

2016 BATCH
I M.TECH
II SEMESTER
REGULAR EXAMINATION
JUNE/JULY-2017
QUESTION PAPERS
ACADEMIC YEAR
2016-17

Subject Code: R16MSE209

M.Tech II Semester Regular Examinations, June/July-2017

ADVANCED STEEL DESIGN

(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

Note: IS codes IS 800 – 2007, IS 875 and Steel tables are permitted to bring into the examination hall.

1. (a) Explain the load transfer mechanism of a double cover butt-joint. (4 M)
1. (b) Find the strength of a lap joint shown in Fig.1, consisting of two plates each of thickness 12 mm and width 300 mm. Also determine the efficiency of the joint. Use M16 bolts of grade 4.6. The staggered pitch is 75 mm and the gauge is 65 mm. The steel plates are of grade Fe410. (8 M)

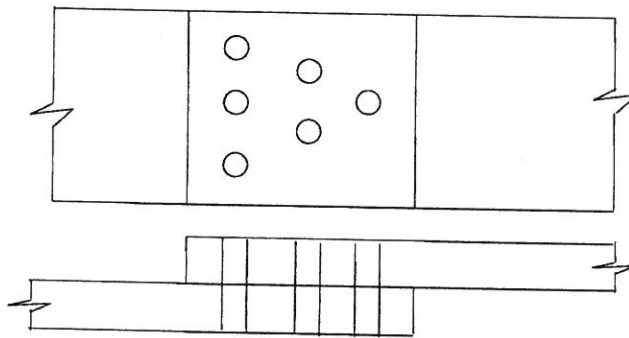


Fig.1

2. (a) Explain the different types of failures of welded joints. (4 M)
2. (b) An angular truss member ISA 100×100×8 is subjected to a factored axial tensile force of 350 kN. It is to be connected to a gusset plate of 10 mm thick. Design the welded joint if the shear strength of the weld is 125 N/mm². (8 M)
3. An ISMB 400 @ 615 N/m beam transmits an end reaction of 250 kN and a moment of 45 kNm to a column ISHB 400 @ 822 N/m. Design a suitable bolted connection. (12 M)
4. Design the purlins of a roof truss using the following data:

Span of the roof truss	:	15 m
Spacing of roof truss	:	4 m
Spacing of purlins along the slope of the roof truss:	2 m	
Slope of the roof truss	:	1 Vertical: 3 Horizontal
Wind load normal to the roof	:	1.5 kN/m ²
Vertical load from roof sheets	:	100 N/m ²

 (12 M)
5. A Pratt truss for a single broad gauge trough type railway bridge consists of 8 panels @ 4 m. The height of the truss is 5 m and the spacing between main girders is 8 m. The chord members are of ISWB 500 @ 952 N/m, the inner web members are of ISHB 400@774 N/m and the end posts are of ISMB 500 @ 869 N/m. Design the bottom lateral bracing if the wind pressure is 2 kN/m². (12 M)

6. Design a steel circular silo of height 12 m and internal diameter 3.5 m to store cement of unit weight 16 kN/m^3 and the angle of internal friction 25° . (12 M)
7. (a) Distinguish between a silo and a bunker. (3 M)
(b) Explain the Janssen's theory for the design of bunkers. (9 M)
8. Explain the following:
- (a) Prying action of bolted connections (3 M)
(b) Types of moment connections (3 M)
(c) Factors affecting the wind force on a roof truss (3 M)
(d) Component parts of a truss bridge (3 M)



Subject Code: R16MEE208

M.Tech II Semester Regular Examinations, June/July-2017

**CUSTOM POWER DEVICES
(Common to PEED, P&ID)**

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Discuss how end user equipment effected by Power Quality Problems.
(b) Explain about power quality variations in distribution circuits? [6+6]
2. (a) Explain about superconducting magnetic energy storage system with a neat diagram?
(b) List out compensation devices for voltage sag and momentary interruptions? [6+6]
3. List out different types of multilevel inverters and discuss about diode clamped multilevel inverter in detail. [12]
4. With a neat sketch and characteristics explain the operation of Thyristor Controlled Series Compensator (TCSC) [12]
5. (a) Explain about Solid state current limiter with neat sketch?
(b) With the help of neat diagram explain about Hybrid Source Transfer Switch? [6+6]
6. (a) Explain about PQ Theory with relevant equations?
(b) Explain the operating principle of UPQC with neat diagram? [6+6]
7. (a) Explain the structure of DVR and mention functions of each block.
(b) Draw and explain the control diagram of IPFC. [6+6]
8. (a) Discuss the interconnection standards of Distribution Generation.
(b) What are the possible solutions to wiring and grounding problems? [6+6]



Subject Code: R16MMD209

M.Tech II Semester Regular Examinations, June/July-2017

MECHANICS OF COMPOSITE MATERIALS

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Define composite material? In what way composite material is different from alloys? What are the advantages of and applications of composite materials?

(b) Write short notes on fibers and matrices
2. (a) Explain about any two fracture modes of fiber reinforced composites

(b) Derive relationship between engineering constants and reduced stiffnesses and compliances
3. (a) Explain the concept of Hooks Law for a two-dimensional lamina.

(b) The engineering elastic constants of a unidirectional graphite epoxy lamina are as follows: $E_{11} = 181$ GPa; $E_{22} = E_{33} = 10.3$ GPa; $\nu_{12} = 0.28$; $G_{12} = 4.4$ GPa. Determine the reduced stiffness matrix.
4. (a) What are the functions of continuous and discontinuous phases of a composite?
(b) Find the coefficients of thermal expansion for a 60° angle lamina of glass/epoxy whose longitudinal and transverse coefficients of thermal expansion are 8.6×10^{-6} m/m/ $^\circ$ C and 22.1×10^{-6} m/m/ $^\circ$ C respectively.
5. Derive the equilibrium equations of for laminated composite plate subjected to transverse loads.
6. (a) Derive constitutive relations for a multidirectional composite in hygrothermal environment?
7. (a) Explain Tsai Hill failure criteria

(b) Explain Hoffman failure criteria
8. (a) What are the important factors influence the mechanical performance of a composite includes the fibre & matrix factors?

(b) Explain Warpage of liminates?



Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16MTE208

M.Tech II Semester Regular Examinations, June/July-2017

ENVIRONMENTAL POLLUTION AND MANAGEMENT

(TE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. a) List out various effects of water pollution. [6]
b) What are the Classifications of pollution? [6]
2. a) Differentiate primary and secondary pollutants and explain about effects of secondary pollutants [8]
b) Explain the working of Electrostatic Precipitator [4]
3. a) How do you collect gaseous air pollutants explain in brief [8]
b) Explain about analysis of SO₂ [4]
4. a) Discuss in detail about water quality management in India [6]
b) Write short notes on Global water crisis [6]
5. a) Write about coastal pollution due to industrial effluents. [4]
b) Explain sources effects and controlling methods of nuclear wastes [8]
6. a) Write about Effects of urbanization on land degradation [6]
b) Explain Impact of modern agriculture on soil. [6]
7. What are the source effects and control measures of noise pollution? [12]
8. Briefly explain the following [12]
a) Occupational Health Hazards
b) Radiation Effects.



Subject Code: R16MDE206

M.Tech II Semester Regular Examinations, June/July-2017

IMAGE AND VIDEO PROCESSING

(DE&CS)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) Discuss the DFT and its properties? Find the DCT coefficients of $f(x,y) = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$?
(b) Generate HAAR kernel Matrix for $N=4$? [6+6]

2. (a) Perform the histogram equalization for the following intensity values
$$\begin{bmatrix} 3 & 1 & 4 & 2 & 5 \\ 1 & 2 & 3 & 3 & 4 \\ 4 & 2 & 5 & 6 & 2 \\ 0 & 4 & 5 & 2 & 4 \\ 1 & 3 & 6 & 2 & 5 \end{bmatrix}$$

(b) Explain basic enhancement filtering process in frequency domain? [6+6]

3. Explain region segmentation techniques on images with suitable examples? [12]

4. (a) For the given symbols and their probabilities $A=0.6$, $B=0.3$ & $C=0.1$, perform the arithmetic encoding operation with a word "CAB"?
(b) Explain Wavelet-based image compression? [8+4]

5. (a) Explain sampling of video signals?
(b) Discuss multiplexing of Luminance, Chrominance and Audio in video processing? [6+6]

6. (a) What is Pixel Based Motion Estimation techniques?
(b) Explain about Two-Dimensional Motion versus Optical Flow [6+6]

7. (a) Explain mean filters & order static filters in restoration in the presence of noise?
(b) Discuss LZW coding with an example? [6+6]

8. (a) What is clustering? Explain about any one clustering technique with example.
(b) Write about sampling and quantization of an image? [6+6]



Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16MDS206

M.Tech - II Semester Regular Examinations, June/July 2017.

EMBEDDED REAL TIME OPERATING SYSTEMS

(DSCE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Discuss interrupt service routine used in RTOS. [6]
(b) Identify time management function calls and briefly explain. [6]
2. Explain the design principles when using an RTOS to design an embedded system [12]
3. (a) Write the features of Windows CE. [6]
(b) Briefly discuss functions of RTLinux. [6]
4. (a) Write about Embedded System of Mobile Phone Software for Key Inputs [5]
(b) Discuss about coding for sending application layer byte streams on a TCP/IP Network [1]
5. (a) Study the process of creating a target image for Windows XP embedded platform. [6]
(b) List the directory command of Linux. [6]
6. (a) Explain the use of semaphore with an example. [6]
(b) Give an overview of RTLinux. [6]
7. List the functional calls provided in RTLinux for mutex and semaphore management. [12]
8. (a) List out various shell variables used. [8]
(b) Mention features of Linux. [4]

Subject Code: R16MSE205**M.Tech II Semester Regular Examinations, June/July-2017****ADVANCED REINFORCED CONCRETE DESIGN****(SE)****Time: 3 hours****Max Marks: 60**

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. A simply supported rectangular slab of size 5mX6m and is isotropically reinforced with 10mm dia@200mm c/c both ways at an average depth of 120mm. The overall depth of slab is 135mm. Estimate safe permissible load on the slab using yield line theory. Use M20 concrete and Fe415 grade steel.
2. Design the exterior panel of a flat slab floor system for a warehouse 24m x 24m divided into panels of 6m x 6m. Load acting is 6kN/m², Materials M20 grade concrete and Fe:415 steel, column size is 350mm diameter, height of storey is 3.2m, Thickness of slab in column strip is 300mm and thickness of slab in middle strip is 200mm.
3. Design a ribbed slab 5 x 5m continuous over two adjacent sides simply supported on the other two sides. Beams are spaced at 1.5 x 1.5m. Assume factored UDL of 20 kN/m². Use M20 concrete and Fe415 steel.
4. Sketch the bending moment envelope after 30% maximum redistribution for a fixed ended beam carrying 2 point loads of 10kN each at one-third points and a uniformly distributed load of 2kN/m over a span of 9m.
5. Design a self supporting chimney is of effective height 30m having diameter at top is 2m. Take the wind pressure intensity as 1.5kN/m² throughout the height . Assume uniform values of permissible tensile and compressive stresses as 120 N/mm² and 90 N/mm².
6. Design a circular silo of 12m height and 6m internal diameter to store cement of unit weight 15.5kN/m³ and $\phi = 25^\circ$.
7. Design a circular cylindrical bunker of capacity 350 kN to store coal using M20 concrete and Fe:415. Steel unit weight is 80 kN/m³ and coal is 8.0 kN/m³, angle of repose of coal is 35°.
8. What are the devices used to improve the ductility performance with seismic loading. Also mention the methods used for achieving these objectives as laid in IS-13920.



Subject Code: R16MEE205

M.Tech II Semester Regular Examinations, June/July-2017

POWER QUALITY

(Common to PE&ED, P&ID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) What is the impact of transient on power quality? Classify the transients that occur in power systems
(b) Explain the sources and causes of different power quality disturbances
2. (a) Explain briefly about the phenomena of current distortion and the voltage distortion under the presence of harmonics.
(b) Explain the general harmonic indices used universally in analyzing the harmonic distortion.
3. (a) Explain the effects of Harmonic Distortion on Transformers and Motor
(b) Explain the harmonic distortion evaluation process.
4. Classify the voltage regulation devices in use on utility and Industrial power system. Explain any two.
5. Explain the idealized behaviour of the following custom power devices for power quality enhancement (i) Solid state current limiter
(ii) Distribution STATCOM
6. (a) Explain the operating conflicts in distribution systems that cause power quality issues.
(b) What are the main power quality issues affected by Distributed Generation?
7. (a) Write the perspectives on DG benefits?
(b) Write the Disadvantages of Distributed Generation.
(c) What are the objectives of Power Quality Monitoring?
8. Explain how the Dynamic Voltage Restorer will enhance power quality at distribution networks



Subject Code: R16MMD205

M.Tech II Semester Regular Examinations, June/July-2017

RAPID TOOLING AND PROTOTYPING

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) What is rapid prototyping? Compare rapid prototyping with traditional prototyping.
(b) Compare rapid technology with CNC technology
2. (a) Explain in detail about the process chain of rapid prototyping
(b) List the advantages and classifications of RP Systems
3. (a) Discuss on STL files and Define slicing relevant to CAD.
(b) Explain in detail about any two RP softwares
4. Explain about laminated object manufacturing with neat sketch. Also enumerate its merits and demerits
5. (a) Describe Fused deposition modeling process with a neat diagram.
(b) Write the limitations and advantages of FDM process?
6. List the differences between following tooling types with neat sketch
 - a) soft tooling v/s hard tooling
 - b) Direct tooling V/s indirect tooling
7. a) Explain stereolithography process.
b) Write the applications of photo polymerization processes.
8. Write short notes on
 - a) collaboration tools
 - b) part building errors
 - c) Errors in SH files



Subject Code: R16MTE205

M.Tech II Semester Regular Examinations, June/July-2017

ENERGY CONSERVATION AND MANAGEMENT

(TE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Write note on 'Indian Energy scenario.'
(b) Explain the principles of Energy Management
2. (a) What do you mean by 'Energy audit'? Discuss types of energy audit briefly.
(b) Explain technologies for energy conservation
3. (a) Discuss the types of depreciation
(b) Explain risk analysis
4. Write note on the following
(a) Pay back method
(b) Investor's rate of return
5. (a) Discuss the different types of devices used for solar energy collection
(b) Explain performance characteristics of a wind turbine
6. (a) Discuss the importance of load curve
(b) Explain the importance of power factor in energy conservation
7. (a) Describe power factor improvement methods
(b) Explain energy conservation in industries
8. Explain different Energy Efficiency Improvement and Cost Saving techniques for a Petrochemical Industry and a Sugar Industry.



Subject Code: R16MDS205

M.Tech II Semester Regular Examinations, June/July-2017

DESIGN OF FAULT TOLERANT SYSTEMS

(DSCE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

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1. (a) Analyze the relation between Reliability and Meantime between failure. [6 M]
(b) Define fault in a digital circuit and explain how a fault is characterized by its parameters. [6 M]
 2. (a) Memorize the design of totally self-checking checker using the two rail checker. [6 M]
(b) Explain the concept of fail safe design of sequential circuits using partition theory. [6 M]
 3. (a) Define Controllability and Observability for a fault effective circuit using an example. [6 M]
(b) Summarize the steps involved in Path Delay Design for checking fault in a combinational circuit. [6 M]
 4. Summarize the Reed Mullers expansion technique for design of testability for a combinational circuit. [12 M]
 5. (a) Explain the Multiple Scan Chains and advantages of Multiple Scan Chains. [6 M]
(b) Summarize the Scan-Based DFT design Rules. [6 M]
 6. (a) Explain Test Pattern generation for Built In Self Test (BIST). [6 M]
(b) Draw the Generic offline BIST architecture and explain its internal blocks. [6 M]
 7. (a) Summarize the hybrid Triple Modular Redundant System. [6 M]
(b) Describe the Time redundancy and Software redundancy. [6 M]
 8. (a) Analyze the Causes and Effects of Fault Masking. [6 M]
(b) Summarize the Testability and Fault analysis methods for Automatic Test Pattern Generation (ATPG). [6 M]



Subject Code: R16MDE205

M.Tech II Semester Regular Examinations, June/July-2017

DETECTION AND ESTIMATION THEORY

(DE&CS)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) Define and explain Markov Sequences and Processes with the real time example with neat diagram. [12]
2. (a) Explain any one of the procedure for the estimation of mean and variance. [6]
(b) Discuss quantitatively about Minimum Probability of error criterion for the detection of signals in Noise. [6]
3. (a) Explain the Neymen-Pearson criterion for detection of constant amplitude signals. [6]
(b) Derive and explain the operation of Baye's estimator. [6]
4. (a) What is hypothesis? Explain the different tests of hypothesis. [6]
(b) Discuss briefly what you understand by Composite Hypothesis Testing. [6]
5. (a) Derive an expression for the estimation signal using linear mean squared estimation. [6]
(b) Explain about Real-time Digital Wiener Filters. [6]
6. Write short notes on the following
(a) Gaussian Processes [6]
(b) Kalman filtering [6]
7. (a) What is the difference between point and interval estimators. Explain any one method of evaluating the interval estimators. [6]
(b) Explain about Multiple Linear Regressions. [6]
8. (a) Write and prove the properties of autocorrelation. [6]
(b) Discuss the properties of PSD. [6]



Subject Code: R16MCS207

M.Tech II Semester Regular Examinations, June/July-2017

UNIFIED MODELLING LANGUAGE

(CS&E)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain in detail about UML language
(b) Define modelling. Explain about the importance of modelling in detail [6+6]
2. (a) Explain and draw the class diagram for student course registration
(b) What are the common properties and uses of class diagrams? [6+6]
3. (a) Explain about the different ways of using a class diagram when modeling the static design view of a system
(b) Explain and draw the sequence diagram for treatment use case between patient and doctor [6+6]
4. (a) Explain in detail about the collaboration diagram with example
(b) Differentiate between collaboration diagram and state chart diagram of UML [6+6]
5. (a) What are the contexts, common properties and common uses of use case diagrams
(b) Enumerate the steps to model a workflow with reference to activity diagrams [6+6]
6. (a) Differentiate between sequence diagram and activity diagram in detail
(b) What is a state? What are the several parts of states? [6+6]
7. (a) List and explain various kinds of events in UML
(b) What are the characteristics of a well-structured deployment diagram? [6+6]
8. (a) Explain the properties of a component diagram
(b) What are standard stereotypes UML defines that apply to components? [6+6]



Subject Code: R16MSE204

M.Tech II Semester Regular Examinations, June/July-2017

THEORY OF PLATES AND SHELLS

(SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. Derive general equation for deflection of circular cylindrical shell loaded symmetrically with respect to its axis (12M)
2. Derive an equation for deflection of simply supported circular plate subjected to udl 'q'. Calculate the maximum deflection when edges are clamped. (12M)
3. Using levy's approach, develop a differential equation for displacement of a simply supported rectangular plate subjected to udl 'q'. (12M)
4. Derive an equation for strain energy in pure bending for plate element. Discuss its limitations. (12M)
5. Explain (4+4+4)
 - a) Annular plates
 - b) Levy's solution of plates
 - c) Membrane theory of cylindrical shells.
6. a) Define shell and explain its advantages and disadvantages(7M)
b) Discuss the structural behaviour of thin shells(5M)
7. A rectangular plate is simply supported on all edges is subjected to in plane tension and lateral forces distributed uniformly. Derive the governing differential equation.(12M)
8. (a) What is membrane theory ? explain its practical application with examples(7M)
(b) What are merits and demerits of plates(5M)



Subject Code: R16MPE204

M.Tech II Semester Regular Examinations, June/July-2017

POWER ELECTRONICS IN RENEWABLE ENERGY SYSTEMS

(PE&ED)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Discuss briefly about the following renewable energy sources and mention their applications
(i) Wind Power Generation Systems (ii) Geothermal Energy (ii) Solar Thermal Energy [4+4+4]
2. (a) Explain with neat flow chart any two Maximum Power Point tracking algorithms for solar PV system. [6+6]
3. (a) Show how a DC-DC converter can be used as a part of an inverter designed to have a square wave output of 48V with a 12 V DC input from a PV panel. The idea is to design the inverter without a transformer. Sketch a block diagram, showing design components to clearly express your design. [12]
4. (a) Derive the expression for power extracted from the wind. [6]
(b) With neat diagram explain the working principle of horizontal axis wind turbine. [6]
5. (a) Using the schematic diagram, explain the working of Doubly-Fed Induction Generation and its control for Wind energy conversion system. [8]
(b) Distinguish between synchronous generator and Induction Generator [4]
6. (a) Explain the following in detail:
(i) Line Commutated Inverters (ii) DC power conditioning Converters [6+6]
7. (a) With neat diagram explain the construction and working principle of PEM fuel cells. [8]
(b) Compare Solid oxide Fuels cells with PEM fuel cells. [4]
8. (a) Describe an efficient power converter topology for efficient step up of voltage in fuel cells. [8]
(b) Mention the advantages and disadvantages of fuel cells. [4]



Subject Code: R16MMD204

M.Tech II Semester Regular Examinations, June/July-2017

FRACTURE MECHANICS

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

- 1.(a) Discuss in detail the effect of material properties on fracture.
(b) Differentiate ductile fracture and brittle fracture.
2. Derive an expression for fracture strength of a brittle solid containing a crack using Griffith energy balance criterion.
3. Define singularity. What kind of singularity describes a stress field near the vicinity of a crack tip in LEFM? Discuss.
4. (a) Explain the effect of material thickness upon plastic zone size and shape.
(b) What is J-integral? Explain J-integral approach.
5. Define fatigue cycle. Explain briefly about low cycle fatigue and high cycle fatigue.
6. What is creep? Explain the role of diffusion on the different forms of creep.
7. Differentiate stress intensity factor, stress concentration factor and energy release rate
8. Write short notes on the following:
 - (i) Creep-fatigue interaction
 - (ii) S-N curves



Subject Code: R16MTE204

M.Tech II Semester Regular Examinations, June/July-2017

GAS TURBINES AND JET PROPULSION

(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) What are the assumptions made in analysis of Brayton cycle? Derive efficiency of constant pressure closed cycle gas turbine

(b) A simple open type gas turbine plant consists of compressor, combustion chamber and turbine. The pressure and temperature at the inlet of compressor are 1 bar and 15°C and the inlet of the turbine are 5 bar and 650°C. Compressor isentropic efficiency is 82%. Turbine's isentropic efficiency is 86% mechanical and combustion efficiencies are 90% and 98%. Assuming $C_{pa} = 1$ kJ/kg-°K, $C_{pg} = 1.2$ kJ/kg°K and $r = 1.4$ for air and 1.334 for gases. Find

(1) The thermal efficiency and

(2) Work ratio of the cycle.

2. (a) Explain the velocity diagram and work done of a stage of Axial Compressor. Thus prove that $\alpha_1 = \beta_2$ and $\alpha_2 = \beta_1$ from the velocity triangles.

(b) An axial flow compressor having eight stages and with 50% reaction design compresses air in the pressure ratio of 4:1. The air enters the compressor at 20°C and flows through it with a constant speed of 90m/s. The rotating blades of the compressor rotate with a mean speed of 180m/s. Isentropic efficiency of the compressor may be taken as 82%. Calculate (i) Work done by the machine (ii) Blade angles. Take $\gamma = 1.4$ and $C_p = 1.005$ kJ/kg K.

3. (a) Explain the turbine and nozzle efficiencies.

(b) A single stage gas turbine operates at its design condition with an axial absolute flow at entry and exit from the stage. The absolute flow angle at the nozzle exit is 70 deg. At stage entry, the total pressure and temperature are 311 kPa and 850°C respectively. The exhaust static pressure is 100 kPa, the total to static efficiency is 0.87 and mean blade speed is 500 m/s. Assuming constant axial velocity through the stage, determine (a) the specific work done (b) the Mach number leaving the nozzle (c) the axial velocity (d) total to total efficiency (e) stage reaction.

4. (a) Write the marine, locomotive and automotive applications of gas turbines.

(b) Describe the future of gas turbines in India.

5. (a) Explain the working differences between turbo prop, turbo jet and turbo fan.

(b) The compressor of a turbojet engine operates at a pressure ratio of 4.5 and handles 30 kg of air per sec. The inlet temperature is 0°C and compressor efficiency is 80%. The air/fuel ratio is 60%. (a) find the power required to drive the compressor. (b) If the efficiency of the turbine is 85% and the burner outlet temperature is 850°C find the pressure and temperature on the discharge side of the Turbine. (c) If the gases expand through a nozzle to 1 atm what is jet velocity. (d) what is the thrust if air speed is 200 m/s. (e) what is propulsive efficiency.

6. (a) Write notes on rocket propulsion, propellant in rockets, classification of rockets.

(b) With a neat sketch classify and explain about chemical rockets

7. (a) Differentiate the Axial flow compressors and Axial flow gas turbines.

(b) A centrifugal compressor having compression ratio of 2 delivers air at the rate of 1.5 kg/s. Find the power required to drive compressor with isothermal compression, if the intake temp is 300 K.

8. (a) Describe about the Impulse turbine analysis.

(b) Explain the Applications of Water Alcohol mixtures and also state its advantages.



Subject Code: R16MEC204

M.Tech II Semester Regular Examinations, June/July-2017

ADVANCED DIGITAL COMMUNICATION

(Common to DE&CS, DS&CE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain how a signal with unknown phase can be detected. [6M]
(b) Explain in detail about Maximum Likelihood Decoder. [6M]
2. (a) Explain the coherent binary MSK method. [6M]
(b) Explain about Noncoherent Binary Frequency-Shift Keying. [6M]
3. (a) Explain the following M-ary modulation Technique [6M]
 i) PSK ii) FSK
(b) What is power spectra and explain the power spectrum of M-ary QPSK? [6M]
4. (a) Explain the Bandwidth efficiency of M-ary FSK. [6M]
(b) Comparison of Binary and Quaternary modulation schemes. [6M]
5. (a) Design a convolution coder with 3 bit shift register and rate efficiency of $1/3$. [6M]
(b) Discuss systematic and non systematic block codes with examples. [6M]
6. (a) Define and explain the procedure of Linear block codes. [6M]
(b) Write short notes on the channel coding theorem. [6M]
7. (a) Explain Nyquist's Criterion for Distortion less Baseband Binary Transmission. [6M]
(b) Explain in detail about Baseband Transmission of Digital Data with neat block diagram. [6M]
8. Write short notes on [6M]
(a) Frequency hopping [6M]
(b) Jamming [6M]



Subject Code: R16MCS204

M.Tech II Semester Regular Examinations, June/July-2017

WIRELESS NETWORKS AND MOBILE COMPUTING

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Write about the different categories of Wireless Networks. [6+6]
(b) Discuss the Infrastructure of Ad-hoc Networks.
2. (a) With a block diagram explain mobile computing architecture. [8+4]
(b) State some limitations of Mobile Computing.
3. (a) Define the terms GSM and GPRS. [2+10]
(b) Show the various subsystems and units in the GSM system structure. How do these subsystems and units differ from those in GPRS?
4. (a) Explain why MAC scheme in wired networks fails in wireless networks and how does the multiple access with collision avoidance (MACA) works. [7+5]
(b) Compare SDMA, TDMA and CDMA.
5. Write a short notes on [4+4+4]
(a) the need of Mobile IP.
(b) how end to end packet delivery is done in Mobile IP.
(c) agent advertisement is done in Mobile IP.
6. Explain in detail about DHCP. [12]
7. (a) Why Traditional TCP is not suitable in Mobile Network. [2+10]
(b) Explain the working of Indirect TCP & Snooping TCP. What are the limitations of both?
8. (a) What are the properties of Mobile Adhoc Networks (MANETs). [4+8]
(b) Describe any four routing algorithms of MANETs.



Subject Code: R16MSE203

M.Tech II Semester Regular Examinations, June/July-2017

STABILITY OF STRUCTURES

(SE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. Find out critical load for lateral buckling of simply supported I- beam (12M)

2. explain about (6+6)
 - a) Torsional buckling
 - b) Buckling of beams

3. Derive differential equation for beam column subjected to lateral concentrated load and find out critical load for a column with one end fixed and one end free (12M)

4. Buckling of I-beam by using energy method (12M)

5. Find out critical load for buckling of a bar with varying cross section (12M)

6. Expression for strain energy in plate bending with in plate forces (12M)

7. Derive the geometrical stiffness matrix for a discretised column with different boundary conditions (12M)

8. Buckling of simply supported rectangular plates compressed in two opposite directions.(12M)



Subject Code: R16MEE203

M.Tech II Semester Regular Examinations, June/July-2017

**ELECTRIC DRIVES – II
(Common to PE&ED, P&ID)**

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

- 1 (a) Discuss the direct vector control scheme for an induction motor [8]
(b) Compare direct vector control and indirect vector control. [4]
- 2 (a) Explain in detail any three rotor speed estimation techniques of Induction motors [4+4+4
]
- 3 (a) Explain with neat diagram, the Load commutated inverter fed synchronous motor drive. [6]
(b) Discuss the constant torque angle control of synchronous motor drives [6]
- 4 (a) Define reluctance. Discuss the principle of operation of a switched reluctance motor. [6]
(b) Draw and explain any two power converter circuits for Switched reluctance motors. [6]
- 5 (a) Discuss the operation of VSI fed BLDC motor drive, draw its back emf, current and torque waveforms? [12]
- 6 (a) Explain how does ac-dc and dc-ac converters are employed in the traction drives? [6]
(b) Explain the different power electronic control schemes of the electric vehicles? [6]
- 7 Discuss the following in detail
(a) Power Factor Control in synchronous motor drives
(b) Motors employed in railway traction [6+6]
- 8 (a) With neat diagram explain the current controlled PMBLDC motor drive. [8]
(b) List different advantages of PMBLDC motors [4]



Subject Code: R16MMD203

M.Tech II Semester Regular Examinations, June/July-2017

EXPERIMENTAL STRESS ANALYSIS

(MD)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Define and establish the stress strain relations for plane stress and plain strain and mention their applications. [7M]
(b) In a plane strain problem, $\sigma_x = 40 \text{ MPa}$, $\sigma_y = -20 \text{ MPa}$, $E = 200 \text{ GPa}$, $\mu = 0.3$. Determine the value of the stress ' σ_z ' and strain in x and y direction. [5M]
2. (a) Describe the elements of a typical data acquisition system used for recording the static data.
(b) What are different types of strain gauges and explain the working principle of any one types of strain gauge with neat sketche.
3. (a) What are different types of recording instruments used to measure the dynamic signals from strain gauge circuits. Explain with neat sketch how to record signals at intermediate frequencies with the help of oscillograph.
(b) Name different types of instruments used to measure signals at very high frequencies. Explain any one type with the help of neat sketch.
4. a) What are the various materials for Three Dimensional Photo Elasticity? [6+6]
b) Discuss how birefringent coating data can be recorded and analyzed?
5. (a) Explain with neat sketch circular polariscope for dark field arrangement with stressed photo elastic model [4 M]
(b) Explain about the Frozen – stress method for three dimensional photo elasticity [8 M]
6. (a) Discuss bi-refrigerant strip coating technique. [6 M]
(b) Determine the stresses in a brittle coating applied to a component made of steel for which $E_s = 2 \times 10^6 \text{ kg/cm}^2$, $\mu = 0.3$. When the specimen stresses are $\sigma_1^s = 2100 \text{ kg/cm}^2$ and $\sigma_2^s = -1400 \text{ kg/cm}^2$.
 - i) For a resin based coating with $E_c = 1.4 \times 10^4 \text{ kg/cm}^2$, $\mu = 0.42$
 - ii) for a ceramic based coating with $E_c = 70 \times 10^4 \text{ kg/cm}^2$, $\mu = 0.25$. [6M]
7. (a) a) Explain the displacement approach in Moire analysis. [6M]
(b) What is fringe sharpening and multiplications in moiré fringe analysis. [6M]

8. (a) Write about iso-chromatic fringe patterns and isoclinic fringe patterns.

[6M]

(b) Write about calibration methods and separation methods in two dimensional Photoelasticity.

[6M]



Subject Code: R16MTE203

M.Tech II Semester Regular Examinations, June/July-2017

ADVANCED REFRIGERATION AND AIR CONDITIONING

(TE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain the method of Compound compression with intercooling and single expansion valve?
(b) A refrigerating machine using F_{12} as working fluid works between the temperatures -18°C and 37°C . The enthalpy of liquid at 37°C is 78 kJ/kg . The enthalpies of F_{12} entering and leaving the compressor are 200 kJ/kg and 238 kJ/kg respectively. The rate of circulation of refrigerant is 2 kg/min and efficiency of compressor is 0.85 . Determine: (i) Capacity of the plant in tons of refrigeration (ii) Power required to run the plant. (iii) COP of the plant.

2. (a) Explain the working principle of Thermostatic Expansion Valve with neat sketch?
(b) A boot-strap cooling system of 20 tons capacity is required for an aeroplane cabin. The temperature and pressure conditions of the atmosphere are 20°C and 0.8 bar . The pressure of air is increased from 0.8 bar and 0.96 bar due to ramming action. The pressure of the air leaving the main compressor and auxiliary compressor are 3.5 bar and 5.25 bar respectively. The isentropic efficiency of both the compressors is 85% and of the turbine is 80% , 60% of the total heat of the air leaving the main compressor is removed in the first heat exchanger and 35% of the total heat of the air leaving the auxiliary compressor is removed in the second heat exchanger. Assuming that ramming is isentropic and cabin pressure is 1.03 bar , find the following (a) kW required to take the load in the cabin. (b) C.O.P of the system. Temperature of air leaving the cabin should not exceed 27°C .

3. (a) Draw a neat compact diagram of Lithium bromide water absorption refrigeration system and explain its working principle.
(b) How the Helium is liquefied? Explain in detail.

4. (a) Why steam jet refrigeration system is more preferable over other systems?
(b) Explain the working principle of vortex tube and explain that the energy exchange phenomena in vortex-tube is not a violation of second law of thermodynamics.

5. (a) Explain the following processes.
 - (i) Cooling with Dehumidification
 - (ii) Heating and Humidification(b) 100 m^3 of air per minute at 30°C DBT and 60% RH is cooled to 20°C DBT by passing through a cooling coil. Find (i) Capacity of cooling coil in tons of refrigeration (ii) R.H. and WBT of air after cooling. take atmosphere pressure is 1 bar .

6. (a) Explain the working principle of air conditioning system used in winter season?

(b) Air flowing at the rate of $100 \text{ m}^3/\text{min}$ at 40°C DBT and 50% RH is mixed with another stream flowing at the rate of $20 \text{ m}^3/\text{min}$ at 26°C DBT and 50% RH. The mixture flows over a cooling coil whose ADP temperature is 10°C and bypass factor is 0.2. Find DBT and RH of air leaving the coil. if this air is supplied to an air conditioned room where DBT of 26°C and RH of 50% are maintained. Estimate (i) room sensible heat factor and cooling coil capacity in tons of refrigeration.

7. (a) Define the term " Effective Temperature" and explain its importance in air-conditioning system. Describe the factors which affect Effective temperature.

(b) An air conditioned room is maintained at 27°C DBT and 50% R.H. when ambient conditions are 40°C DBT and 27°C WBT. The room sensible heat gain is 14 kW. The air enters the conditioned hall at 7°C DBT and saturated. Determine (a) Volume of moist air supplied to the space in m^3/min .

(b) Latent heat gain in the room in kW. (c) Cooling load of the air washer in kW if 30% of the air supplied to the room is fresh air and remaining 70% is circulated.

8. (a) Explain the Spray type Dehumidifier with neat sketch?

(b) Write a short notes on Design of Grill and factors affecting Grill Performance.



Subject Code: R16MEC203

M.Tech II Semester Regular Examinations, June/July-2017

DSP PROCESSORS AND ARCHITECTURES

(Common to DECS, DSCE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

-
1. a) Find the Z-transform of the following function: $x(n) = n(1/2)^n u(n)$
b) Compute the DFT of the following sequence by DIT-FFT
 $x(n) = [1, -2, 1, -1, 2, 1, -2, 1]$ [6+6]
 2. a) List out and explain sources of errors in DSP implementations
b) Explain double precision fixed point format? [6+6]
 3. a) Discuss bus architecture and memory of DSP processor?
b) Explain various data addressing capabilities? [6+6]
 4. a) Discuss the Memory space of TMS320C54XX Processors
b) Explain the onchip peripherals of DSP ? [6+6]
 5. a) Write about ADSP-2181 high performance Processor
b) Provide Overview of Hardware Processing Units and Register files [6+6]
 6. Explain the about DMA operation, configuration and addressing? [12]
 7. Consider the signal $x(n) = nu(n)$.
 - (i) Determine the spectrum of the signal
 - (ii) The signal is applied to decimator that reduces the sampling rate by a factor of 2. Determine the output spectrum.
 - (iii) Show that the spectrum in part (ii) is simply Fourier transform of $x(3n)$.[12]
 8. Discuss the following:
 - (i) Interrupts of TMS320C54XX processors
 - (ii) Pipeline Operation of TMS320C54XX Processors
 - (iii) Features for External Interfacing[12]



Subject Code: R16MCS203

M.Tech II Semester Regular Examinations, June/July-2017

DATA WAREHOUSING AND DATA MINING

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain data mining as a step in the process of knowledge discovery. [6+6]
(b) Explain Types of data attributes and data sets.

2. Suppose that the data for analysis include the attribute age. The age values for the data tuples are (in increasing order): [4+4+4]
13,15,16,16,19,20,20,21,22,22,25,25,25,25,30,33,33,35,35,35,35,36,40,45,46, 52,70
a) Use smoothing by bin means to smooth the above data, using a bin depth of 3. Illustrate your steps. Comment on the effect of the technique for the given data.
b) How might you determine outliers in the data?
c) What other methods are there for data smoothing?

3. (a) Draw and explain the architecture for on-line analytical mining. [6+6]
(b) Explain the three-tier data warehousing architecture.

4. Explain the following: [4+4+4]
a) Data warehouse Back end tools and Utilities
b) Meta Data Repository
c) Types of OLAP servers

5. Explain hold out, random sub-sampling, cross-validation and bootstrap methods? [12]

6. (a) What is Bayes theorem? Explain about Naive Bayesian classification. [6+6]
(b) Explain training Bayesian belief networks.

7. (a) Can we design a method that mines the complete set of frequent item sets? [6+6]
without candidate generation. If yes, explain with an example.
(b) What are different techniques to improve the efficiency of Apriori? Explain.

8. (a) Suppose that the data mining task is to cluster the following eight points (with(x,y) representing location) into three clusters. [6+6]
A1(2,10), A2(2,5), A3(8,4), B1(5,8), B2(7,5), B3(6,4), C1(1,2), C2(4,9).
The distance function is Euclidean distance. Suppose initially we assign A1, B1, and C1 as the center of each cluster, respectively. Use the k-means algorithm to show only
i. the three cluster centers after the first round execution, and
ii. the final three clusters.
(b) K-MEANS strengths and weaknesses.

Subject Code: R16MSE202

M.Tech II Semester Regular Examinations, June/July-2017
EARTHQUAKE RESISTANT DESIGN
 (SE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

Note: The Code Books IS-1893(PART-I):2002, IS-13920:1993 are permitted into the examination hall.

1. (a) Explain the characteristics of different types of seismic waves. (6 M)
1. (b) Describe the working principle of a seismograph. (6 M)
2. (a) Explain the behaviour of various types of lateral load resisting structural systems. (6 M)
2. (b) Explain the mechanism of base isolation and also the different types of base isolation devices. (6 M)
3. Determine design seismic load on the various frames of a four-storey reinforced concrete Telephone Exchange building plan and elevation as shown in Fig.1. The building is located in New Delhi. The soil condition is medium stiff. The reinforced concrete frames are infilled with brick masonry. The lumped weight due to dead load is 3 kN/sq.m on floors and 5 kN/sq.m on roof. The live load on floors is 5 kN/sq.m and 2 kN/sq.m on roof. (12 M)

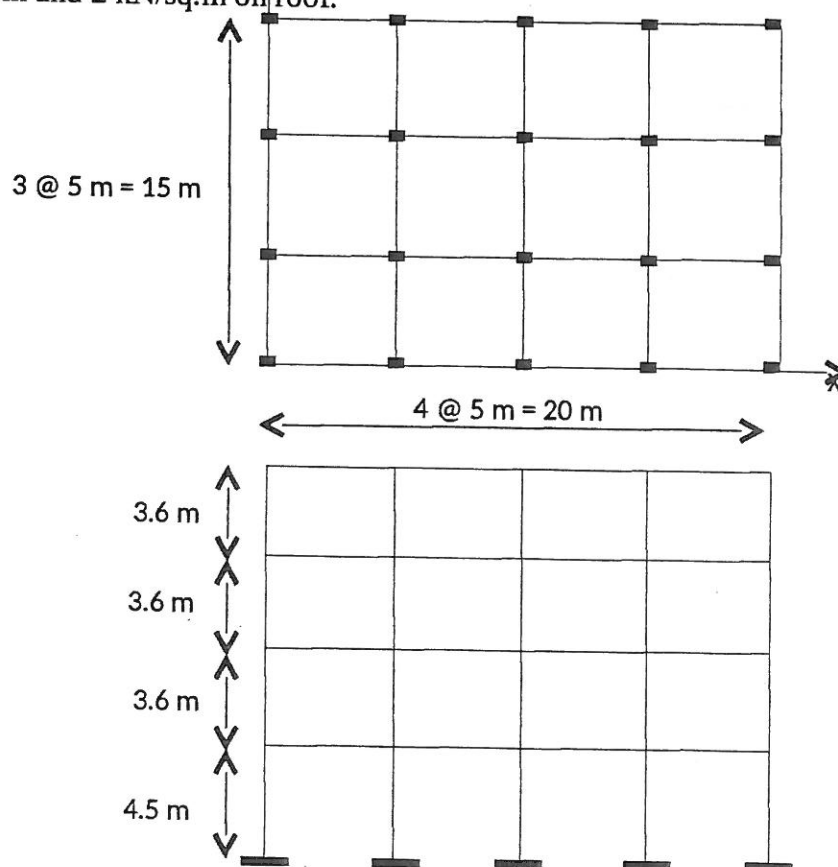


Fig.1

4. (a) Explain the building architectural considerations for effective seismic design. (6 M)
4. (b) Explain the behaviour and failure pattern of masonry buildings during earthquakes. (6 M)
5. (a) Explain the various types of ductility and also describe the factors influencing the ductility of reinforced concrete members. (6 M)
5. (b) Explain the ductile detailing provisions of a beam-column joint as per IS code of practice. (6 M)
6. (a) Distinguish between the seismic demand and seismic capacity. (4 M)
6. (b) Explain the various methods of retrofitting of RCC columns. (8 M)
7. (a) Differentiate Earthquake magnitude and intensity. Also explain the different earthquake magnitude scales. (8 M)
7. (b) Explain the seismic zonation of India and seismic hazard of India. (4M)
8. (a) Explain the construction of response spectrum used in earthquake resistant design of structures. (6 M)
8. (b) Explain the modelling of infill masonry walls for the analysis of earthquake resistant structures. (6 M)



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Subject Code: R16MEE202

M.Tech - II Semester Regular Examinations, June/July-2017.

SOFT COMPUTING TECHNIQUES

(Common to PE&ED, P&ID)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain about supervised and unsupervised learning with examples?
(b) Discuss about the Mc-Culloch pitts model of artificial neural networks
[6+6]
2. Draw and explain the architecture and the training algorithm used in Kohonen Self organizing Maps
[12]
3. a) Let $X = \{a,b,c,d\}$ $Y = \{1,2,3,4\}$ $\tilde{A} = \{(a,0) (b,0.8)(c,0.6)(d,1)\}$
 $\tilde{B} = \{(1,0.2)(2,1)(3,0.8)(4,0)\}$ $\tilde{C} = \{(1,0) (2,0.4) (3,1) (4,0.8)\}$
Determine the implication relations
(i) IF x is \tilde{A} THEN y is \tilde{B} (ii) IF x is \tilde{A} THEN y is \tilde{B} else y is \tilde{C} .
b) The task is to recognize english alphabetical characters (F,E,X,Y,I,T) in an image processing system. define two fuzzy sets I and F to represent the identification of characters I&F
 $I = \{(F,0.4),(E,0.3),(X,0.1),(Y,0.1),(I,0.9),(T,0.8)\}$
 $F = \{(F,0.99),(E,0.8),(X,0.1),(Y,0.2),(I,0.5),(T,0.5)\}$ Verify De Morgans laws. [6+6]
4. (a) Draw the block diagram of a Fuzzy logic system
(b) Discuss in detail about the development of rule base and decision making system with the help of fuzzy logic system. [4+8]
5. (a) Discuss the creation of off spring and search space? Write the working principal of Genetic algorithm.
(b) State and explain the different selection methods in GA [6+6]
6. Illustrate case study about a fusion Approach of Multispectral Images with SAR Image for flood area analysis [12]
7. (a) State the various types of soft computing techniques and Mention some application areas for NN
(b) Explain in detail different artificial neural network architectures [6+6]
8. a) What is the Hopfield network? Illustrate the steps involved in Hopfield network algorithm to store and recall a set of bipolar patterns?
b) State and prove BAM stability theorem? [6+6]



Subject Code: R16MMD202

M.Tech II Semester Regular Examinations, June/July-2017

GEOMETRICAL MODELING

(MD)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain various methods of defining wireframe entities points, lines, arcs and circles.
(b) Describe the parametric representation of a circle.
2. (a) Find the length of common perpendicular to two skew lines.
(b) Derive the normal vector to a cubic spline curve at any of its points.
3. (a) Differentiate between Bezier curve and cubic spline curve.
(b) Discuss in detail about modification and blending of Bezier curve segments.
4. With appropriate sketches explain the characteristics of B-spline curves.
5. Elaborate on description of various surface model entities with neat sketches.
6. (a) What are the properties of a good solid model? Explain
(b) Explain the steps in B-rep scheme of representation of a solid model
7. Write about the common primitives of a solid model. How a solid model is created by Boolean operations?
8. Write short notes on the following.
 - (i) Evaluation of points on curves
 - (ii) Surface trimming



Subject Code: R16MTE202

M.Tech II Semester Regular Examinations, June/July-2017

DESIGN OF THERMAL SYSTEMS

(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) Give the classification of heat exchangers.
(b) Explain the working of shell & tube heat exchanger.

2. (a) Discuss the criteria for heat exchanger design.
(b) What are the fouling factors? Explain their effect on heat exchanger design.

3. (a) Explain the reasons for using multiple passes on tube side and shell side of multi tube heat exchangers.

(b) Explain the significance of mean temperature difference.

4. (a) Explain the LMTD analysis for various heat exchangers?

(b) In a balanced counter flow heat exchanger where $m_c C_{p_c} = m_h C_{p_h}$. Show that $\Delta T_1 = \Delta T_2 = \Delta T$ at any section and the temperature profile of two fluids are parallel and linear.

5. (a) Draw the temperature distribution in a concentric tube heat exchanger when operated under parallel and counter flow conditions.

(b) It is desired to heat 450 kg/hr of water from 10^oC to 75^oC utilizing the heat of flue gases ($C_p = 2.9$ kJ/kg C). The gases are available with a flow rate of 1,800 kg/hr at a temperature of 165^oC. If the overall heat transfer coefficient is 125 W/m²C, determine the length of 3 cm tubing required for parallel flow and counter flow heat exchanger.

6. (a) Explain the working of Vertical reflux type condenser.

(b) Discuss sub cooling and super heating.

7. Write and explain the various vaporizing process in heat exchangers.

8. Classify cooling towers and explain natural draught cooling tower.



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Subject Code: R16MEC202

M.Tech II Semester Regular Examinations, June/July-2017

CMOS ANALOG AND DIGITAL IC DESIGN

(Common to DE&CS, DS&CE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
All questions carry EQUAL marks

1. (a) Discuss the layout rules of MOS devices and modeling?
(b) $V_{GS} = 2.5V$, Sketch to scale the output characteristics of an enhancement n-channel device if $V_T = 0.3V$ and $I_D = 500\mu A$ when $V_{GS} = 5 V_{in}$ saturation. [6+6]
2. (a) Design universal logic gates using CMOS.
(b) Discuss the procedure for designing of complex logic circuit design with an example? [6+6]
3. (a) Design SRLatch clocked flipflop circuits with CMOS gates?
(b) Differentiate static and dynamic latches. [6+6]
4. (a) Explain the voltage characteristics of a CMOS voltage bootstrapping circuit?
(b) Explain Dynamic CMOS transmission gate logic with suitable examples? [6+6]
5. Discuss MOS Active resistor and Wilson current mirror? [12]
6. (a) Explain push-pull inverter in CMOS amplifier circuits?
(b) Discuss any two the cascade amplifier characteristics? [6+6]
7. (a) Write about High Gain Amplifiers Architectures?
(b) Discuss Simulation and measurement techniques? [6+6]
8. (a) Discuss the following
(i) Zipper CMOS Circuits (ii) True single- phase clock dynamic
(b) Write about AOI and OIA gates? [8+4]

Subject Code: R16MCS202

M.Tech II Semester Regular Examinations, June/July-2017

SOFTWARE ENGINEERING

(CSE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) With the neat diagram, explain water fall model.
(b) What is software process model? Explain with a block diagram the evolutionary development model. [6+6]
2. (a) What are the different metrics for specifying non-functional requirements? explain any two of them
(b) What is data flow diagram? Draw a data flow diagram for order processing system. [6+6]
3. (a) Give reasons why requirement elicitation and analysis is a difficult phase in requirements engineering process
(b) Define architectural design. With an example, describe the repository model and give its advantageous and disadvantageous. [6+6]
4. Explain refactoring. What is software architecture and point out its importance?
(b) Explain object oriented design process with example of weather mapping system of the layered architecture [6+6]
5. (a) List out the different steps for interface design.
(b) Define validation and verification and explain two complementary approaches to system checking and analysis [6+6]
6. (a) Differentiate between block box testing and white box testing
(b) Define unit testing. Explain about unit test considerations and procedures [6+6]
7. (a) Elaborate on the role of quality control and quality assurance in achieving software quality
(b) What is software metric? Explain the importance of it in detail [6+6]
8. (a) Differentiate between function-oriented and size-oriented metrics
(b) Discuss about Risk refinement [6+6]



Subject Code: R16MSE201

M.Tech II Semester Regular Examinations, June/July-2017

FINITE ELEMENT METHOD

(SE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. What are the various steps in Finite Element Method and explain them.
2. Explain the basic principle of the Rayleigh-Ritz method, in the context Finite Element method.
3. (a) What do you mean by shape functions and derive shape functions for a simple bar element.
(b) write short notes on merits and demerits o Finite Element Method.
4. Derive the shape functions of a simple rectangular Serendipity element in terms of isoparametric element form.
5. Derive stiffness matrix of an axi-symmetric triangular element.
6. A fixed beam is subjected to uniformly distributed load, w/m all throughout. Analyze the beam using finite element method and determine the maximum deflection and maximum bending moment in the beam.
7. Write the applications of FEM to plate elements.
8. Write short answers on the following.
 - (a) Static condensation
 - (b) Jacobin matrix
 - (c) CST Elements



Subject Code: R16MEE201

M.Tech II Semester Regular Examinations, June/July-2017

SWITCHED MODE POWER CONVERTERS

(Common to PEED, P&ID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

- 1 (a) With the help of circuit and relevant waveforms, discuss the working of single switch push-pull converter [8]
(b) Explain the necessity of isolation in switched mode power converters. [4]
- 2 (a) Describe the working principle and modes of operation of full bridge converter with isolation. [6]
(b) Analyze the steady state behaviour of half bridge converter with necessary equations. [6]
- 3 (a) What is meant by state space averaging? Derive the state space average equation of a buck converter. [12]
- 4 (a) Explain the various frequency domain specifications of linear time invariant systems in detail. [6]
(b) Derive the relationship between phase margin and damping factor. [6]
- 5 (a) What is meant by resonant converters? How are they useful in SMPS applications? [4]
(b) Discuss the operation of ZVS resonant switch converters. Draw the circuit diagram and relevant waveforms. [8]
- 6 (a) With neat diagram explain the principle of operation of quasi resonant zero voltage switching boost converter and derive the expression for DC gain. [12]
- 7 (a) Discuss and derive the small signal model of any one switched mode dc-dc converter. [12]
- 8 (a) Explain the concept of ZCS. Also with neat diagrams and waveforms describe the working principle of M-type converter with ZCS. [12]

Subject Code: R16MMD201

M.Tech II Semester Regular Examinations, June/July-2017
FINITE ELEMENT METHODS

(MD)

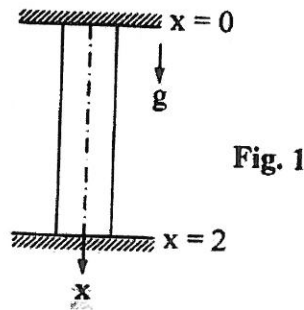
Time: 3 hours

Max Marks: 60

Answer any FIVE questions.
 All questions carry EQUAL marks

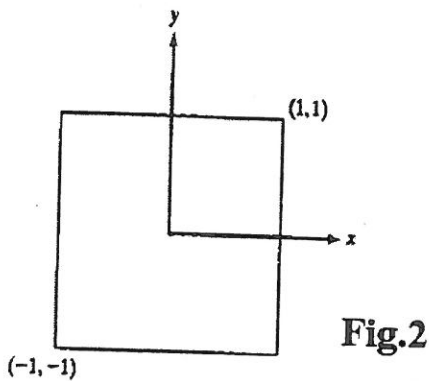
1. (a) Discuss in detail about the concepts of FEM formulation. How is that FEM emerged as powerful tool? Discuss in detail about applications of finite element method. [6M]

(b) Using RayleighRitz method, find the displacement of the midpoint of the rod and stress at $x = 1.5$ units; shown in fig.1. Assume $E = 1$, $A = 1$, $\rho g = 1$, Assume suitable displacement field. [6M]

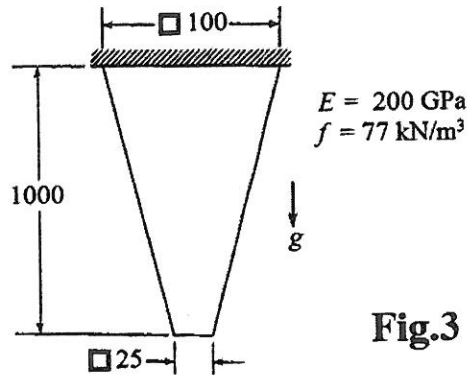


2. (a) Obtain the [D] matrix by using generalized Hooke's law for the following conditions (a) Plane stress and (b) plane strain [8 M]

(b) A displacement field $u = 1 + 3x + 4x^3 + 6$; $v = xy - 7x^2$ is imposed on the square element shown in Fig.2: Determine the strain vectors (two normal strains and one shear strain) [4 M]



3. For a uniformly varying square c/s taper bar shown in Fig.3 (all dimensions are in mm), find the following:
- Model the domain using three elements
 - Displacement of each node
 - Stress in each element
 - Support reaction



4. Explain the step by step FEM procedure in finding nodal displacements of 1D problems by considering point load, body load and traction load acting on the element.
5. (a) Differentiate between Isoparametric super parametric and sub parametric formulations.
 (b) Using Gauss 2x2 rule, evaluate the following integral and compare with exact solution.

$$\int_1^5 \int_1^5 (x^2 + xy^2) dx dy$$

6. (a) The nodal coordinates of axi-symmetric elasticity element is given in the table below. Obtain the strain displacement matrix ([B] matrix). [6M]

node	coordinate (cms)
r_i	1.0
z_i	1.0
r_j	3.0
z_j	1.0
r_k	3.0
z_k	4.0

- (b) For a given triangular element having coordinates (2, 2), (8, 7), and (2, 7). Determine the stresses in the element if nodal displacement vector, $q = [1 \ 1.5 \ 1.02 \ 0.8 \ 0 \ 0.5]^T$, Young's modulus, $E=70$ GPa, and poisson's ratio, $\mu = 0.25$, Consider a plane strain case problem. [6M]

7. (a) Derive consistent mass matrix of a 2 noded bar element. [6M]
 (b) Explain briefly about the characteristic polynomial technique for finding the mode shapes of a bar subjected to axial vibrations. [6 M]

8. A long bar of rectangular cross section, having thermal conductivity of $1.5 \text{ W/m } ^\circ\text{C}$ is subjected to the boundary conditions shown in the Fig. 4. Two opposite sides are maintained at a uniform

temperature of $180\text{ }^{\circ}\text{C}$; one side is insulated, and the remaining side is subjected to a convection process with $T_{\infty}=25\text{ }^{\circ}\text{C}$ and $h=50\text{ W/m}^2\text{ }^{\circ}\text{C}$. Determine the temperature distribution in the bar.

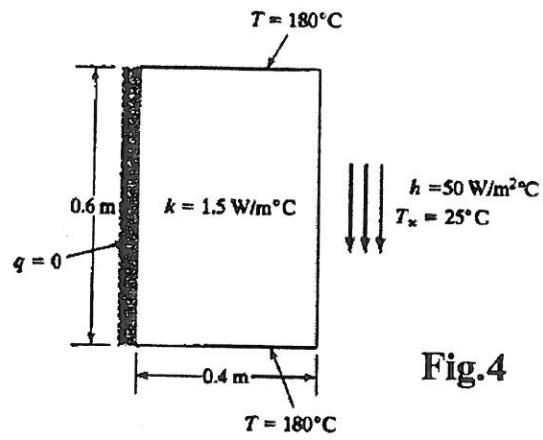


Fig.4



Subject Code: R16MTE201

M.Tech II Semester Regular Examinations, June/July-2017

COMPUTATIONAL FLUID DYNAMICS

(TE)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

1. (a) What is the need for classification of PDE and how do you classify second order PDE?

(b) Find second iteration for following algebra by using Gauss-Seidel method.

$$x + y + z = 6$$

$$2x + 3y + 5z = 32$$

$$1.5x + 2y - z = 7.5$$

2. (a) Write the finite difference formula with Taylor forward difference for 1-D steady state heat conduction equation. A rod with 1-D heat transfer at 100°C in one end and other end is at 30°C in steady state. The length of the rod is 12cm. Determine the temperature at every node in the rod by considering $\Delta x = 3\text{cm}$.

3. (a) write a short note on,

i) implicit method, ii) explicit method, iii) Crank-Nicolson method

(b) Explain the solution for an equation of 1-D unsteady heat conduction equation by explicit method,

$$\frac{\partial T}{\partial t} = C \frac{\partial^2 T}{\partial x^2}$$

4. (a) Explain following control volume scheme

i) node-centered, ii) cell-centered,

(b) Explain the nodal equation for following equation by considering minimum 6 nodal points

$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} = 0$$

5. Derive the equation for the solution of compressible flow through 1 - D Convergent - divergent nozzle and write the step by step algorithm.

6. (a) Explain the domain of influence for hyperbolic and elliptical equations.

(b) Write a short note on

i) Central difference scheme ii) upwind difference scheme

7. (a) Explain the difference between SIMPLE and SIMPLER methods.

(b) Explain the method of capturing the shock in dealing with the nozzle flows.

8. Explain the following terms,

i) Reynolds stress, ii) multi grid method, iii) density coupling



Subject Code: R16MDE201

M.Tech II Semester Regular Examinations, June/July-2017

CODING THEORY AND APPLICATIONS

(DE&CS)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

1. Describe the following terms related to Reliable Digital Data Transmission:
(a) Mutual Information (b) Entropy (c) Average Information (d) Logarithmic measure of information [12]
2. (a) The generator matrix for a (6, 3) block code is given below. Find all code vectors of this code.
 $G = [001101; 010011; 100110]$ [6M]
(b) Explain hamming codes with suitable example? [6M]
3. (a) The generator polynomial for a (15,7) cyclic code is $g(x) = 1+x^4+x^6+x^7+x^8$. Find the code vector (in systematic form) for the message polynomial $D(x) = x^2+x^3+x^4$. Assume that the first and last bits of the code vector $V(x)$ for $D(x) = x^2+x^3+x^4$ suffer Transmission errors. Find the syndrome of $V(x)$. [8M]
(b) Explain Encoding procedure of cyclic codes? [4M]
4. (a) Discuss the encoding process of convolution coding with an example? [6M]
(b) Give the comparison between linear block codes and convolutional codes. [6M]
5. (a) Discuss bounds on burst error correcting capabilities? [6M]
(b) Write about Burst -Error-Correcting Codes [6M]
6. (a) Explain Numbers for single and double error correction of BCH codes. [6M]
(b) Write about syndrome Computation and Iterative Algorithms? [6M]
7. Let X denote a random variable, and a, b denote arbitrary constants. If X is discrete, how are the entropies $H(ax)$ and $H(x+b)$ related to $H(x)$. What are the various types of errors? [12M]
8. (a) Briefly describe about the Code tree, Trellis and State Diagram for a Convolution Encoder. [6M]
(b) Draw the block diagram of error - trapping decoder for burst - error correcting codes and explain its decoding procedure. [6M]



Subject Code: R16MDS201

M.Tech II Semester Regular Examinations, June/July-2017

ADHOC AND WIRELESS SENSOR NETWORKS

(DS&CE)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) Explain the entities in the protocol stack of the about IEEE 802.11 standard.[6]
(b) Explain about CSMA/CA mechanism. [6]
2. (a) Explain the HIPERLAN/2 architecture and reference model. [6]
(b) Describe about Security in mobile IP. [6]
3. (a) Explain about the Design goals of a MAC Protocol for Ad Hoc Wireless Networks.[6]
(b) Describe the Hidden and Exposed Terminal Problems in wireless networks. [6]
4. (a) Explain about AODV Routing Protocol. [6]
(b) Differentiate between DSR and TORA Routing Protocols. [6]
5. (a) Differentiate between Table -Driven Routing Protocols and On-Demand Routing Protocols. [6]
(b) Explain Routing Protocols with Efficient Flooding Mechanisms. [6]
6. (a) Explain about Ad hoc Transport Protocol. [6]
(b) Explain about TCP with explicit Link failure Notification. [6]
7. (a) Explain Issues and Challenges In Providing Qos in Ad Hoc Wireless Networks.[6]
(b) Explain the Classification of Energy Management Schemes. [6]
8. List out and explain about the applications of wireless sensor networks. [12]



Subject Code: R16MCS201

M.Tech II Semester Regular Examinations, June/July-2017

INFORMATION SECURITY

(CS&E)

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions.
All questions carry EQUAL marks**

1. (a) What is a security attack? Explain different security mechanism. [6 + 6]
(b) Explain the characteristics of block and stream ciphers.

2. a) Compare the substitution method in DES and AES. Why do we need only one substitution table in AES, but several in DES? [6 + 6]
b) What are the merits of Output-Feedback (OFB) as compared to Cipher Feedback (CFB)?

- 3 (a) What is the significance of prime numbers in cryptography? [6 + 6]
(b) Define Euler's totient functions. Determine $\phi(27)$ and $\phi(35)$.

- 4 (a) Explain the Diffie-Hellman key exchange algorithm. [4 + 8]
(b) Consider a Diffie-Hellman scheme with a common prime $q = 11$ and a primitive root $\alpha = 2$
 - i) Show that 2 is primitive root of 11
 - ii) If user A has public key $Y_A = 9$, what is A's private key X_A ?
 - iii) If user B has public key $Y_B = 3$, What is the shared secret key K, shared with A

- 5 (a) What are the services provided by digital signatures? Explain if the following are provided [6 + 6]
 - i) Source Authentication ii) Data Integrity and iii) Source Non-Repudiation.
b) What is Birthday Attack on Digital Signatures? Can it be performed by an 'Outsider'?

6. (a) Explain key management and distribution in detail. [6 + 6]
(b) Explain X.509 directory authentication service

7. (a) What does SSL handshake establish? How is it performed? [6 + 6]
(b) What services are provided by IPsec? Explain. [6 M]

8. (a) Explain about Firewall Configuration? [6 + 6]
(b) What are the various types of firewalls?
