

AR19

CODE: 19MTE1014

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech II Semester Regular Examinations, December-2020

**ENERGY CONSERVATION AND MANAGEMENT
Thermal Engineering**

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

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|----|----|---|-----|
| 1. | a) | What is the importance and role of energy management? | 6M |
| | b) | Discuss in detail the role of energy manager in Manufacturing industry. | 6M |
| 2. | a) | Write a short note on Future power development trend in India. | 6M |
| | b) | Explain how power factor improvement helps to save energy. | 6M |
| 3. | a) | What is the importance of Energy Audit? | 6M |
| | b) | Layout the general procedure in Energy Audit? | 6M |
| 4. | a) | Discuss the various principles of Energy conservation. | 6M |
| | b) | Write a short note on critical assessment of energy usage in industries. | 6M |
| 5. | | Discuss the different methods of return on investment analysis for energy projects with suitable example. | 12M |
| 6. | a) | Explain payback period for energy conservation? | 6M |
| | b) | Explain the concept of present worth method and Internal rate of return. | 6M |
| 7. | | Explain the need and selection criteria for energy consultant and discuss in detail how the energy consultant help the industries in energy conservation strategies | 12M |
| 8. | a) | What do you mean by co-generation? Classify co-generation system & explain bottoming cycle with sketch. | 6M |
| | b) | What are the advantages of co-generation power plant? | 6M |

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CODE: 19MPE1017

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech. II Semester Regular Examinations, December, 2020

HVDC TRANSMISSION (PED)

Time: 3 Hours

Max Marks: 60

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

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|----|----|---|-----|
| 1. | a) | What are the different applications of D.C. transmission system? Explain them in detail? | 6M |
| | b) | Briefly explain the power handling capabilities of HVDC lines. | 6M |
| 2. | | Draw the schematic diagram of a typical HVDC converter station with 2 six pulse converter units and explain the function of each component. | 12M |
| 3. | a) | Explain the starting and stopping of HVDC link in detail? | 6M |
| | b) | Explain the Converter control characteristics used in HVDC? | 6M |
| 4. | | Write a short notes on (a) Over current protection b) Smoothing reactor (c) D.C. breakers | 12M |
| 5. | a) | Mention the configurations and impedance characteristics of various types of filters. | 6M |
| | b) | Explain the design aspects of single tuned filter. | 6M |
| 6. | a) | What is the importance of per unit system and explain? | 6M |
| | b) | Explain about the power flow analysis in AC power system? | |
| 7. | a) | With neat diagram explain the different kinds of HVDC links? | 6M |
| | b) | What are the uses of circuit breakers in HVDC systems? Explain in detail? | 6M |
| 8. | a) | Explain the effect of harmonics on HVDC system? | 6M |
| | b) | What are classifications of load flow power system busses? Explain any one bus? | 6M |

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CODE: 19MVL1019

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech II Semester Regular Examinations, December-2020

**SYSTEM MODELING & SIMULATION
(VLSI System Design)**

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. a) Explain the concept of discrete event simulation with an example. 6M
b) Illustrate the simulation of single server queuing system with the help of flow diagram. 6M
2. a) Discuss about General purpose simulation packages with an example. 6M
b) Write short notes on object oriented simulation & Mention its advantages and Disadvantages. 6M
3. a) Briefly explain the guidelines for determining the levels of model in detail 6M
b) Discuss about motion control models. 6M
4. a) Evaluate the procedure for modeling input signals with example. 6M
b) Explain about simulation diagrams in event driven models. 6M
5. a) Illustrate the procedure for simulation of the petrinet with example. 6M
b) Explain the process for the analysis of continuous- time Markov process. 6M
6. a) Write short notes on system encapsulation. 6M
b) Explain about modeling and simulation methodology. 6M
7. a) Explain the process involved in simulating queuing systems. 6M
b) Discuss about multiple servers. 6M
8. a) Define effective ratio? Derive the expression for effective ratio for uniform search? 6M
b) What is system identification? Explain about alpha/beta trackers. 6M

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CODE: 19MCS1018

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech II Semester Regular Examinations, December-2020

SOFTWARE TESTING METHODOLOGIES Computer Science and Engineering

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. a) Discuss about requirements, features and functionality of bugs 6M
b) List and explain five types of structural bugs 6M
2. a) Explain data flow model? Discuss various components of it? 6M
b) Discuss the following strategies of data flow testing with suitable examples 6M
1.All Predicate Uses (APU) strategy
2.All Computational(ACU) strategy
3. a) Demonstrate a nice domain? Give an example for nice two dimensional domain? 6M
b) Discuss in detail the nice domains and ugly domains with suitable examples ? 6M
4. a) Define path product, path expression and path sum ? Explain with an example 6M
b) Explain applications of path, path products and regular expressions 6M
5. a) Describe the procedure for specification validation using KV charts 6M
b) What are the components of a decision table explain in detail ? 6M
6. a) Explain the node reduction algorithm ? 6M
b) Explain about graph matrices and their applications ? 6M
7. a) List out various dichotomies and explain ? 6M
b) Explain the model of testing with a neat sketch ? 6M
8. a) What is meant by transaction flow testing? Explain it with an example. 6M
b) Explain data flow testing with an example ? 6M

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SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech II Semester Regular Examinations, December-2020

DESIGN OF PRE STRESSED CONCRETE STRUCTURES Structural Engineering

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. a) Explain about the necessity of using high strength concrete and high strength steel in prestressed concrete? Also, mention the minimum concrete strength required for the prestressed concrete as prescribed by the IS1343 code? 6
b) List the various types of tensioning devices? Explain with sketches 'Hoyers long line system of prestressing' 6
2. a) Write down the difference between pre tensioning and post tensioning methods of prestressing. 6
b) A prestressed concrete beam with a rectangular section 200 mm wide by 300 mm deep is used over an effective span of 6m to support an imposed load of 4 kN/m. The density of the concrete is 24 kN/m³. At the quarter span section of the beam, find the magnitude of the concentric prestressing force necessary for zero fiber stress at the soffit when the beam is fully loaded. 6
3. a) Explain the loss of prestress due to Elastic deformation of concrete? How do you compute the loss of stress due to elastic deformation of concrete in post tensioned members with several cables which are successively tensioned? 6
b) A prestressed concrete beam of section 300 mm x 450 mm, is prestressed with wires (area= 400 mm²) located at a constant eccentricity of 60 mm and carrying an initial stress of 1100 N/mm². The span of the beam is 12 m. Calculate the percentage loss of stress in wires if the beam is post tensioned. Use the following data. 6
M60 grade of concrete ; Relaxation of stress in steel = 5% of the initial stress; Shrinkage of concrete = 200×10^{-6} for post tensioning; Creep coefficient = 1.6; Slip at anchorage = 1 mm ; Frictional co-efficient for wave effect = 0.0015 per meter.
4. a) Briefly explain the mechanism by which prestressing force is transferred to concrete in pretensioned members 6
b) The deck of a prestressed concrete culvert is made up of a slab 300 mm thick. The slab is spanning over 8 m and supports a total uniformly distributed load comprising the dead and live loads of 15 kN/m². The grade of concrete is M35. The concrete slab is prestressed by straight cables each containing 10 high-tensile wires of 5 mm diameter stressed to 1200 N/mm² at a constant eccentricity of 120 mm. The cables are spaced at 250 mm intervals in the transverse direction. Estimate the instantaneous deflection of the slab at centre of span under prestress and imposed loads. 6

5. a) What are the benefits of continuous members in prestressed concrete structures. 6
- b) A pretensioned T-beam has a flange width of 300 mm and thickness of 200 mm. The rib is 150 mm wide and 350 mm deep. The beam is prestressed by a tendon cross-sectional area 200 mm^2 at an effective depth of 500 mm. If $f_{ck} = 50 \text{ N/mm}^2$ and $f_{pu} = 1600 \text{ N/mm}^2$, estimate the flexural strength of section using IS code specification 6
6. A Prestressed concrete beam 250mm wide and 600mm deep is subjected to an axial prestressing force of 1500 kN. Design the end block by Guyon's method. 12
7. a) Explain with sketches the variation of bond stress, stress in steel and concrete in transmission zone of pretensioned concrete. 6
- b) A prestressed concrete beam with a rectangular section 120 mm wide by 300 mm deep, a curved cable having an eccentricity of 100 mm at the centre of the span and reducing to zero at the supports is used, the effective force in the cable being 180 kN. Span 10 m. The beam supports a total uniformly distributed load of 5 kN/m which includes the self weight of the member. Estimate the percentage reduction in the principal tension in compression with the case of axial prestressing. 6
8. a) What are the advantages of using composite construction with prestressed and *in situ* concrete in structural members? 6
- b) A precast pretensioned beam of rectangular section has a breadth of 100 mm and depth of 200 mm. The beam with an effective span of 5 m, is prestressed by tendons with their centroid coinciding with the bottom kern. The initial prestress in the tendons is 150 kN. The loss of prestress may be assumed to be 15 per cent. The beam is incorporated in a composite T-beam by casting a top flange of breadth 400 mm and thickness 40 mm. If the composite beam supports a live load of 8 kN/m^2 , calculate the resultant stresses developed in the precast and in situ cast concrete assuming the pretensioned beam as (a) unpropped (b) propped during the casting of slab. Assume the same modulus of elasticity for concrete in precast beam and in situ cast slab. 6

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech. II Semester Supplementary Examinations, December-2020

**ANALYSIS OF DYNAMIC SYSTEMS
(PED)**

Time: 3 Hours

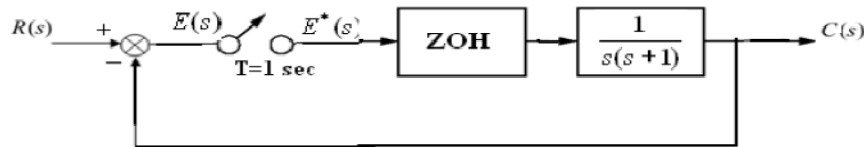
Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Write the advantages of digital control systems. [4M]
(b) Draw the block diagram of a digital control system and explain its various components. [8M]
2. (a) Solve the following difference equation by use of z-transform method. [8M]

$$y(k+2) + 3y(k+1) + 2y(k) = r(k), r(k) = (1)^k, y(0) = 1, y(k) = 0, k < 0$$

(b) Evaluate $Z^{-1} \left[\frac{3z^2 + z}{(5Z - 1)(5z + 2)} \right]$. [4M]
3. (a) State and explain Jury's stability test? [4M]
(b) Obtain the pulse transfer function for the system shown in figure. [8M]



4. Derive the Pulse transfer function of digital PID Controller. Also the design procedure of PID Controller. [12M]
5. (a) Consider the single input digital control system, [8M]

$$X(k+1) = \begin{bmatrix} 0 & 2 \\ -2 & -4 \end{bmatrix} X(k) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(k)$$
. Determine the state feedback matrix K such that the state feedback $u(k) = -KX(k)$, places the closed loop poles at $0.1 \pm j0.1$.
(b) Write a short note on full order state observers. [4M]
6. Obtain the discrete time state and output equation and pulse transfer function (when the sampling period $T = 1$ Sec) of the following continuous time equation. [12M]

$$G(s) = \frac{Y(s)}{U(s)} = \frac{1}{s(s+2)}$$
7. (a) For the given pulse transfer function $\frac{Y(z)}{U(z)} = \frac{z+1}{z^2+1.3z+0.4}$. Obtain the state space representation in phase variable form. [8M]
(b) Explain the conditions to be satisfied for reconstruction of sampled signal into continuous signal. [4M]
8. Explain the procedure of designing a state feedback controller through LQR. [12M]