AR13

CODE: 13CE4033 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech II Semester Supplementary Examinations, July-2018

GROUND WATER DEVELOPMENT AND MANAGEMENT

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define aquiclude
   b) Define storage coefficient
   c) What is Leaky aquifer?
   d) Write down the relation between porosity, Specific yield and Specific retention
   e) Explain about Partially penetrating well
   f) What is unconfined aquifer?
   g) Distinguish between Open wells and tube wells
   h) What is Aquitard?
   i) What is Artesian well?
   j) What is Isopleth?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Give an account of classification of rocks based on porosity and permeability with suitable example. 6
   b) Explain the ground water hydrological cycle with a neat sketch. 6

(OR)

3. a) Explain the factors which influence ground water movement in the zone of Saturation? 6
   b) A 300 mm diameter well penetrates 25m below the static water-table. After 24 hours of pumping at 6000 litres/min, the water table in a test well at 90m is lowered by 0.53m and in a well 30m away the drawdown is 1.11m. What is the transmissibility of the aquifer? 6

UNIT-II

4. a) Derive an expression for discharge from a well fully penetrating a unconfined aquifer. 6
   b) Explain the unsteady flow towards a well with a neat sketch. 6

(OR)

5. a) Derive Theim's equation of steady ground water flow towards a well in a unconfined aquifer. 6
   b) What do you understand by recuperation test? Derive the equations used in the Test 6

UNIT-III

6. Explain any two methods of surface exploration 12

(OR)

7. Write a note on applications of aerial photogrammetry in subsurface investigations 12

UNIT-IV

8. a) How Remote Sensing are used in artificial recharge of ground water studies? 6
   b) State the favourable conditions for natural and artificial recharge? 6

(OR)

9. List out different methods of artificial recharge and explain any two methods 12

UNIT-V

10. a) What is saline water intrusion? Explain the occurrence of saline water Intrusion 6
    b) What is meant by conjunctive use of water 6

(OR)

11. Explain Ghyben-Herzberg relation between fresh water and saline water? 12

AR13

CODE: 13EE4030 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, July-2018
DIGITAL CONTROL SYSTEMS
(Elective-III)
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) List the advantages and dis advantages of digital control systems?
   b) Mention the types of sampling operations?
   c) What is zero-order hold?
   d) Write Properties of Z-transform?
   e) Draw the block diagram of LTI discrete time system of state space?
   f) Write the expression for state transition matrix?
   g) State the relation between state equation and Pulse transfer function ?
   h) Explain the terms i) state ii) state space ?
   i) What is meant by Controllability?
   j) List the methods used to test the stability of discrete time system.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) State and prove the sampling theorem? **6**
   b) Derive transfer functions for the following data hold circuits. **6**
   (i) Zero order hold circuit (ii) First order hold circuit

(OR)

3. a) Explain with neat diagram the sampling theorem . **6**
   b) Derive the Mathematical Analysis of the sampling process. **6**

UNIT-II

4. a) Obtain the Z-transform of the following **6**
   (i) $x(t) = \frac{1}{a}(1 - e^{-at})$
   (ii) $x(t) = t^2 e^{-at}$ where 'a' is constant.

   b) Consider $x(z)$ where **6**
   $$x(z) = \frac{2z^3 + z}{(z-2)^2(z-1)}$$
   obtain the inverse Z-transform of $x(z)$

(OR)

5. a) State and prove the following Z-Transform theorems **4**
   (i) Shifting theorem (left & right) (ii) Initial value theorem
   (iii) Final value theorem.
   b) Explain the three inverse z transform methods **8**

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CODE: 13EE4030 **SET-2**

UNIT-III

6. a) Consider the following state model of a continuous time system. **7**

$$\dot{x}(t) = \begin{bmatrix} -1 & -1 \\ 0 & -2 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$
$$y(t) = x_1(t)$$

Find its state transition matrix.

b) Write the properties of state transition matrix **5**

(OR)

7. a) Consider the following discrete transfer function. **7**

$$G(z) = \frac{0.17z + 0.04}{z^2 - 1.1z + 0.24}$$

Find out the state variable model in 3 different canonical forms.

b) Explain the various types of state space representation of a discrete time systems. **5**

UNIT-IV

8. a) Obtain the discrete time state and output equations of pulse transfer function (when the sampling period T=1 sec) of the following continuous time system **12**

$$G(s) = \frac{Y(s)}{U(s)} = \frac{1}{s(s+2)}$$

(OR)

9. a) Find the equivalent state equations for the discrete data control system, whose input –output relation is described by the difference equation y(k+2)+5y(k+1)+y(k)=u(k) **8**

b) Explain the relation between state equations and high order difference equations via canonical form. **4**

UNIT-V

10. a) State and explain Jury's stability test. [8] **6**

b) Using Jury's stability criterion find the range of K, for which the characteristic equation is $z^3 + Kz^2 + 1.5Kz - (K+1) = 0$ closed loop stable. **6**

(OR)

11. a) **Explain the Concepts of controllability and observability.** **6**

b) **Investigate the controllability and observability of the digital system.** **6**

$x(k+1) = \begin{bmatrix} -1 & 0 \\ 1 & -1 \end{bmatrix} x(k) + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u(k)$ and $y(k) = [1 \quad 1]\, x(k)$

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CODE: 13ME4034 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, July-2018
INDUSTRIAL AUTOMATION
(ELECTIVE-III)
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What are the different elements of automated system?
   b) Define closed-loop system.
   c) Define line balancing.
   d) What is PLC?
   e) What are the different levels in automation?
   f) Define Automated Production line.
   g) Give examples for point-to-point and not continuous path operations
   h) What is design process layout?
   i) Define productivity.
   j) State the applications of storage systems.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Explain the various strategies used in automation? 5M
   b) Describe the hydraulic and pneumatic components used in automation. 7M

(OR)

3. a) Write about tool changing devices controls. 6M
   b) What are the reasons for automation? 6M

UNIT-II

4. a) Define 'Lower bound approach' used in the analysis of transfer lines without storage buffer and explain with suitable example. 5M
   b) An eight-station assembly machine has an ideal cycle time of 6 sec. The fraction defect rate at each of the eight stations is p = O.015,and the system operates using the instantaneous control strategy, when a breakdown occurs. It takes 1 minute on an average, for the system to be put back into operation. Determine the production rate for the assembly machine, the yield of good product (final assemblies containing no defective components), and proportion uptime or the system 7M

(OR)

5. a) Describe the terms storage buffer and partial automation 4M
   b) A six-station assembly machine has an ideal cycle time = 9 sec. The cost of individual components is low and the fraction defect rate at each of the six stations is p = 0.02. When a breakdown occurs, it takes an average of 2 minutes for the system to be put back into operation. A decision must be made whether the system should be operated under memory control or instantaneous control. For both of these strategies, determine: (i) production rate of good assemblies. 8M
   (ii) yield of good product (proportion of final assemblies containing no defective components), and
   (iii) proportion of uptime of the assembly system. Which control would you recommend and why?

AR13

CODE: 13ME4034 **SET-1**

UNIT-III

6. a) What are the different types of manual assembly system 5M
   b) Assign the work elements to stations following any line balancing algorithm 7M

Element	T_{ek} (min.)	Immediate predecessors
1	30	-
2	18	1
3	48	1
4	12	2
5	6	2
6	36	3
7	24	4,5
8	30	3,5
9	18	7,8

(OR)

7. a) Discuss briefly about the following line balancing terms: 5M
   i) Precedence diagram
   ii) Manual Rational Work Element
   b) The total work content time of a certain assembly job is 7.8 min. The estimated downtime o the lines is D = 5% and the required production rate is Rp = 80 units/hr. 7M
   i) Determine the theoretical minimum number of workstations required to optimize the balance delay.
   (ii)For the number of stations determined in part (i), compute the balance delay d.

UNIT-IV

8. a) Explain about Identification & Tracking Systems. 6M
   b) With the help of neat sketch explain the Walking Beam transfer system 6M

(OR)

9. a) What is Material Handling? 4M
   b) What are the functions of material handling system? Explain the types of material handling systems and their applications 8M

UNIT-V

10. a) When and how is Rapid Prototyping used in Product Development? 6M
    b) Write the advantages of CMM 6M

(OR)

11. a) Explain the objectives of Concurrent Engineering. 6M
    b) Define 'Business Process Reengineering' and discuss how the model of Business Process Reengineering works 6M

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CODE: 13EC4037 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, July-2018

OPTICAL COMMUNICATIONS & NETWORKS
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1x10=10 M]**

1. a) Define Numerical aperture of a step index fiber.
   b) Name any two types of bending losses.
   c) What are the advantages of LED?
   d) What is the significance of intrinsic layer in PIN diodes?
   e) What is polarization Mode Dispersion (PMD)?
   f) What is Intra Modal Dispersion
   g) What are the different error sources in fiber optical receiver?
   h) What is Probability of error?
   i) Mention the three types of fiber couplers.
   j) What are splices?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Define a mode? Explain mode theory in optical fiber? **6M**
   b) A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47.Determine: (a) the critical angle at the core–cladding interface; (b) the NA for the fiber; (c) the acceptance angle in air for the fiber. **6M**

(OR)

3. a) Explain what is meant by a graded index optical fiber, giving an expression for the possible refractive index profile. **6M**
   b) Explain about bending losses in optical fiber and how they can minimize? **6M**

UNIT-II

4. a) Draw the structure of surface emitting LEDs and explain its operation. **6M**
   b) Explain the working principle of distributed feedback laser diode. **6M**

(OR)

5. a) Explain the temperature effect on avalanche gain. **6M**
   b) Compare different types of Photo detectors. **6M**

UNIT-III

6. a) Explain the intermodal dispersion measurement technique in time domain. **7M**
   b) A 6 km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive index difference of 1%. Estimate:
   (a) the delay difference between the slowest and fastest modes at the fiber output;
   (b) the rms pulse broadening due to intermodal dispersion on the link. **5M**

(OR)

7. a) Explain the concept of Material dispersion. **6M**
   b) Explain how an optical power can be launched into a fiber. **6M**

UNIT-IV

8. a) Explain optical analog receiver. **6M**
   b) Explain rise time budget in an optical link with example. **6M**

(OR)

9. a) Explain considerations and component choice for optical system design. **6M**
   b) Explain about link power budget with example. **6M**

UNIT-V

10. a) Explain WDM necessity in Optical communication system. **6M**
    b) Describe what is meant by the fusion splicing of optical fibers. Discuss the advantages and drawbacks of this jointing technique. **6M**

(OR)

11. a) Write short notes on Optical switches and isolators. **6M**
    b) With a schematic structure, explain about semiconductor optical amplifier **6M**

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