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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : M.Tech III Sem Regular & Supplementary Examinations Jan-2025
Course Name : Rehabilitation and Retrofitting of Structures
Course Code : B420415
Branch : Structural Engineering
Date & Session : 16-01-2025 AN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. What are the basic symptoms of distress in concrete structures? 1 M
2. What are the causes for deterioration and distress in structures? 1 M
3. How is Cathodic protection done to steel structures 1 M
4. State the methods to improve the corrosion resistance of RC structures. 1 M
5. What is a conditional survey? 1 M
6. What is the necessity of damage assessment of any structure? 1 M
7. Why and how underpinning is done to structures 1 M
8. Briefly explain the process of shortcreting. 1 M
9. Name some common applications of Instrumentation in structures. 1 M
10. What are the various crack repair methods? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss in detail the various construction and design deficiencies which cause distress in the RCC structures. 10M

OR

11. B). Explain any two chemical causes of concrete structure damage. 10M

12. A). Explain about: 10M

(i) Phenomenon of desiccation in structures.

(ii) Fire rating of structures.

OR

12. B). List the causes of design and construction errors in construction. Explain any two causes. 10M

13. A). i) Explain the procedure for the damage assessment of structures. 5M

ii) Explain the various methods of diagnosis of distress in structures. 5M

OR

13. B). Illustrate with sketches, any two standard non-destructive tests carried out for the assessment of concrete strength as per IS code standards. 10M

14. A). Explain the various methods of repair of underwater structures. 10M

OR

14. B). Explain the different methods of strengthening reinforced concrete beams. 10M

(P.T.O.)

15. A). Explain different types of fiber-reinforced polymer composites used for retrofitting. 10M

OR

15. B). Explain the instrumentation of a building in connection with monitoring the health of structures. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : M.Tech III Sem Regular & Supplementary Examinations Jan-2025
Course Name : Reliability Engineering
Course Code : B443417
Branch : Power Electronics
Date & Session : 16-01-2025 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define the term of reliability. 1 M
2. What is Reliability Function? 1 M
3. Draw the bath tub curve. 1 M
4. Define Hazard function. 1 M
5. Define Path and Cutset. 1 M
6. Classify of Engineering Systems. 1 M
7. State the difference between reliability and quality. 1 M
8. What are the types of rate concepts? 1 M
9. What are the Reliability Parameters? 1 M
10. Write a short note on MTBF. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the different types of random variables with examples. 10M
- OR**
11. B). Derive the mathematical expectation for binominal distribution. 10M
12. A). i) Explain the terms failure rate, MTBF and MTTF. 5M
ii) Analyze the failure modes of components with respect to common life characteristic curve. 5M
- OR**
12. B). Summarize the characteristics and functions of a bath tub curve and relate them to a concurrent example. 10M
13. A). Explain briefly about Reliability Evaluation of Complex Systems. 10M
- OR**
13. B). Explain briefly about Minimal Cutset and Decomposition Methods. 10M
14. A). Explain briefly about rate concepts by Markov process. 10M
- OR**
14. B). Find out the reliability using Markov analysis for load sharing units. 10M

(P.T.O.)

15. A). A generator system consists of primary and a standby unit. The primary fails at a constant rate of 2 per month, and the stand by system fails only when online at a constant rate of 4 per month. Repair can begin only when both units have failed. Both units are repaired at the same time with an MTTR of 20 days. Derive the steady state equations for the state probabilities and solve for the system availability. 10M

OR

15. B). Explain briefly about Frequency & duration concepts. 10M

14. A). Explain the role of Email for Embedded systems. 10M

OR

14. B). Explain the concept of exchanging messages using UDP and TCP protocols. 10M

15. A). What are the key challenges in achieving time synchronization in wireless sensor networks, especially with respect to energy consumption, node mobility, and clock drift? 10M

OR

15. B). Explain the concept of data-centric routing in wireless sensor networks. How does it differ from traditional routing approaches that rely on node addresses? 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : M.Tech III Sem Regular & Supplementary Examinations Jan-2025
Course Name : Digital Forensics
Course Code : B458413
Branch : Computer Science & Engineering
Date & Session : 16-01-2025 AN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define forensics science. 1 M
2. What is Digital forensics? 1 M
3. List out the steps for processing computer evidence. 1 M
4. What is a Chain of custody? 1 M
5. Define probable cause. 1 M
6. List parts of gathering evidence 1 M
7. What are the different types of networks? 1 M
8. What is the purpose of an Intrusion Detection System (IDS)? 1 M
9. What is subscriber identity Modules in mobile devices? 1 M
10. Differentiate track points and track logs in GPS devices. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the role of the forensic examiner in the judicial system. 10M
- OR**
11. B). Explain the Investigation Triad. 10M
12. A). Discuss the five rules of collecting electronic evidence 10M
- OR**
12. B). Explain how to secure a computer incident or a crime scene. 10M
13. A). Explain evidence management and presentation process. 10M
- OR**
13. B). Explain the importance of a forensic mindset and define the workload of law enforcement. 10M
14. A). Discuss the open-source security tools uses for network forensic analysis. 10M
- OR**
14. B). Explain the need for collection of Network evidence and discuss the investigations process. 10M
15. A). What do you understand by mobile device forensics? Explain. 10M
- OR**
15. B). Explain the amendment of IT Act 2008 for legal aspects of digital forensics. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : M.Tech III Sem Regular & Supplementary Examinations Jan-2025

Course Name : Optimization Techniques

Course Code : B458601

Branch : SE/ CSE

Date & Session : 18-01-2025 AN

Duration: 3 hours

Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Classify Optimization Problems. 1 M
2. Define Design Constraints. 1 M
3. When does degeneracy occur in Transportation Problem? 1 M
4. Bring out one point the relation between LPP and Transportation problem. 1 M
5. Write about Kuhn -Tucker conditions. 1 M
6. Write formula for Fibonacci Method. 1 M
7. What do you understand by the term 'penalty'? 1 M
8. Differentiate between the interior and exterior penalty function methods. 1 M
9. List any two applications of dynamic programming. 1 M
10. Write any two characteristics of dynamic programming. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). State the Optimization problem. Classify & explain various types of optimization problems with examples. 10M

OR

11. B). Solve the following LPP by Graphical Method 10M

$$\text{Minimize } Z = 20 X_1 + 10 X_2$$

$$\text{Subject to Constraints : } X_1 + 2X_2 \leq 40$$

$$3X_1 + X_2 \geq 30$$

$$4X_1 + 3X_2 \geq 60$$

$$\text{Non -Negativity : } X_1, X_2 \geq 0$$

12. A). Find the Initial Basic Feasible Solution of the following transportation problem by VAM method 10M

Source	Destination				Availability
	D1	D2	D3	D4	
O1	1	2	1	4	20
O2	3	3	2	1	50
O3	4	2	5	9	30
Demand	10	40	30	20	

OR

12. B). Explain Special cases in Transportation Problem and also explain degeneracy case in Transport Problem. 10M

(P.T.O.)

13. A). Minimize $f(x) = .65 - \left(\frac{.75}{1+x^2}\right) - .65 \times \tan^{-1}\left(\frac{1}{x}\right)$ in the interval $[0,3]$ by the Fibonacci method using $n = 6$? 10M

OR

13. B). Solve the following **non-LPP** by Lagrangian Multiplier method? 10M

Min Z = $4X_1^2 + 2X_2^2 + X_3^2 - 4X_1 X_2$

stc: $X_1 + X_2 + X_3 = 15$

$2X_1 - X_2 + 2X_3 = 20$

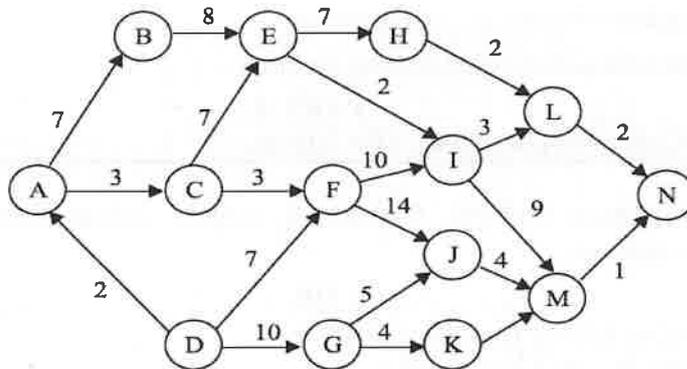
$X_1 X_2 X_3 \geq 0$

14. A). Max $f(x) = x_1^2 - x_1 x_2 + 3x_2^2$. Use the univariant method by taking starting point as $(1,2)$. Show Calculations for only two cycles? 10M

OR

14. B). Min $f(x_1, x_2) = 4x_1 + 6x_2 - 2x_1^2 - 2x_2^2 - 2x_1 x_2 + 1 - 2x_2^2$ Using the steepest descent method. Take Starting point as $(0, 0)^T$. 10M

15. A). Find the longest path between points A and N by solving the dynamic programming problem given in Figure. 10M



OR

15. B). Explain the computational procedure used in dynamic programming. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : M.Tech III Sem Regular & Supplementary Examinations Jan-2025
Course Name : Disaster Management
Course Code : B420601
Branch : PE/ ES
Date & Session : 18-01-2025 AN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Differentiate between hazard and risk. 1 M
2. Give examples of Manmade disasters. 1 M
3. Considering the pandemic due to CoViD-19, what would be the recovery measures? 1 M
4. Define famine. 1 M
5. Differentiate rescue and preparedness. 1 M
6. What are the steps in the process of disaster preparedness? 1 M
7. Tell the purpose of Initial Damage Assessment. 1 M
8. What monitoring systems are used for tracing the path of cyclones? 1 M
9. What are the various conservation measures of soil erosion? 1 M
10. Discuss the different stages of relief process. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Describe the different type of natural and man induced disasters. 10M
- OR**
11. B). What are the causes for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamil Nadu? Specify its epicenter and magnitude. 10M
12. A). What are the different types of droughts? Suggest relief and rehabilitation measures for any two types of droughts. 10M
- OR**
12. B). Identify the Landslide-prone regions of India and suggest some measures to mitigate the disasters caused by these. 10M
13. A). Figure out the benefits of GIS in disaster management and What are the steps involved in GIS for disaster management? 10M
- OR**
13. B). Explain the concept of disaster preparedness and throw light on disaster preparedness measures. 10M
14. A). 'Community-based disaster preparedness plan needs to take cognizance of different types of activities needed at various stages of disaster management'. Examine. 10M
- OR**
14. B). Develop how risk information is used for Disaster Risk Management and explain about risk communication. 10M

(P.T.O.)

15. A). Relate the building collapse during earthquake to impact of earthquake disaster and explain both pre and post disaster measures undertaken to mitigate the sufferings of people in an earthquake situation. 10M

OR

15. B). What was the type of flood that affected Hyderabad recently? Critically evaluate the risk reduction strategies followed during the disaster? 10M
