

Time: 3 Hours

[Total Marks : 80 ]

Notes :

1. Question No **ONE** is **Compulsory**.
2. Answer any **THREE** from remaining.
3. Draw **FIGURES** wherever necessary. Figures to the right indicate full marks.
4. **WRITE** proper question / sub question numbers on the left margin allotted in answer sheet.
5. Each Question carries **EQUAL** marks.
6. **ASSUME** any additional data if necessary and state it clearly.

1. **Attempt (Any 4)**

- a) Enlist the primary, secondary and tertiary treatments available for industrial wastewater. Write disposal methods for the treated industrial effluents in detail. **05**
- b) A waste water effluent of 600 lit/sec with a BOD=35mg/l, DO=3.2mg/l and temperature of 23<sup>0</sup>C enters a river where the flow is 28m<sup>3</sup>/sec, and BOD=3mg/l, DO=9.2mg/lit and temperature of 17<sup>0</sup>C. Determine the BOD and DO after mixing of waste water with the river water. **05**
- c) What is a common effluent treatment plant? State the merits and demerits of it. **05**
- d) Write a note on toxicity and bioassay test. **05**
- e) Explain the difference between stream standards and effluent standards. What is stream sanitation? **05**

2. a) Discuss various methods of mixing adopted for equalization. Also Explain online and off-line equalization with diagram. **10**

- b) Discuss the characteristics of the waste water generated from a typical Dairy Industry. Draw the flow sheet for the treatment of effluent for the disposal on land and into Inland surface water. **10**

3. a) Explain in detail manufacturing in Distillery industry. What are the byproducts recovered? State Characteristics of effluents of distillery industry. **10**

- b) Describe with the help of a flow sheet how you will treat wastes from electroplating industry. **10**

4. a) A city discharges 150 cumecs of sewage into a river, which is fully saturated with oxygen and flowing at a rate of 1200 cumes during its lean days with a velocity of 0.1m/sec. The 5 day BOD of sewage at a given temperature is 250 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. **10**
- [Assume other data required]
- b) What are advanced treatments.? Explain Reed Bed Technology in detail **05**
- c) Write a note on Volume Reduction of waste water. **05**
5. a) Enumerate the various methods that can be used for biological treatments. Explain any two methods in detail. **10**
- b) Explain the manufacturing process of the paper industry(with flow diagram). What is good housekeeping and discuss the characteristics of the waste water generated. **10**
6. a) Draw the flow diagram of treatment for the tannery industry. Also draw the flow diagram of the manufacturing process of tannery showing byproduct removal. **10**
- b) Differentiate between EIA and Audit. **5**
- c) What is the difference between ETP and STP? Why is there a need for ETP for industrial wastewater treatment? **5**

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Time: 3 Hours

Max. Marks: 80

Note:

Question 1 is Compulsory

Attempt any three of remaining five questions

Figure to Right indicates full Marks

Assume the suitable data and clearly state the same

**Q1 Question 1 is Compulsory**

A. Determine the critical path and Project Duration, Activity times and all the types of floats. 10M

Activity	Succeeding Activity	Duration
P	Q, R	10
Q	S, T	12
R	U	14
S	U	17
T	V	11
U	V, W	16
V	X	8
W	Y	10
X	Y	13
Y	-	9

B. Explain 14 principles given by Mr. Henry Fayol for successfully running the organization 10M

Q.2a. Following is the data of associated with research and development project

Activity	A	B	C	D	E	F	G	H	K
Succeeding Activity	C	D,E,F	E, F	G	H	K	K	-	-
to	2	1	2	6	4	5	7	6	3
tm	4	3	5	7	8	7	10	9	4
tp	6	5	8	8	12	9	13	12	5

- i) Determine the Duration, standard deviation, and variance of project.
- ii) What is the probability of completing the project in 30 days?
- iii) What is the schedule duration with 50% probability?
- iv) What is the schedule duration with 98% probability

Z	-3	-2	-1	0	1	2	3
P%	0.13	2.28	15.87	50	84.13	97.72	99.87

Q.2.b. i) Work Breakdown Structure 8M

ii) Differentiate Bar chart and Milestone Chart

- Q3a. What is Resource Smoothing and Leveling. 8M  
 Explain the process of Resource smoothing and resource leveling.
- Q.3b. Prepare EST and LST schedule. Prepare resource histogram Which schedule you will prefer and why? 12M

Activity	A	B	C	D	E	F	G	H
Preceding Activity	-	A	-	-	-	C	B, E	G, F
Time	2	2	2	4	2	3	3	4
Mason/Day	6	7	3	9	4	8	2	1

- Q.4.a What do you mean by time and cost over run? Discuss the causes of time over run and cost over run. What are the control measures to avoid time and cost over run. 8M
- Q.4.b Determine the optimum cost and optimum duration of project. Data for each activity is given. 12M  
 Indirect cost = 40,000 Rs/ Day.

Activity	Succeeding Activity	Normal Time	Crash Time	Normal Cost (In Lakhs)	Crash Cost (In Lakhs)
P	Q	48	32	18	22
Q	R	112	72	15	22
R	U	96	56	18	24
S	T	72	48	24	30
T	U	96	92	8	20
U	-	48	48	20	20

- Q.5a. What is need of updating the schedule? Discuss the procedure of updating the schedule. 8M
- Q.5b. What are the causes of accidents? Suggest the corrective measures to avoid accidents on construction site 8M
- Q.5c. What is the role of inspection in Quality control 4M
- Q6 Write short notes (Any 5) 20M
- i) Principles of scientific management
  - ii) Roles of various agencies involved in construction project
  - iii) ABC Analysis
  - iv) Human Resource management
  - v) Role of safety in construction
  - vi) OSHA
  - vii) Workmen compensation act

(3 Hours)

[Total Marks:80]

N.B. 1) Question No. 1 is compulsory.

- 2) Attempt any three questions from the remaining questions.
- 3) Figures to right indicates full marks.
- 4) Assume suitable data, if necessary.

**Q1.** Write short notes on the following (Any Four) **20**

- i. Triple constraints in Project Management
- ii. Project charter and Project sponsor
- iii. Project Management Information system
- iv. Goldratt's critical chain methods
- v. Project audits

**Q.2** (a) Explain stages of team development and growth. What are the advantages of effective team and barriers to team effectiveness? **10**

(b) A project is composed of 8 activities, the time estimate for which are given below. **10**

Activity	Predecessor	Duration		
		$t_o$	$t_m$	$t_p$
A	-	2	4	12
B	-	10	12	26
C	A	8	9	10
D	A	10	15	20
E	A	7	7.5	11
F	B, C	9	9	9
G	D	3	3.5	7
H	E, F, G	5	5	5

Z	Probability (P)
0	0.5
0.5	0.6950
1	0.843

- (i) Draw the network diagram.
- (ii) Find the critical path and expected projected duration.
- (iii) Calculate the standard deviation and variance of the project.
- (iv) What is the probability of completing the project on 30-week deadline?

**Q.3** (a) Explain work breakdown structure and Gantt chart with example. **10**

(b) A project requires an initial investment of Rs. 200000 and it is expected to generate a cash flow of Rs. 10000 for 3 years. The target rate of return of the project is 12% per annum. Calculate the net present value of the project. **05**

(c) Explain non numeric project selection models. **05**

- Q.4** (a) Explain top down and bottom-up budgeting. **05**  
(b) What is the difference between resource loading and resource leveling? **05**  
(c) Describe probability and impact matrix. Explain risk response strategies for positive and negative risks. **10**
- Q.5** (a) A project in its 20<sup>th</sup> week has an actual cost of Rs. 250,000. It was scheduled to have spent Rs. 241,000. For the work performed to date, the budgeted value is Rs. 252,000. What are the cost and schedule variances for the project? What are the SPI and CPI? **05**  
(b) Describe Earned value management technique in Project Management. **05**  
(c) Explain Project Procurement Management. What is the difference between contracting and outsourcing? **10**
- Q.6** (a) Explain multicultural and virtual projects. **05**  
(b) Why is ethics important in Project management? **05**  
(c) What is project termination? Explain different types of project terminations. **10**

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3 Hours

[Total Marks: 80]

**NB:**

1. Question No.1 is compulsory
2. Attempt any three questions out of remaining questions

**Q1. Attempt any Four**

**(4x5)**

- a. What is safety campaign? State the importance of safety campaign.
- b. What are the basic safety measures to be taken at any construction site?
- c. Write a short note on “Pre-Planning and Safe Work Practices”.
- d. State and explain various steps involved in “Hazard recognition (or identification)” procedure.
- e. What do you mean by work place violence? How it can be prevented?

**Q2.**

**(2x10)**

- a. What is workers compensation insurance? Explain in detail with considering various key points.
- b. What are different types of work place violence? Discuss preventive steps.

**Q3.**

**(2x10)**

- a. Write a detailed note on safety precautions in using scaffolding and platforms
- b. State various causes of falls. Explain General Strategies for Preventing Slips under OSHA guidelines.

**Q4.**

**(2x10)**

- a. State responsibilities of
  - i. Safety Manager
  - ii. Safety Action Group
  - iii. Employees
  - iv. General Worker's Responsibilities
  - v. On-site Supervisors Responsibilities
- b. Explain each and every one in detail “Safety Measures and accident Prevention in Bridges”

**Q5.**

**(2x10)**

- a. Write note on safety policies to be adopted on a construction site, methods and equipment.
- b. What precautions are to be taken while excavation at a site for foundations?

**Q6.**

**(2x10)**

- a. Explain in details safety tips while using crewel crane and tower crane.
- b. Write a short note on “safety in building construction”.

(3 Hours)

[Total Marks: 80]

1. Question No.1 is **Compulsory**.
2. Attempt any **Three Questions** out of remaining questions.
3. Each **Full Question** carries **20 Marks**.

**Q1. Attempt any Four**

(4x5)

- a. What is shoring? Write a short note on Raking shoring.
- b. Why shear wall is necessary in tall structures? Explain its behavior and importance during earthquake.
- c. What is structural auditing? Why Structural auditing is important before repair and retrofitting.
- d. What are the physical properties for good repairing materials?
- e. What is Rusticide? Explain step by step procedure for Rusticide.

**Q2. Attempt any Two**

(2x10)

- a. What is manufactured damping? Explain the working procedure for fluid viscous damper.
- b. What are various nondestructive methods for damage assessment? State the procedure for rapid chloride penetration test.
- c. What are the various stages of repairing RCC structures? Explain surface preparation procedure in detail.

**Q3. Attempt any Two**

(2x10)

- a. Write a detailed note on “cantilever needle beam method”.
- b. What is fiber wrap technique? State its advantages and limitations.
- c. Explain the causes of structural deterioration in heritage structures.
- d. What is chemical cleaning? Explain the detailed procedure.

**Q4. Attempt all Four**

(4x5)

- a. Explain step by step procedure for RCC beam jacketing using well detailed figures.
- b. State step by step working procedure for rebound hammer and ultrasonic pulse velocity in condition assessment of concrete.
- c. Discuss about various causes for steel structure deterioration.
- d. State various causes of steel corrosion. Explain any one in detail.

**Q5. Attempt all Four**

(4x5)

- a. State various retrofitting techniques and explain any one in detail.
- b. Write a detailed note on “Steel plate jacketing in RCC members”
- c. State various foundation rehabilitation methods. Explain slab jacking in detail with figure.
- d. Explain detailed procedure of using concrete bonding agents.

**Q6. Attempt any Two**

(2x10)

- a. State various types of steel corrosion and explain any one in detail.
- b. What is routine maintenance? State the importance of routine maintenance in building construction.
- c. Write a short note on routing and sealing of cracks.
- d. What is fiber reinforced injection grouting? State its advantages.



(Time: 3 Hours)

(Total Marks: 80)

Note:

1. Question No.1 is compulsory
2. Attempt any **three** out of the remaining **Five** questions.
3. Assume suitable data if necessary.

- Q. 1.** Answer **any FOUR** of the following: (20)
- (a) Define Environmental Objective as per ISO 14001
  - (b) What are the challenges in implementation of ISO 14000 standards?
  - (c) Unawareness or ignorance of environmental protection will lead to detrimental consequence comment. Justify the statement.
  - (d) Write short note on Global Warming as a Global Environmental Concern.
  - (e) Discuss on Applications of Environmental Management System..
  - (f) Discuss the key success factors for applied to almost all the operation for EMS implementation.
- Q. 2.** (a) What is Water (P & CP) Act? Give its objectives. (10)  
(b) Discuss in short about Environment Protection Act. (10)
- Q. 3.** (a) Discuss roles of Government as regulatory agency for Environmental Management. Enlist 3 points. (10)  
(b) Explain limiting factors and carrying capacity as related to Ecosystems. (10)
- Q. 4.** (a) What is Total Quality Environment Management Concept? (10)  
(b) How is CSR related to Environmental Management? Explain with an example. (10)
- Q. 5.** (a) Elaborate the ISO 14001 EMS Model for Municipalities. (10)  
(b) Discuss in short about EMS certification. (10)
- Q. 6.** Answer the following (20)
- (a) Discuss on Wildlife protection Act.
  - (b) What are the guidelines to conduct and Environmental audit?