AR16

CODE: 16MTE1017 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech., II Semester Regular Examinations, JULY, 2017

THERMAL AND NUCLEAR POWER PLANTS
(Elective-III)
(Thermal Engineering)

Time: 3 Hours Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Enumerate different sources of Energy and briefly discuss about them. 6M
   (b) Write a short note on Power Scenario in India. 6M

2. (a) Briefly discuss about (i) Coal and Ash circuit (ii) Feed water and Steam circuit used in Steam power plants with simplified sketches. 6M
   (b) Discuss the factors to be considered while selecting a site for Thermal power plant. 6M

3. (a) Draw a simple layout showing combined Brayton and Rankine cycle power plant and explain its operation with the help of T-s diagram. 6M
   (b) Discuss the advantages of combined cycle power plant. 6M

4. (a) List out essential components of a Nuclear reactor and discuss the functions and materials of each component. 6M
   (b) Briefly discuss the safety measures to be taken for Nuclear power plants 6M

5. (a) Explain briefly how do you do the cost analysis of a power plant? 6M
   (b) Write a short note on performance and operating characteristics of power plants. 6M

6. (a) List out the commonly used instruments in a power plant and discuss briefly how a Bourdon Tube pressure gauge works with a simplified sketch. 6M
   (b) Classify temperature measuring instruments and explain the working of Radiation pyrometer with the help of a neat diagram. 6M

7. The maximum demand of a power station is 96000 kW and daily load curve is described as follows: 12M

Time hours	0-6	6-8	8-12	12-14	14-18	18-22	22-24
Load(MW)	48	60	72	60	84	96	48

   (i) Determine the load factor of power station.
   (ii) What is the load factor of standby equipment rated at 30 MW that takes up all load in excess of 72 MW? Also calculate its use factor.

8. (a) Discuss briefly the following coal handling equipment (i) Belt conveyor (ii) Bucket elevator with the help of simplified sketches. 6M

   (b) Briefly explain working of CO_2 and O_2 gas analysers with the help of neat sketches 6M

AR16

CODE: 16MVL1014 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, July-2017

SYSTEM MODELING & SIMULATION
(Common to VLSI and DECS)

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Define model. Explain various types of simulation models with suitable examples	6M
	(b)	Explain simulation of Inventory System with suitable event diagram	6M
2.	(a)	Explain about general purpose simulation package with suitable diagrams	6 M
	(b)	Compare simulation packages and program languages	6M
3.	(a)	Write a short note on Object Oriented Simulation with an example	6M
	(b)	Explain Petri nets & analysis	6M
4.		List out various techniques for increasing the simulation validity and credibility & explain the quantitative techniques to test validity of a model in detail	12M
5.	(a)	Explain the procedure for modelling input signals with suitable example	6M
	(b)	Explain System Integration in detail.	6M
6.	(a)	Explain why are disturbance signals necessary in Simulation	6M
	(b)	Explain characteristics of Poisson distributio	6M
7.	(a)	Compare Discrete Time Markov processes & Continuous –Time Markov processes.	6M
	(b)	Explain the types of Queues in Event driven models	6M
8.	(a)	Explain the cyclic co-ordinates method for multidimensional optimization	6M
	(b)	Explain α/β tracker with suitable algorithm and diagram	6M

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CODE: 16MPE1013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, JULY, 2017

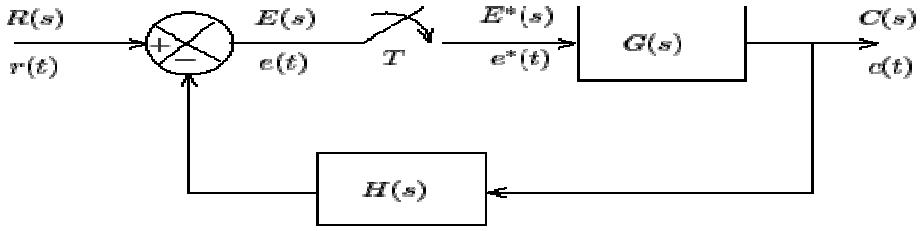
ANALYSIS OF DYNAMIC SYSTEMS
(PED)

Time: 3 Hours Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain Sampling theorem in Control systems. 5
   (b) Briefly explain the importance of A/D conversion in Digital Control Systems with an example. 7

2. (a) Obtain the Pulse Transfer Function for the following Data Control System as shown in figure below with G(s) = $\frac{1}{(s+2)}$& H(s) = 1. Assuming Sampling Time T =1sec. 8



   (b) Determine the Inverse Z- Transform for the function F(Z) = $\frac{z}{(z-2)^2(z+2)}$. 4

3. Check the controllability & Observability for the discrete system X(k+1) = $\begin{matrix}-1 & 0\\ 0 & -3\end{matrix}$ X(k) + $\begin{matrix}0\\1\end{matrix}$ U(k) and Y(k) =[2 0]X(k). 12

4. (a) Discuss the basic requirements to design a state feedback controller. 4
   (b) Determine the State feedback controller gain matrix K for the discrete system X(k+1) = $\begin{matrix}0 & 1\\ -1 & -3\end{matrix}$ X(k) + $\begin{matrix}0\\1\end{matrix}$ U(k) closed loop poles located at -2 & -5. 8

5. (a) Discuss briefly about the role of Bilinear Transformation technique in assessing the stability 4
   (b) Test the Stability of a Discrete system with a characteristic equation F(Z) = $z^4 + 0.5z^3 - 2z^2 + z + 0.5$=0 using Bilinear Transformation. 8

6. (a) Obtain the Zero Input Response of the discrete system X(k+1) = $\begin{matrix}0 & 1\\ -1 & -3\end{matrix}$ X(k) + $\begin{matrix}0\\1\end{matrix}$ U(k) with initial condition X(k) = $\begin{matrix}0.1\\0.2\end{matrix}$ 6
   (b) Determine the Zero state response for the discrete system subjected to unit impulse input for the system X(k+1) = $\begin{matrix}0 & 1\\ -1 & -3\end{matrix}$ X(k) + $\begin{matrix}0\\1\end{matrix}$ U(k) 6

7. Consider the system $X(k+1) = GX(k) + HU(k)$ 12

Y(k) =CX(k)+DU(k)

Where $G = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}, H = \begin{bmatrix} 0 \\ 1 \end{bmatrix} C = [0 \quad 1], D = 0$

Determine the following quantities for the discrete state model

i) State Transition Matrix

ii) Pulse transfer function

8. Explain in detail about the design aspects of LQG controller for a system 12

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CODE: 16MCS1015 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, July-2017

CRYPTOGRAPHY AND NETWORK SECURITY
(Computer Science and Engineering)

Time: 3 Hours Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	List and briefly explain passive and active security attacks.	[6M]
	(b)	Write short notes on i) Phishing ii) SQL injection.	[6M]
2.	(a)	What are the design criteria of DES that are intended to increase the diffusion of the algorithm?	[6M]
	(b)	Explain cipher feedback mode of operation.	[6M]
3.	(a)	List all the points on the elliptic curve E_{23} (1,1).	[4M]
	(b)	Users A and B use the Diffie-Hellman key exchange technique with a common prime q=13, and a primitive root $\alpha = 7$. i) Show that 7 is primitive root of 13. ii)If A has public key $Y_A = 5$, what is his private key X_A. iii) If B has public key $Y_B = 12$, what is the secret key shared with A.	[8M]
4.	(a)	List the steps involved in the authentication service in another realm.	[4M]
	(b)	What are the various services performed in PGP? Draw the flow charts for transmission and reception of PGP messages.	[8M]
5.	(a)	Draw the scope of ESP encryption and authentication for IP_V4.	[6M]
	(b)	Explain the SSL record protocol operation.	[6M]
6.		What is a firewall? Discuss any three types of firewalls.	[12M]
7.	(a)	Define diffusion and confusion.	[4M]
	(b)	Explain the operation of purchase request at customer and merchant for secure electronic transaction.	[8M]
8.	(a)	Describe the Blowfish algorithm.	[8M]
	(b)	What are the phases of a virus that go through during its life time?	[4M]

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CODE: 16MSE1015 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, JULY, 2017
PRESTRESSED CONCRETE
(Structural Engineering)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) What are the general principles of pre-tensioning and post-tensioning?
   (b) What are the methods and systems of pre-tensioning and post tensioning? Explain them in detail.

2. (a) Explain about Fressinet system with neat sketch.
   (b) What do you understand about the necessity of using high strength concrete and steel for pre-stressed concrete?

3. A rectangular concrete beam of cross-section 350 mm deep and 230 mm wide is pre-stressed by means of 15 wires of 6 mm diameter located 70 mm from the bottom of the beam and 3 wires of diameter 6 mm, 30 mm from the top. Assuming the pre-stress in the steel as 820 N/mm^2, calculate the stresses at the extreme fibres of the mid-span section when the beam is supporting its own weight over a span of 6 m. If a uniformly distributed live load of 7 kN/m is imposed, evaluate the maximum working stress in concrete. The density of concrete is 24 kN/m^3.

4. (a) Explain about loss of pre-stress due to elastic deformation & shrinkage.
   (b) A concrete beam is pre-stressed by a cable carrying an initial pre-stressing force of 300 kN. The cross sectional area of the wires in the cable is 300 mm^2. Calculate the % of loss of stress in the cable only due to Shrinkage of concrete using IS:1343 recommendations assuming the beam to be a pre-tensioned and post-tensioned, Assume E for steel 210 kN/mm^2

5. A pre-tensioned beam 230 mm wide and 350 mm deep is pre-stressed by 12 wires each of 6 mm diameter initially stressed to 1300 N/mm^2 with their centroids located 120 mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using IS: 1343-80 code and the following data:
   Relaxation of steel stress = 90 N/mm^2
   E_S = 200 kN/mm^2; E_C = 35 kN/mm^2
   Creep coefficient (φ) = 1.6
   Residual shrinkage strain = 3×10^{-4}

6. The support section of a pre-stressed concrete beam, 230 mm × 450 mm is required to support an ultimate shear force of 150 kN. The compressive pre-stress at the centroid al axis is 7.5 N/mm^2. The characteristic cube strength of concrete is 30 N/mm^2. The cover to the tension reinforcement is 50 mm. if the characteristic tensile strength of stirrups is 415 N/mm^2, Design suitable shear reinforcement using IS Code.

7. A post-tensioned pre-stressed concrete T-beam with un bonded tendons is made up of a
flange 300 mm wide by 150 mm thick and the width of the rib is 150 mm. The effective depth of the section is 320 mm. The beam is pre-stressed by 24 wires each of 5 mm diameter having a characteristic strength of 1650 N/mm^2. The effective stress after all losses is 900 N/mm^2. If the cube strength of concrete is 56 N/mm^2, estimate the flexural strength of the section using Indian code provisions. Assume (L/d) ratio = 20

8. A pre-stressed concrete beam supports a live load of 4 kN/m over a simply supped span of
8m. The beam has an I section with an overall depth of 400 mm. The thickness of the flange and web are 60 and 80 mm respectively. The width of flange is 200 mm. The beam is to be pre-stressed by an effective pre-stressing force of 235 kN with a suitable eccentricity such that the resultant stresses at soffit of the beam such at the centre of span is zero. (a) Find the eccentricity required for the force. (b) If the tendon is concentric, what should be the magnitude of the pre-stressing force for the resultant stress to be zero at the bottom fibre of the central span section

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