 | Write short notes on any two: | 14 |
| | a. closed loop position control | |
| | b. load equalization | |
| | c. Speed sensing. | |

Section – B

- | | | |
|-----|--|----|
| Q.5 | (a) Explain the starting performance of Induction motor. | 06 |
| | (b) Explain slip power recovery drive for Induction motor. | 07 |
| Q.6 | (a) What is self-controlled synchronous motor Drive. | 07 |
| | (b) Explain variable frequency control of synchronous motor. | 06 |
| Q.7 | (a) Explain BLDC motor Drive. | 06 |
| | (b) Discuss drive circuit for stepper motor. | 07 |
| Q.8 | Write explanatory note on any two: | 14 |
| | (a) closed loop position control of servo motor | |
| | (b) braking of Induction motor drive | |
| | (c) single phase induction motor drive | |

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1817
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Micro Controller & its Applications
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q. 1 & Q.5 are compulsory. Attempt any two questions from remaining in each section
 - ii) Figures to the right indicate full marks
 - iii) Assume suitable data, if necessary

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Write on ALP to generate a square wave of 1KHz using timer 0 on port 0.1 | 05 |
| | b) Draw and explain format of TMOD register in 8051 | 05 |
| Q.2 | a) Write an ALP for addition of two 8 bit BCD numbers | 08 |
| | b) Explain rotate & SWAP instruction related to 8051. | 07 |
| Q.3 | a) Write 8051 ALP which checks whether the ten numbers stored from external RAM memory address, 2000H are odd/even. The program should store according 00H/FFH from internal location 30H onwards | 15 |
| Q.4 | Write a short note on following (solve <u>any three</u>) | 15 |
| | a) Interfacing of ADC with 8051 | |
| | b) Logical and compare instructions | |
| | c) Role of program counter & stack pointer in 8051 | |
| | d) TCON register | |

Section B

- | | | |
|-----|---|----|
| Q.5 | a) Write on ALP to interface 4*4 key matrix with 8051 | 05 |
| | b) Explain following instructions | 05 |
| | i) SET b, P0.0 | |
| | ii) CLR P0.7 | |
| | iii) ANL C, bit | |
| | iv) ORL C, bit | |
| Q.6 | a) Enlist priority interrupts of 8051. Draw and explain IP register | 08 |
| | b) Write a note on serial communication in microcontroller | 07 |

Q.7 How can we get the pulses at He port bit P0.1 using toggling? Assume the pulse interval are $100\ \mu\text{s}$ using 8 bit to timer in 8051, where $T = 200\ \mu\text{s}$ and output is 0 for $100\ \mu\text{s}$ interval and 1 for $100\ \mu\text{s}$ interval. Draw related timing diagrams

Q.8 Write a short note on following (Solve any three)

- Interfacing of LCD with 8051
- Serial communication interrupts of 8051
- Delay cycle instruction
- Interfacing of DAC with 8051

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1874
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
El-1 Machine Tool Control & Monitoring
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Attempt any three questions from each section.
 - ii) Use of steam tables, Mollier charts, non-programmable calculator is allowed.
 - iii) Neat diagrams must be drawn wherever necessary.
 - iv) Figures to the right indicate full marks.
 - v) Assume suitable data, if necessary.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) What are the two basic Control System in any Machine Tools Automation? | 08 |
| | b) What are Data Loggers? | 05 |
| Q.2 | a) Explain Supervisory computer control. | 06 |
| | b) Write an essay on Direct Digital Control. | 07 |
| Q.3 | a) What are different types of Electrical Drives? | 05 |
| | b) Write an essay on Electrical Drives. | 08 |
| Q.4 | Write short notes on any two: | 14 |
| | a. AC Motor | |
| | b. Syncro feedback devices | |
| | c. PLC | |
| | d. Diffraction Grating | |

Section B

- | | | |
|-----|---|----|
| Q.5 | a) Explain Primary Signals & Secondary Signals with proper examples. | 06 |
| | b) Describe the term Vibration in details. | 07 |
| Q.6 | a) What is Acoustic Emission? Give examples and case studies. | 07 |
| | b) How 'Machine Tool Condition Monitoring through Vibration' is done? | 06 |
| Q.7 | a) Explain in detail Visual Monitoring. | 06 |
| | b) Write a detailed note on Leakage Monitoring. | 07 |
| Q.8 | Write explanatory notes on any two: | 14 |
| | a) Lubrication system | |
| | b) Thickness monitoring | |
| | c) Image Processing Techniques | |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1872
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
El-1 Optimization Techniques
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

1. Attempt any three questions from each section
2. Assume suitable data if required .

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain algorithm of Bounding phase method used for single variable optimization. | 06 |
| | b) Write algorithm of interval halving method for single variable optimization. | 07 |
| Q.2 | a) Use two iterations of Powell's quadratic estimation method to minimize the function
$f(x) = 2e^x - x^3 - 10x$ | 06 |
| | b) Find at least one root of the function $f(x) = x^3 + 5x^2 - 3$ | 07 |
| Q.3 | a) Perform two iterations of the cubic search method to minimize the function
$f(x) = (x^2 - 1)^3 - (2x - 5)^4$ | 06 |
| | b) Explain cubic search method. | 07 |
| Q.4 | a) What is Evolutionary optimization method? Explain | 06 |
| | b) Write Hooke – Jeeves pattern search method. | 07 |
| Q.5 | Write short notes on any two
1) Objective function
2) Optimal problem formulation
3) Specialized optimization algorithms | 14 |

Section – B

- | | | |
|-----|---|----|
| Q.6 | a) Explain Parallel subspace property. | 06 |
| | b) What is Gradient – based method? Explain? | 07 |
| Q.7 | a) Locate and classify the stationary point for the function. | 06 |

$$f(x_1, x_2) = 10(x_2 - x_1^2)^2 + (1 - x_1)^2$$

- b) Perform two iterations of a unidirectional search using the golden section search method for
 $f(x_1, x_2) = (x_1^2 - x_2)^2 + x_2^2$
 $S = (2,1)^T$ from the point $(-5, 5)^T$ upto the point $(5,0)^T$ 07

- Q.8 a) Explain Kuhn –Tucker necessity theorem for a NLP problem. 06

- b) What is penalty function method? Explain. 07

- Q.9 a) For the minimization problem minimize $x_1^2 + x_2$ subject to 06

$$g_1(x) = 10 e^{(x_1^2+x_2)} - 5x_1 + 12 \geq 0$$

$$g_2(x) = 5x_1^3 + 2x_2 - 9 \leq 0$$

$$0 \leq x_1, x_2 \leq 3$$

Find whether the point $(0,1)^T$ is feasible

- b) Explain Gradient projection method. 07

- Q.10 Write short note on any two 14

- 1) Integer programming
- 2) Coding in GA
- 3) Similarities between GAs and traditional methods

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1873
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
El-1: Automotive Electronics
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Q.No.5 & Q.No.10 are compulsory.
 2. Solve any two questions from remaining questions in each section.
 3. Figure to right indicate full marks.
 4. Assume suitable data if necessary.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain automotive engine and how it controls. | 08 |
| | b) Explain different components of electronic engine management system. | 07 |
| Q.2 | Give the different automotive sensors used. Explain oxygen sensor and engine torque sensor. | 15 |
| Q.3 | Explain in detail Exhaust gas sensor also discuss its switching characteristics. | 15 |
| Q.4 | a) Explain in detail feedback carburettor system. | 08 |
| | b) Draw and explain fuel metering sensor. | 07 |
| Q.5 | Write short note on: (any two) | 10 |
| | a) Attitude sensor | |
| | b) Fuel injection system | |
| | c) Throttle position sensor. | |

Section B

- | | | |
|-----|---|----|
| Q.6 | a) What do you mean by Actuators? Explain different actuators available in automobile. | 08 |
| | b) Draw and explain electronic spark timing control system. | 07 |
| Q.7 | Explain in detail breaking control system, also explain slip and torque characteristics in breaking system. | 15 |
| Q.8 | What is cruise control system? Draw and explain digital cruise control system. | 15 |
| Q.9 | a) What is Electromagnetic interference? Explain different internal and external sources to vehicle. | 08 |
| | b) Explain steering control system. | 07 |

Q.10 Write short note on: (any two)

- a) Air mass flow sensor
- b) Suspension control
- c) Electronic dashboard instruments

10

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1616
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Control System Engg.
(REVISED)

[Time: Three Hours]

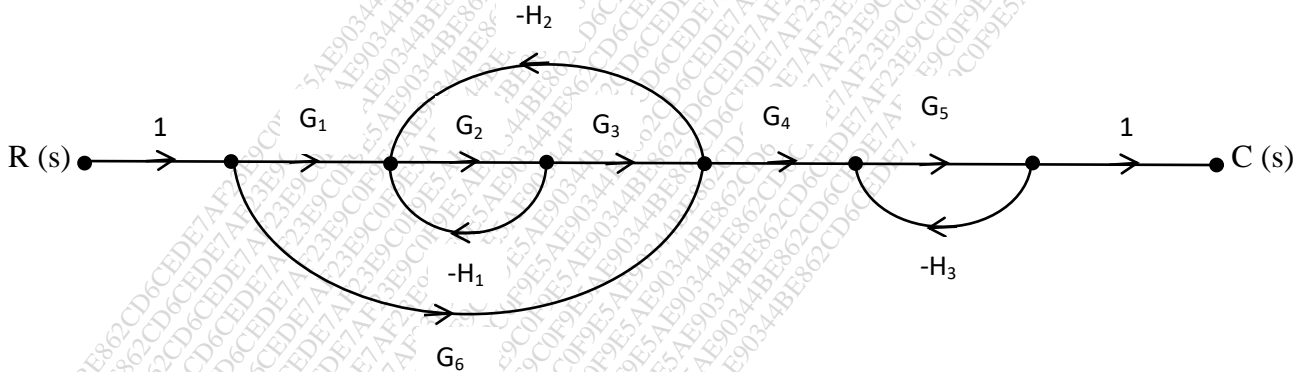
[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt any three questions from each section.
 - ii) Figure to the right indicates full marks.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Draw and explain the block diagram of control system. | 07 |
| | b) What is transfer function? Explain its significance in control system. | 06 |
| Q.2 | a) Explain different standards test signals in control system. | 06 |
| | b) Obtain the transfer function of the system whose signal flow graph is shown below. | 07 |



- | | | |
|-----|---|----|
| Q.3 | a) Derive the response of second order system for unit ramp signal. | 06 |
| | b) Find the values of peak time ,rise time and settling time | 07 |
| | For $\frac{C(S)}{R(S)} = \frac{64}{s^2+5s+64}$ | |
| Q.4 | Write short note on. | |
| | a) Frequency domain specification. | 07 |
| | b) Nyquist stability criterion. | 07 |

Section B

- | | | |
|-----|---|----|
| Q.5 | a) State and explain the concept of state, state variable and state equation. | 07 |
| | b) Discuss controllability and observability.in state space method. | 06 |
| Q.6 | a) Give the classification of MRAC system .explain any one in details. | 07 |
| | b) With the help of block diagram explain MIMO systems. | 06 |

- Q.7 a) Explain ON/OFF controller with an example. 07
- b) Give the detailed classification of controllers used in automation. 06

- Q.8 Write short notes:
 - a) Servomotor 07
 - b) Amplidyne 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1727
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (Automation)
Elective-II: Artificial Intelligence & Expert Systems
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B
- Please check whether you have got the right question paper.
- i. Question No.1 and 6 are compulsory.
 - ii. Answer any two questions from remaining questions each from Section A and Section B.
 - iii. Numbers shown in right side indicates full marks.

Section A

- Q.1 Answer the following questions in brief (Any five): 10
- (a) State the applications of artificial intelligence.
 - (b) What is Alpha-Beta pruning?
 - (c) What is meant by perception in context to computer vision?
 - (d) What is meant by segmentation in image processing?
 - (e) Give an example of 'tree' in artificial intelligence problem.
 - (f) How an image is formed using a camera?
- Q.2 (a) What are the different search strategies? Explain any one in detail. 07
 (b) Explain Waltz's algorithm of labeling the objects in a scene. 08
- Q.3 (a) Explain the Syntactic Analysis with a typical algorithm. 07
 (b) Explain forward and backward reasoning with example. 08
- Q.4 (a) What are the early image processing operations? Explain edge detection in detail? 07
 (b) What are the different natural language models? Explain any one in detail. 08
- Q.5 (a) Write a short note on – Hill climbing search method 07
 (b) Explain about object sorting method using image processing in computer vision system. 08

Section-B

- Q.6 Answer the following questions in brief (Any five) 10
- (a) What do you mean by 'knowledge representation'?
 - (b) What are semantic nets?
 - (c) What are the resolution strategies?
 - (d) What do you understand by 'supervised learning'?
 - (e) What are the basic syntactic elements of first order logic?
 - (f) What is meant by 'ontological engineering'?

- Q.7 (a) Explain failure-driven learning with typical examples. 07
- (b) Consider the following axioms: 08
 The law says that it is crime for an Indian to sell weapons to hostile nations. The country Pakistan, an enemy of India, has some army tanks and all of its tanks were sold to it by Col. Arora, who is an Indian.
 Represent these axioms in first order predicate logic. Convert each formula to clause form.
- Q.8 (a) What are the types of learning? Explain 'induction' type of learning with a suitable example. 07
- (b) What are the differences between declarative representation and procedural representation? 08
- Q.9 (a) Explain the typical practical application to understand the natural language processing. 07
- (b) Explain the structured knowledge representation with suitable example. 08
- Q.10 (a) Write a short note on –Propositional Logic. 07
- (b) Explain augmented transition networks. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1654
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T)
Advanced Compiler Design & Implementation
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.
 i) Solve any two questions from each section.
 ii) Assume suitable data wherever necessary and state it clearly.

Section A

- Q.1 a) How to recognize tokens? Draw the transition diagram for relational operators, keywords, constants and whitespaces. 08
- b) With suitable diagram, explain the role of Lexical analyzer. Also discuss about Lexical Analysis versus parsing. 06
- c) Describe following terms 06
- i. Interpreter
 - ii. Assembler
 - iii. Linker and Loader
- Q.2 a) Consider following SDD 08
- T.val=F.val
 L.val=E.val
 E.val=E.val+T.val
 E.val=T.val
 T.val=T.val*F.val
 F.val=E.val
 F.val=digit.lexval
- Draw annotated parse tree for following expression
- i. $3*5+4$
 - ii. $(3+4)*(5+6)$
- b) Distinguish between Synthesized attribute and inherited attribute. 06
- c) Draw the model of LR parser. Also write the LR parsing algorithm with functions ACTION and GOTO. 06
- Q.3 a) Explain the extended Backus naur form syntax notation. Write ICAN program for Datatype, Expressions and statements. 08

b) Consider following production rules –

- E-> TE'
- E'-> +TE'
- E'-> -TE'
- E'-> ε
- T-> (E)
- T-> id
- T-> num

Write down semantic actions and construct Dependency graph for a-4+c.

06

c) Explain a language processing system, with a block diagram.

06

Section B

Q.4 a) Consider an assignment statement. 10

A:= -B*(C+D) Translate it into

- i) Three address code
- ii) Quadruple
- iii) Triples
- iv) Indirect Triples

b) Describe specification of a type checker by considering following grammar for 10

Declarations and Expressions

- $P \rightarrow D; E$
- $D \rightarrow D; D \mid id : T$
- $T \rightarrow char \mid int \mid array[num] \text{ of } T \mid \uparrow T$
- $E \rightarrow literal \mid num \mid id \mid E \text{ mod } E \mid E [E] \mid E \uparrow$

Q.5 a) Explain with suitable example, how to partition the given tree address codes in basic block. 10
Write the algorithm for this.

b) Explain briefly the performance metrics to be considered while designing a garbage collector. 10

Q.6 a) Describe in brief Applications of DAG with respect to elimination of Common Sub expression. 10

b) Discuss issues in designing of code generator. 05

c) Write short note on runtime environment in intermediate code generation. 05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1740
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
Elective-II: Advanced Algorithm
(REVISED)

[Time: Three Hours]

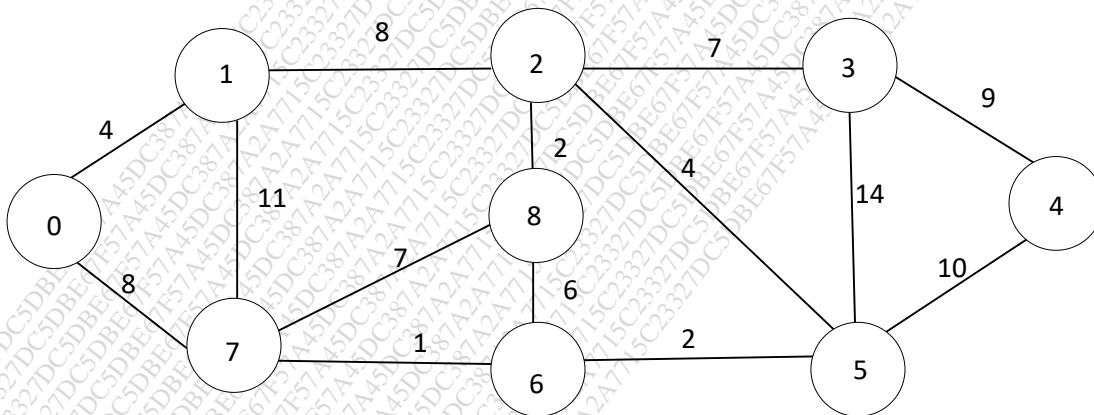
[Max. Marks: 80]

Please check whether you have got the right question paper.
 1) Attempt any two questions from each Section.

N.B

Section A

- Q.1 a) How to measure performance of an algorithm? Explain how to compute complexity of following problem bubble sort & linear search. 10
 b) Write an algorithm to perform operations on a stack & a queue. 10
- Q.2 a) What are balanced search trees? Explain various tree operations to balance a tree. 10
 b) Construct comparison tree for four numbers. 10
- Q.3 a) Write an algorithm to perform graph traversal- Explain all steps with a suitable example. 10
 b) Define minimum cost spanning tree. Construct MCST for given graph- 10



Section B

- Q.4 a) Sort the given set of numbers using quicksort. 10
 [70,20,10,30,20,50,60,80]
- b) Define dynamic programming. Explain how to find optimal binary search tree using dynamic programming. 10

- Q.5
 - a) What is back-tracking? Explain sum of subsets problem using back tracking. Construct 10 solution space and answer state tree.
 - b) How to solve optimal storage on tapes problem using greedy method. Explain with an 10 example.

- Q.6
 - a) Differentiate between NP-hard & NP-complete problems. Write Cook's theorem. 10
 - b) Write steps to solve NP-hard graph problems. How to obtain optimized solution for 10 TSP.

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1730
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
Elective-II: Adhoc & Sensor Network
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any two questions from each section.
 - ii) Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | a. What is a Ad-HOC wireless network? Explain various issues involved in Ad-Hoc wireless networks. | 12 |
| | b. Explain significance of multi-channel & power control MAC protocols. | 08 |
| Q.2 | a. What is the role of a routing protocol? Explain its classification. | 10 |
| | b. Discuss in detail AD-HOC transport layer issues. | 10 |
| Q.3 | Write short notes on the following. | 20 |
| | a. TCP with explicit link | |
| | b. TCP-BUS | |
| | c. Split TCP | |
| | d. Data dissemination. | |

Section B

- | | | |
|-----|--|----|
| Q.4 | a. With a suitable diagram explain sensor network architecture. | 10 |
| | b. Explain hybrid TDMA / FDMA and CSMA based MAC. | 10 |
| Q.5 | a. Explain issues in WSN routing. | 07 |
| | b. What is localization? Explain indoor sensor network localization. | 07 |
| | c. Explain QoS in WSN. | 06 |
| Q.6 | Write short notes on the following. | 20 |
| | a. Necessity for mesh networks | |
| | b. IEEE 802.11s architecture | |
| | c. Capacity models. | |
| | d. Vehicular mesh networks. | |

Total No. of Printed Pages:2

SUBJECT CODE NO: H-1757
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
Information Theory & Coding
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i) Solve any two questions from each section.
- ii) Assume additional suitable data, if necessary and state it clearly.

SECTION – A

- Q.1
- a) Explain sampling theorem in detail. 07
 - b) Explain analog to digital conversion with neat diagram 07
 - c) What is signal? Explain types of signals. 06
- Q.2
- a) A DMS has an alphabet of 5 symbols with their probabilities as 0.37, 0.33, 0.16, 0.07, 0.04. Compute Huffman code for this source and find average code word length. 10
 - b) For the given channel matrix, calculate $W(X)$, $W(Y)$ and channel capacity given $P(x_1) = 0.6, P(x_2) = 0.3$ and $P(x_3) = 0.1$. 10
- $$P(Y|X) = \begin{bmatrix} 1/2 & 1/2 & 0 \\ 1/2 & 0 & 1/2 \\ 0 & 1/2 & 1/2 \end{bmatrix}$$
- Q.3
- a) Discuss : i) additive property of entropy 10
ii) Symmetrical property of entropy
 - b) Explain the Shannon limit random selection of codes. 10

SECTION – B

- Q.4
- a) Explain decoding of a linear block code. 07
 - b) Explain cyclic redundancy check codes. 07
 - c) Explain generator polynomials. 06
- Q.5
- a) Show that $C = [0000, 1100, 0011, 1111]$ is a linear block code. What is minimum distance? 07
 - b) Explain syndrome decoding with suitable example. 07
 - c) Explain tree codes and Trellis code. 06

- Q.6
- a) For a (7,4) cyclic code the received vector $z(x) = 0100101$ and the generator polynomial $g(x) = 1 + X + X^3$. Draw the syndrome calculation circuit and correct the single error in the received vector also explain operation of circuit. 10
 - b) Explain forward error correction and detection codes their efficiencies. 10

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1820
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
Advanced Data Mining
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Solve any two questions from each section
2. Assume suitable data wherever required

Section A

- Q.1 a) What is a KDD process? Explain in brief data preprocessing. 10
- b) What is confusion matrix? Explain in detail any five metrics used for evaluating the performance of a classifier. 10
- Q.2 a) What is Bayes theorem? Explain with suitable example Naïve Baye's classification algorithm. 10
- b) Describe in brief the process of extracting rules from decision tree. How do we calculate the accuracy and coverage of this classifier? 10
- Q.3 a) What are the different data structures used for measuring data dissimilarity? How can we measure data dissimilarity of nominal and binary attributes? 10
- b) Explain with suitable example frequent item set generation process. 10

Section B

- Q.4 a) What are the typical requirement of clustering? Explain in detail agglomerative hierarchical clustering algorithms. 10
- b) Use K – means algorithm to cluster following points in three cluster 10
A1 (2,10), A2(2,5) , A3(8,4), B1(5,8) , B2(7,5), B3(6,4), C1(1, 2), C2(4,9)
- i) Assume A1, B1 and C1 as initial centroids
 - ii) Use Euclidean distance measure.

- Q.5 a) Explain with suitable example working of FP growth algorithm. 10
- b) A data base has nine transactions. Let minimum support =2 and minimum confidence =70% 10

TID	List of Items
T1	A, B, E
T2	B,D
T3	B,C
T4	A,B,D
T5	A,C
T6	B,C
T7	A,C
T8	A,B,C,E
T9	A,B,C

- i) Find all frequent item sets using apriori algorithm.
- ii) Find strong association rules for any one frequent item set.

- Q.6 Write short notes on four 20
- Text mining
 - Outlier analysis
 - Application and trends in data mining
 - DB scan clustering
 - Multi dimensional analysis of data objects.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1876
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
EI-1: Information Retrieval
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Solve any two questions from each section.
 2. Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What is information retrieval? Discuss on its past, present and future. | 10 |
| | b) What is modelling? Explain characterization of IR models | 10 |
| Q.2 | a) Explain alternative set theoretic models. | 10 |
| | b) Explain alternative probabilistic models. | 10 |
| Q.3 | a) What is retrieval evaluation? Explain retrieval performance evaluation in detail. | 10 |
| | b) Explain:- | 10 |
| | i) Keyword based querying | |
| | ii) Pattern matching | |

Section B

- | | | |
|-----|---|----|
| Q.4 | a) Explain following text operations. | 10 |
| | i) Document pre-processing | |
| | ii) Document clustering | |
| | b) Explain in detail text compression techniques. | 10 |
| Q.5 | a) What do you mean by inverted files? Explain. | 06 |
| | b) Explain sequential searching. | 07 |
| | c) What is | 07 |
| | i) Boolean queries | |
| | ii) Structured queries | |
| | iii) compression | |

Q.6 Write short notes on the following.

- i) Parallel IR
- ii) The information access process
- iii) Relevance judgments
- iv) Interface support for the search process

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1875
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
EI-1: Advanced Digital Communication
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Solve any two full questions from each section.
 2. Assume suitable data if required.
 3. Figures to the right indicate full marks.

Section A

- Q.1
- a) Explain the various elements involved in digital communication system. Also explain their limitations. 06
 - b) Explain the properties of media in detail. 06
 - c) Explain adaptive sub band coding scheme & explain how does it differ from ADPCM. 08
- Q.2
- a) Explain DM & ADM schemes in detail. Also write their error probabilities expressions. 10
 - b) Explain non-uniform quantization. Write the expressions for A-law & μ -law companders. 10
- Q.3
- Write short notes on
- i) PCM & its applications
 - ii) Robust quantization
 - iii) Internet checksum
 - iv) Two dimensional parity check

Section B

- Q.4
- a) Explain duobinary & modified duobinary correlative coding schemes with suitable examples. 10
 - b) Explain discrete PAM systems. Also give the Nyquist criteria for distortionless baseband binary transmission. 10

- Q.5 a) Give the detailed comparison of binary and quadrature modulation techniques. 06
- b) Explain the bandwidth efficiency of M-ary FSK and PSK schemes. 06
- c) Compare coherent and non-coherent digital modulation schemes. 04
- d) Explain the need of adoptive equalization. 04

- Q.6 Write short notes on 20
- i) Power spectra of digital modulation technique
 - ii) M-ary modulation schemes
 - iii) MSK
 - iv) Eye patterns of M-ary PAM systems.

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1877
FACULTY OF SCIENCE AND TECHNOLOGY
M.E. (C.S. & I.T.)
EI-1: System Simulation Modeling
(REVISED)

[Time: Three Hours]**[Max.Marks: 80]**

Please check whether you have got the right question paper.

- N.B
1. Solve any two questions from each section.
 2. Assume suitable data if necessary.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain steps in a simulation study. | 10 |
| | b) Explain systems, system environment, components of a system. | 10 |
| Q.2 | a) Explain time advance algorithm. | 10 |
| | b) Explain continuous distributions. | 10 |
| Q.3 | a) Explain characteristics of queuing systems. | 10 |
| | b) Explain tests for random numbers. | 10 |

Section B

- | | | |
|-----|---|----|
| Q.4 | a) Explain parameter estimation in detail. | 10 |
| | b) Explain how to select input models without data. | 10 |
| Q.5 | a) Explain verification of simulation models in detail. | 10 |
| | b) Explain calibration and validation of models. | 10 |
| Q.6 | a) Explain high level computer system simulation. | 10 |
| | b) Explain simulation of computer networks. | 10 |