Duration: 3hrs   **[Max Marks:80]**

Instructions: (1) Question No 1 is **Compulsory**.
                (2) Attempt any **three** questions out of the remaining five.
                (3) **Each** full question carries **20** marks.

1		Answer any **FOUR**	
	a	What are the essential parameters for the selection of a good repair material?	**(05)**
	b	Discuss the significance of routine maintenance of structures	**(05)**
	c	Briefly explain Cathodic Protection	**(05)**
	d	What are the precautions to be taken for repair and rehabilitation of heritage structures	**(05)**
	e	Enlist the common design and fabrication errors in steel structures	**(05)**
2	**a**	Explain Ultrasonic Pulse Velocity method for diagnosis and assessment of deterioration in concrete structures	**(10)**
	b	List out the applications of ferrocement as a repair material	**(05)**
	c	What is carbonation? What are the factors affecting it?	**(05)**
3	**a**	Briefly explain methods to repair and rehabilitate structures having foundation distress	**(10)**
	b	What are the causes of lamellar tearing in steel structures and how it can be prevented?	**(05)**
	c	Explain passivators and chemical rust removers	**(05)**
4	**a**	Describe in detail the plate bonding technique and suggest its suitability	**(10)**
	b	Briefly explain	**(10)**
		(i) Injection grouting	
		(ii) Epoxy resins	
5	**a**	Suggest some methods adopted for seismic retrofitting of RC structures. Explain each method in detail	**(10)**
	b	Discuss the causes of failure in steel structures?	**(05)**
	c	Write short note on routing and sealing of cracks	**(05)**
6		Briefly explain the following:	
	a	Fibre wrapping technique	**(05)**
	b	Chloride Penetration Test	**(05)**
	c	Polymer modified cement mortar	**(05)**
	d	Plastic shrinkage cracks	**(05)**

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Duration: 3 hrs   **[Max Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
       (2) Attempt any three questions out of the remaining five.
       (3) All questions carry equal marks.
       (4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	**[20]**
	a	Explain briefly roles and duties of Environmental manager?	
	b	What is meant by disaster? Differentiate between Industrial Disaster and Man Made Disaster.	
	c	What is the scope of Environment Management?	
	d	With reference to the concept of sustainability, write short notes on the 'Triple Bottom Line approach'.	
	e	Give a brief account of the Factories Act.	
2	a	Discuss briefly about the standards in ISO 14000 family of standards.	**[10]**
	b	Discuss in detail about Environmental issues relevant to India.	**[10]**
3	a	What is Corporate Environmental Responsibility? Explain it.	**[10]**
	b	Discuss the cause of Global warming. Explain briefly its effects and control measures.	**[10]**
4	a	With reference to EMS, explain PDCA cycle with neat diagram.	**[10]**
	b	Discuss the role of Central Pollution Control Board (CPCB) in pollution monitoring.	**[10]**
5	a	What do you understand by the term "Biodiversity"? Discuss about the factors causing loss of biodiversity.	**[10]**
	b	Discuss the salient features of the Water (Prevention and Control of Pollution) Act.	**[10]**
6	a	What is the concept of carrying capacity? What is meant by habitat? Elaborate.	**[10]**
	b	Explain the concept of Total Quality Environmental Management (TQEM)?	**[10]**

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Time: 3 hours   **(80 Marks)**

Note:

  i)   **Q. 1 is compulsory.**
  ii)   **Attempt any three out of remaining questions.**
  iii)   **Figures to right indicates full marks.**
  iv)   **Assume Suitable data if required.**

Q.1 a) Following table shows the activities, their interdependence and the durations.

Activity	A	B	C	D	E	F	G	H
Preceding activity	-	-	-	A	A	B, D	C, E	F, G
Duration (days)	5	4	9	7	5	7	6	5

Draw A-O-A network. Identify critical path. Determine Project duration. Work out all activity times and floats   -10M

b) Explain the contribution of Mr. Henry Fayol toward the development of management
   thoughts.   - 10M

Q.2 a) A small project is composed of eight activities as given below:

  i)   Draw project network
  ii)   Find expected duration, standard deviation and variance of all activities.
  iii)   What is the probability that the project will be completed in 27 days.
  iv)   What is the probability of completing the project 5 days before scheduled duration?
                                                                                                   - 10 M

Activity		Estimated duration (days)		
i	j	t_0	t_m	t_p
1	2	3	5	7
1	3	5	7	19
1	4	2	5	9
2	5	1	2	3
3	4	2	4	6
3	5	3	5	7
4	6	7	12	18
5	6	6	9	12

Z	-3.0	-2.0	-1.0	0	+1.0	+2.0	+3.0
P (%)	0.13	2.28	15.87	50	84.13	97.72	99.87

b) What do you understand by "Inventory Control?
   Also explain A-B-C Analysis in detail.   -10 M.

41824   Page **1** of **2**

Q.3a) For a small project, prepare a resource histogram based on EST and LST schedule. Comment which schedule will you prefer? Why? -10 M

Activity	A	B	C	D	E
Preceding activity	--	--	A	B	C, D
Duration (days)	7	5	4	5	3
Labours required	3	4	5	3	2

b) What is Resource Allocation? Also explain methods of Resource Allocation. -10 M

Q.4) a) Find out optimum cost & optimum duration for the project whose details are given below.   Indirect Cost of Project = Rs.1500/day -10 M

Activity	Duration (days)		Cost (Rupees)	
	Normal	Crash	Normal	Crash
A (1-2)	7	5	12000	16000
B (1-4)	9	6	20000	27000
C (1-3)	4	3	7000	9000
D (2-4)	6	4	15000	18000
E (3-4)	5	3	5000	8000
F (4-5)	7	4	10000	16000

b) What do you understand by time overrun and cost overrun of a project? Explain the important causes, adverse effects and the corrective measures of time overrun and cost overrun.
-10 M

Q.5 a) What is an updating of network? Also explain stepwise procedure of Updating. -10 M

 b) Explain: - 1) Minimum Wages Act 2) Workmen's Compensation Act -10 M

Q.6) Write notes on followings **(Any five)** - 20 M

1) Dummy activity & it's purposes
2) Contribution of F. W. Taylor
3) Network Rules
4) Economic Order Quantity
5) Injury Frequency Rate & Injury Severity Rate
6) Quality Manual & Quality Assurance
7) OSHA

(Time: 3 Hours)   **Total Marks: 80**

N.B.:
1. **Question No.1 is compulsory.**
2. **Attempt any three questions out of remaining questions.**

Q1. Attempt any Four   **(4x5)**
   a. What are the responsibilities of safety action group?
   b. Write a detailed note on "General OSHA Requirements"
   c. State and explain safety tips while using tower crane.
   d. Write a short note on "importance of safety trainings".
   e. Discuss on "Worker's compensation and insurance"
   f. State the importance of safety campaign.

Q2. Attempt any Two   **(2x10)**
   a. State and explain responsibilities of
      i. Safety Manager   ii. Safety Action Group   iii. Employees
   b. Discuss on safety while using scaffolding and working platforms.

Q3. Attempt any Two   **(2x10)**
   a. Write a brief note on "Safety Measures and accident Prevention in high rise buildings."
   b. State and explain the importance of "national and state laws for worker safety and well-being."

Q4. Attempt any Two   **(2x10)**
   a. What are the elements for effective safety management? Explain each element in detail.
   b. Which factors are influencing safety on construction projects.

Q5. Attempt any Two   **(2x10)**
   a. Explain each and every step in detail "Safety Measures and accident Prevention in Bridge Construction".
   b. Write a detailed note on safety precautions in using electrical appliances.

Q6. Attempt any Two   **(2x10)**
   a. Write a short note on Prevention of Cold Stress.
   b. State various national safety policies their implementation and importance.

42408   **Page 1 of 1**

Time: 3hour   **Max. Marks: 80**

Question.No.1 is compulsory.
2. Answer any three questions out of remaining five questions.
3. Assume suitable data wherever required
4. Figures to the right indicate full marks.

Q.1 Attempt any four   20
1) Explain in detail population equivalence and its significance .
2) What are various sources and types of industrial waste water ?
3) Write a note on stream sampling.
4) Write Streeter Phelphs Equation and explain all its parameters.
5) Write a note on Reed Bed Technology(RBT)

Q.2 a) A waste water effluent of 400 lit/s with DO = 1.8 mg/lit enters a river where
the flow is 32 m^3/sec with DO = 8.5 mg/lit. Determine the DO after mixing
of waste water with the river water.   10
   b) Explain pasteurization and various byproduct making in dairy industry. What are the
treatment units of effluent treatment plant of dairy industry Draw a ETP flow diagram.   10

Q.3 a) Compare the characteristics of Sugar Industry, Tannery Industry and Paper industry.
Which units are common and what different treatment you will suggest for every industry
mentioned above in the ETP.   10
B) What is Environmental Impact Assessment? Explain in detail with a case study various
steps in EIA.   10

Q 4 a). A city discharges 105 cumecs of sewage in to a river, which is fully saturated   with
oxygen and flowing at a rate of 1600 cumes during its lean days with a velocity of 0.15m/sec.
The 5 day BOD of sewage at a given temperature is 280 mg/lit. Find out when & where the
critical DO deficit will occur in the downstream portion of the river & what is its amount.
Assume coefficient of purification of stream (f) as 4 & coefficient of deoxygenation (KD) as
0.1 **[Assume other data required]**   **10**
b) Explain with neat flow sheet manufacturing process of Distillery industry. Write down the
byproduct obtained from the effluents along with the process.   **10**

Q5 a) Discuss various types of advance treatments, its necessity and advantages .   **10**
B) What are various biological treatments .Draw a neat sketch of UASB and explain its
construction, working and process.   **10**

Q6. Write a short note on (Any Four)   20
      A) Sludge Dewatering Techniques
      B) CETP
      C) Zones of Pollution in the river-stream.
      D) Environmental Audit
      E) Electroplating Process.

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Time: 3-hour   **Max. Marks: 80**

N.B : (1) Question No. 1 is Compulsory.
       (2) Attempt any three questions out of the remaining five.
       (3) All questions carry equal marks.
       (4) Assume suitable data, if required, and state it clearly.
       (5) Notations carry the usual meaning.

Q1. Answer the following **(Any FOUR)**   **[20M]**

     a) What are the three basic goals of a project and how do project managers achieve them in conditions of uncertainty?
     b) Why project manager's role is more of a facilitator rather than a supervisor?
     c) Explain the work breakdown structure.
     d) What is Goldratt's critical chain method?
     e) Briefly describe the purchasing cycle.
     f) What are the four stages of team development and growth?

Q2.   (a) Swanson Industries has a potential project with an initial cost of Rs. 20,00,000. The capital budget allows to accept only one project. Using the NPV method, which project should be selected?   **[10M]**

Cash Flows (Year)	Project A	Project B	Project C	Project D
1	5,00,000	6,00,000	10,00,000	3,00,000
2	5,00,000	6,00,000	8,00,000	5,00,000
3	5,00,000	6,00,000	6,00,000	7,00,000
4	5,00,000	6,00,000	4,00,000	9,00,000
5	5,00,000	6,00,000	2,00,000	11,00,000
Discount Rate	6%	9%	15%	22%

     (b) What is the project life cycle? How is the cost of change, risk, and influence of stakeholders affected by Project time during the life cycle of the project?   **[10M]**

Q3.   (a) What are the responsibilities of the project auditor? What is essential for a successful project Audit?   **[10M]**

Q3.   (b) Explain probability and impact matrix. What are the risk response strategies for negative risks (threats) and positive risks (opportunities)?   **[10M]**

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Q4. (a) Following are the manpower requirements for each activity in a project.

Activity	Normal Time	Man Power Required
0 -1	2	4
1-2	3	3
1-3	4	3
2-4	2	5
3-5	4	3
3-6	3	4
4-7	6	3
5-7	6	6
6-8	5	2
7-9	4	2
8-9	4	9

i)   Draw the project network diagram.

ii) Rearrange the activity suitably to reduce the existing total manpower requirement.   **[10M]**

Q4. (b) Differentiate between the Functional, Pure Project, and Matrix organizations. **[10M]**

Q5. (a) How communication is planned and managed in project management?   **[10M]**

Q5. (b) A consulting project has an actual cost of Rs. 45000, Scheduled cost of Rs. 35000, and the value of completed work is Rs. 31000. Find the Scheduled and Cost Variance. Also, find SPI and CPI**.**   **[5M]**

Q5. (c) State various project estimation and scheduling techniques.   **[5M]**

Q6. (a) What is a scope creep? How does a formal change control system work in project management?   **[10M]**

Q6. (b) List and briefly describe the ways the project may be terminated. What are some non-technical reasons for project termination?   **[10M]**

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