H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Rehabilitation and Retrofitting of Structures**
Course Code : **B420415**
Branch : **Structural Engineering**
Date & Session : **19-01-2026 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 distress and its classification in concrete structures. 1 M
2. What are shrinkage cracks? State any one preventive measure. 1 M
3. Mention two chemical causes leading to deterioration of concrete. 1 M
4. Write short note on carbonation and its effect on durability. 1 M
5. State any two Non-Destructive Testing (NDT) methods and their purpose. 1 M
6. What is the importance of visual inspection before rehabilitation? 1 M
7. Define shotcreting and list one of its applications. 1 M
8. What are Epoxy mortars? Mention one of their uses. 1 M
9. Give any two advantages of using FRP in structural retrofitting. 1 M
10. Define Structural Health Monitoring (SHM). 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Discuss the various types of cracks observed in RCC structures and their causes. How can periodic inspection reduce the occurrence of structural distress? 10M

OR

11. B). Explain the various causes of distress in reinforced concrete structures. 10M

12. A). Describe the process of corrosion initiation and propagation in steel reinforcement. Suggest appropriate corrosion control methods in marine environments. 10M

OR

12. B). Explain the effects of alkali-aggregate reaction and sulphate attack on concrete. What preventive measures can be taken during design and construction? 10M

13. A). Illustrate the use of ultrasonic pulse velocity and rebound hammer tests for concrete evaluation. Discuss the interpretation of results and their limitations. 10M

OR

13. B). Explain the role of structural auditing and monitoring in assessing the service life of structures. List steps for preparing a rehabilitation plan. 10M

14. A). Discuss the materials used in repair such as polymer concrete, micro-silica concrete, and epoxy resin mortars. Explain their characteristics and applications. 10M

OR

14. B). Explain different retrofitting techniques for columns and beams. Include diagrams for steel jacketing and fiber wrapping. 10M

(P.T.O.)

15. A). Explain how smart materials and sensors are used for monitoring structural health. Discuss their working principles and advantages. 10M

OR

15. B). Describe the performance evaluation of repaired structures and methods to ensure serviceability. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Reliability Engineering**
Course Code : **B443417**
Branch : **Power Electronics**
Date & Session : **19-01-2026 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 Random variable. 1 M
2. Name any two Properties of Binomial Distribution. 1 M
3. Draw Bathtub curve. 1 M
4. Define MTBF. 1 M
5. What happens to the reliability of a parallel system if one component fails? 1 M
6. Define Path and Cutset. 1 M
7. What is a steady-state probability in a Markov chain? 1 M
8. What is the difference between a transition probability and a transition rate? 1 M
9. What does a multi-state system represent? 1 M
10. What is the basic principle of network reduction in reliability analysis? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). How would you define Reliability and explain what are the important aspects of the definition of reliability needs careful consideration? 10M

OR

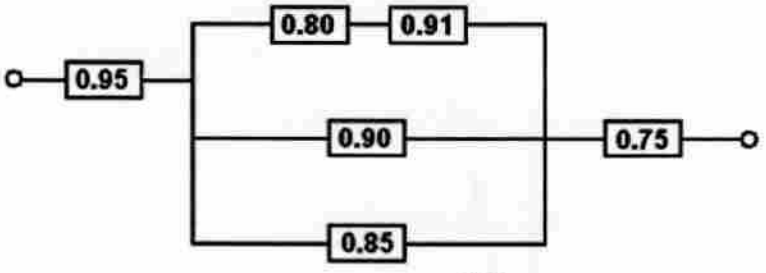
11. B). Discuss about reliability prediction based on weibull distribution. 10M

12. A). Deduce the expression for reliability function in terms of Hazard rate. 10M

OR

12. B). Explain how the reliability of a product is impacted by the different modes of failure in systems. 10M

13. A). Evaluate the unreliability of the system for the component reliabilities shown in the figure. 10M



OR

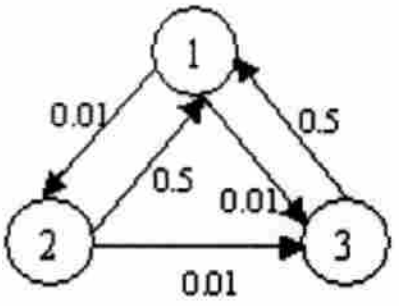
13. B). Explian the Series and parrallle systems to evaluate the reliability. 10M

(P.T.O..)

14. A). Define a discrete-time Markov chain. Explain its properties with an example. 10M

OR

14. B). The state space diagram and transition rates in f/yr of a continuous Markov process are shown in Figure. Evaluate the steady state probability (Limiting state Probability) of each state. 10M



15. A). Describe the frequency balance approach for multi-state systems with the help of a flow diagram. 10M

OR

15. B). Define common mode failures. Explain their impact on overall system reliability. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Embedded Networks**
Course Code : **B455413**
Branch : **Embedded Systems**
Date & Session : **19-01-2026 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.	Compare serial and parallel communication protocols.	1 M
2.	List the serial communication control signals.	1 M
3.	Outline the CAN bus applications.	1 M
4.	Illustrate the purpose of USB enumeration.	1 M
5.	Summarize the features of Ethernet.	1 M
6.	What are the uses of Ethernet?	1 M
7.	Infer the applications of TCP.	1 M
8.	Distinguish between Email and FTP	1 M
9.	Define Wireless Sensor Network.	1 M
10.	Summarize the Common network topologies in Wireless Sensor Networks.	1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Explain SPI communication protocol and its interfacing techniques with neat diagram.	10M
	OR	
11. B).	Describe the PCI Communication Protocol briefly and compare with I2C.	10M
12. A).	Explain USB bus protocol with neat diagram.	10M
	OR	
12. B).	Summarize the CAN bus interfacing with PIC microcontroller with neat sketch.	10M
13. A).	Explain the elements of a network and how to build a network using Ethernet in detail.	10M
	OR	
13. B).	Analyze Ethernet Controllers using the internet in local and internet communications.	10M
14. A).	Distinguish between serving web pages with dynamic data and serving web pages that respond to user input.	10M
	OR	
14. B).	Outline the File Transfer Protocol briefly.	10M
15. A).	Evaluate the Energy efficient MAC protocols in detail.	10M
	OR	
15. B).	Explain Data Centric routing in wireless sensor networks briefly.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Digital Forensics**
Course Code : **B458413**
Branch : **Computer Science & Engineering**
Date & Session : **19-01-2026 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. List out any two tools used for Digital Forensic. 1 M
2. What is computer Crime? 1 M
3. What is retrieved data? 1 M
4. What are the rules of evidence? 1 M
5. What are the two types of evidences? 1 M
6. What are the tools used in operating system forensics? 1 M
7. What is network forensic? 1 M
8. Which computer is mostly used for forensic workstation? 1 M
9. What is the use of IT ACT 2000 ? 1 M
10. Name some mobile forensic software tools. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain different types of computer forensic and network forensic services. 10M

OR

11. B). i) What are the benefits of professional forensics methodology? Explain. 5M
ii) List out different Computer Crimes. 5M

12. A). What to collect Evidence and Explain Types of Evidence? What are the rules of evidence? 10M

OR

12. B). Explain the role of Data Back up in Data Recovery. Also explain the data recovery solutions. 10M

13. A). How to Create and manage shared folders using operating system. 10M

OR

13. B). i) What is the Importance of the forensic mindset? 5M
ii) Define the workload of law enforcement and explain in detail. 5M

14. A). Explain about computer forensic workstation in detail. 10M

OR

14. B). Explain about how to secure a network also write about tools and techniques of Network Forensic. 10M

15. A). What is mobile forensic. Explain evidences in a Mobile device forensics. 10M

OR

15. B). Explain the recent trends in mobile forensic techniques. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Optimization Techniques**
Course Code : **B458601**
Branch : **SE/ CSE**
Date & Session : **21-01-2026 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. Write the standard form of linear programming problem. 1 M
2. Define convex set. 1 M
3. What is traveling salesman problem? 1 M
4. Differentiate between transportation problem and an assignment problem. 1 M
5. How do you test positive definite of a square matrix? 1 M
6. Define unimodal function. 1 M
7. What is the main difference between direct search methods and descent methods? 1 M
8. Define gradient of a function. 1 M
9. What is multistage decision problem? 1 M
10. Write the mathematical formulation of dynamic programming problem. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Solve the following system of equation using pivot operations 10M

$$6x_1 - 2x_2 + 3x_3 = 11$$
$$4x_1 + 7x_2 + x_3 = 21$$
$$5x_1 + 8x_2 + 9x_3 = 48$$

OR

11. B). Minimize $f = -3x_1 - 2x_2$ 10M
Subject to $x_1 - x_2 \leq 1$; $3x_1 - 2x_2 \leq 6$ and $x_1, x_2 \geq 0$.

12. A). A company has factories F_1, F_2 and F_3 that supply products to warehouses W_1, W_2 and W_3. Weekly factory capacities, Weekly warehouse requirements and unit shipping costs (in rupees) are as follows 10M

Factories	Warehouses			Suppl
	W_1	W_2	W_3	y
F_1	16	20	12	200
F_2	14	8	18	160
F_3	26	24	16	90
Demand	180	120	150	

Determine the optimal transportation schedule to the company.

(P.T.O..)

OR

12. B). Five men are available to do five jobs. From past records, the time (in hours) that each man takes to do each job is known and is given in the following table. 10M

		Jobs				
		I	II	III	IV	V
Men	A	2	9	2	7	1
	B	6	8	7	6	1
	C	4	6	5	3	1
	D	4	2	7	3	1
	E	5	3	9	5	1

Find out how men should be assigned the jobs in way that will minimize the total time taken.

13. A). Solve the following non-linear programming problem 10M

$$\text{Min}Z = x_1^2 + x_2^2 + x_3^2$$
$$\text{subject to } x_1 + x_2 + 3x_3 = 2$$
$$5x_1 + 2x_2 + x_3 = 5 \text{ and } x_1, x_2, x_3 \geq 0.$$

OR

13. B). Find the minimum of $f(x) = x(x - 1.5)$ by Fibonacci search method in the interval [0, 5], take $N = 6$. 10M

14. A). Minimize $f(x_1, x_2) = -8x_1 + 4x_1^2 - 5x_1x_2 + 3x_2^2$ starting from the point $\begin{pmatrix}0\\0\end{pmatrix}$ by Powell's method. 10M

OR

14. B). Draw the flow chart for the Fletcher and Jeeves method and explain about each block. 10M

15. A). Classify the types of multistage decision problems. 10M

OR

15. B). Explain the concept of sub optimization and the principle of optimality. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **M.Tech III Semester Regular & Supplementary Examinations January-2026**
Course Name : **Disaster Management**
Course Code : **B420601**
Branch : **PE/ ES**
Date & Session : **21-01-2026 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 is nuclear hazard? 1 M
2. What the different types of man induced disasters? 1 M
3. Write about the causes of landslides. 1 M
4. Explain the impact of volcanic eruptions on environment. 1 M
5. Define disaster preparedness. 1 M
6. What is the role of media in disaster preparedness? 1 M
7. Define the term risk assessment. 1 M
8. Give the strategies in Disaster Risk Reduction. 1 M
9. What is disaster mitigation? 1 M
10. What are the uses of state disaster management plan? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Define 'disaster' and discuss the various types of disasters. 10M

OR

11. B). Distinguish between the terms hazards and disaster. List the classification of hazard in detail with suitable examples. 10M

12. A). Define earthquake and explain in detail about the types, causes and preventive measures of earthquake. 10M

OR

12. B). Explain briefly how the manmade hazards can be controlled and regulated. 10M

13. A). Explain the development plans adopted in India for disaster management. 10M

OR

13. B). Explain disaster preparedness and bring out its key components. 10M

14. A). Enumerate the various steps for strengthening the capacity for reducing risk. 10M

OR

14. B). Explain the industrial safety measures protocol for disaster management. 10M

15. A). Explain the any one mitigation program adopted in India to overcome a disaster. 10M

OR

15. B). Discuss various emerging trends in disaster mitigation. 10M

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