

- N. B.:** 1) Question No. 1 is **Compulsory**.
 2) Answer any **three** from the remaining.
 3) Each **full** question carries **equal** marks.
 4) **Assume** suitable data, if needed & **state** it clearly.
 5) Use of IS 456:2000 is **permitted**.

Q. 1) (a) Draw neat sketches, showing the behaviour of vertical stem wall & heel slab of a counterfort retaining wall. What is the reason of providing vertical ties & horizontal ties in the counterfort part? (04 M)

(b) What are the various situations, demanding the need of raft Foundation? What are the advantages of Raft Foundation? (04 M)

(c) Fig. 1 shows a part plan of the building. Slab (S1) has thickness of 120 mm & slab (S2) has thickness of 140 mm. For the building, live load = 4 kN/m^2 , floor finish = 1 kN/m^2 . Beam B1 is 8.2 m long, 200 mm wide & 450 mm deep. Also, beam B1 carries a masonry wall 115 mm thick & 3 m high, with masonry unit wt. = 18 kN/m^3 . Calculate the factored (design) UDL carried by the beam (B1). Include the self weight of the beam itself. (04 M)

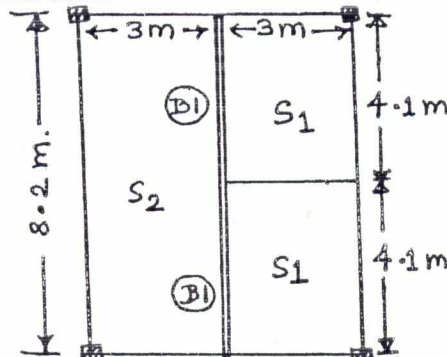


Fig. 1

(d) Write a note on Open Well Staircase, with a neat sketch. (04 M)

(e) A rectangular underground water tank has wall height of 3 m. The tank is empty. The soil outside is saturated, with the saturated unit weight = 18 kN/m^3 . Unit weight of water = 9.81 kN/m^3 . Angle of repose of soil = 30° . Determine the pressure at the base of the wall. (04 M)

Q. 2) Carry out the design for the slab S2 & beam B2 (fig. 2). Take Live Load = 3 kN/m^2 , Floor Finish = 1.5 kN/m^2 . Use M20 grade of concrete & Fe415 grade steel. Take all the necessary checks. Draw neat reinforcement diagram. Use Limit State Method. (20 M)

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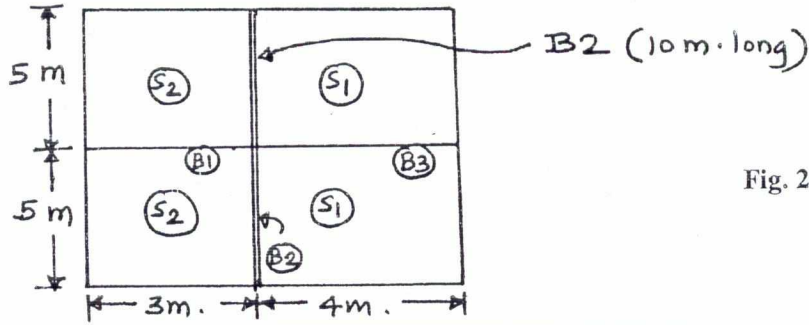


Fig. 2

Q. 3) Carry out the complete design of a cantilever retaining wall to retain the leveled back-fill, 5.2 m above the ground level. Unit weight of the soil is 17 kN/m^3 & its angle of repose is 30° . Safe Bearing Capacity of the foundation soil is 220 kN/m^2 . The coefficient of friction between the soil & concrete at the base is 0.60. Use M20 grade of concrete & Fe415 steel. Carry out all the necessary stability checks. Draw a neat sketch, indicating the reinforcement details. Adopt Limit State Method. (20 M)

Q. 4) (a) Design a dog-legged staircase for an office building in a room which measures 3 m X 6 m (clear dimensions or inside dimensions). Floor to floor height is 3.5 m. The building is liable to over-crowding, as it's a public building. Stairs are supported on brick walls 230 mm thick at the ends of the landings (i. e. landing spans parallel to the stairs). Provide M20 concrete & Fe415 steel. Fixing the dimensions of risers & treads for the human comfort, is expected. Carry out the necessary checks. Show the reinforcement details. Use Limit State Method. (14 M)

(b) Write a note on the types of joints in a water tank, as per IS 3370 (Part 1): 2009. Draw the neat sketches. (06 M)

Q. 5) (a) Design a circular water tank of 13 m internal diameter & 5 m height. The tank has flexible base & it rests on the ground. Use M30 concrete & Fe415 steel. Use Working Stress approach. The permissible stress in steel under direct tension is 130 MPa. The permissible stress in the concrete under direct tension is 1.5 MPa. The following table can be referred to fix the thickness of the tank wall or, alternate approaches can be adopted. Draw reinforcement details. Use Working Stress approach. (08 M)

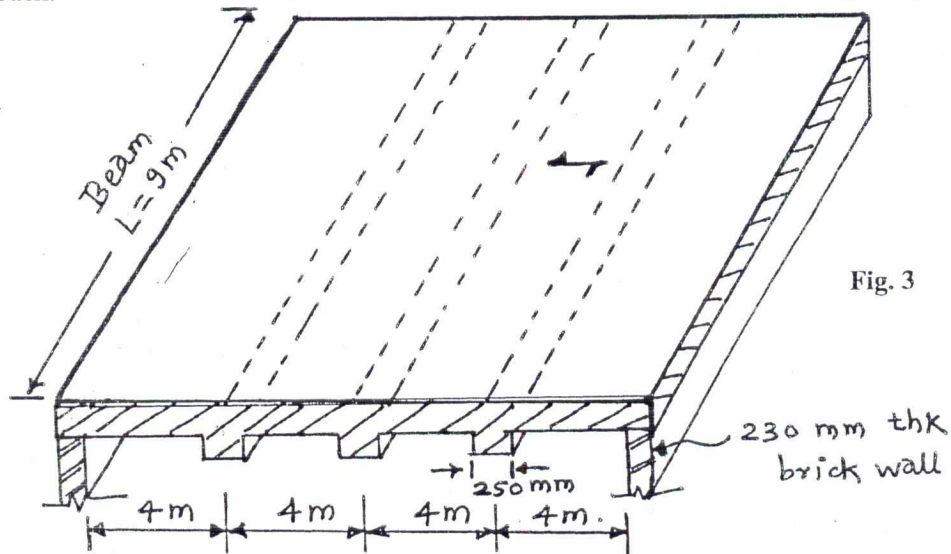
Table: Minimum Thickness of Members in Direct Tension (Uncracked Condition)

Grade of Concrete	Thickness of members in (mm) for tension T in (Newtons)	
	Mild Steel	HYSD Bars
M 25	T/1465	T/1444
M 30	T/1682	T/1660

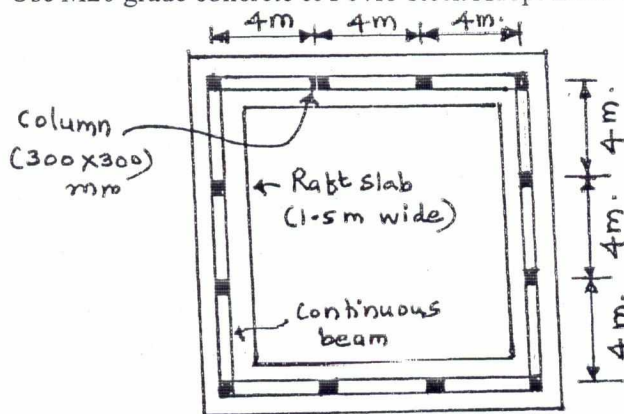
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(b) Design a rectangular water tank, open at the top. The clear size to be provided is (3 m X 8 m) & 3 m deep. The tank rests on a firm ground. Provide M25 grade concrete & Fe415 steel. Take $\sigma_{cbc} = 8.5 \text{ MPa}$ & permissible stress in steel = 150 MPa. Use approximate method for the analysis. Adopt Working Stress approach. Draw steel details. (12 M)

Q. 6) (a) A hall in a building has a floor consisting of a One-Way Continuous Slab cast with Simply Supported beams of width 250 mm, spaced at 4 m c/c (fig. 3) The clear span of the beam is 9 m. Assuming a Live Load on the slab as 3 kN/m^2 , partition load as 1 kN/m^2 & load due to finishes as 0.6 kN/m^2 , design the slab with M20 grade concrete & Fe415 steel. Draw reinforcement details. Adopt Limit State approach. (12 M)



(b) Design a suitable raft slab connecting the columns of a building (fig. 4). Design of the continuous beam over the raft slab is not needed. The size of the building is (12 m X 12 m), with the columns spaced at 4 m intervals. Service load transmitted by each column is 450 kN, column size is (300 mm X 300 mm). Soil SBC is 120 MPa. Use M20 grade concrete & Fe415 steel. Adopt Limit State Method. (08 M)



-----END OF PAPER-----

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[REVISED COURSE]

(3 Hours)

[Total marks : 80]

NOTE:.

- Question No. 1 is compulsory.
- Attempt any Three out of the remaining five questions.
- Figure to the right indicates full marks
- Assume any suitable data and clearly state the same.

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- Q.1 A) Enlist the different methods of tunneling in soft soil. State the various stages in construction of tunnel along with the equipments required. Describe with neat sketches any one method. 10
B) Discuss the advantages and disadvantages of using equipments and machineries at construction site. 10
- Q.2 A) What is meant by balancing of equipment? Cycle time of power shovel of 2 m³ capacity is 30 seconds. Truck of 8 m³ and 12 m³ are available at rate of Rs. 800 and Rs. 1200/day respectively for 10 hrs. The cycle time of 8 m³ truck is 14 minutes. And 12 m³ trucks are 16 minutes. How do you balance the operation of shovel and truck with least idle time and minimum cost. 10
B) What are commonly used Hauling equipments in construction industry? Explain their suitability and factors affecting their performance. 10
- Q.3 A) What are the different types of crushers used for production of aggregate? Describe Cone crusher with neat sketch stating components and it's working. 10
B) Define shotcreting. What are the different methods of shotcreting? State the application of shotcreting with merits. 10
- Q.4 A) What do you understand by soil stabilization? What properties of ground are improved by stone column? Discuss the ground improvement technique by Stone column with a neat sketch stating diameter, depth, spacing and materials of columns. 10
B) Explain the step by step procedures of blasting in hard rock. What precautions are required to be taken during transportation and storing of blasting materials? 10
- Q.5 A) What is vacuum concrete? Why is it necessary? Explain the step by step procedure of vacuum concreting with sketch. Enlist its applications. 10
B) Write a report on visit to a construction site of a fly over bridge. Discuss mainly about equipments used and methods adopted for construction. 10
- Q.6 Write short notes on any four 20
i- Jumbo Drill
ii-Sand drain
iii-Advance form work techniques
iv-Drilling pattern
v-Cladding types with suitability
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(3 HOURS)

[Total Marks: 80]

- N.B: 1) Question No. 1 is compulsory.
 2) Attempt any three questions out of remaining five questions.
 3) Assume suitable data, if required.
 4) Figures to the right indicates full marks

Q.1) a) Following is the data associated with a small construction Project.
 Draw Network. Calculate event Times. Identify Critical Path, Also determine Values of all types of floats. -10M.

Activity	A	B	C	D	E	F	G
Preceding Activity	-----	A	A	A	B	D	C,E,F
Duration(days)	5	4	7	5	3	4	7

b) Explain, Henry Fayol's 14 Principles of Management. -10M.

Q2.a) Following is the data associated with a small Project.

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
To (weekss)	1	1	2	1	2	2	3
Tm (weeks)	1	4	2	1	5	5	6
Tp(weeks)	7	7	8	1	14	8	15

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

Determine standard Deviation & Variance of the Project.

Also determine the Probability of completing the project at:-

- i) Expected duration ii) 3 weeks earlier than expected duration
 iii) 3 weeks later than expected duration.

b) What is Quality control? Explain the role of inspection in quality control. -08M.

Q3.a) Determine optimum cost & optimum duration for the following data of a project.
 Indirect Cost of project = Rs. 1000/day. -10M.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Normal Duration(days)	6	8	4	5	5	7
Crash Duration(days)	3	5	1	3	3	4
Normal Cost (Rs)	7000	4000	6000	8000	5000	8000
Crash Cost (Rs)	14500	8500	9000	15000	11000	15000

(Turn Over)

b) What do you understand by "Updating of Project? What information is required while updating? Explain the stepwise procedure of updating. -10 M.

Q4.a) Table below shows activities, their durations and labour requirements: -12M.

Activity	Duration	Carpenters
A(1-2)	8	3
B(1-3)	11	4
C(2-5)	6	2
D(3-4)	5	5
E(3-5)	8	3
F(4-5)	5	3

Workout daily requirement of carpenters with all activity schedule to start at their EST, LST. Also prepare histogram. Comment which schedule will you prefer & why?

b) Explain, Resource Smoothing & Resource Levelling. -08M.

Q.5a) Explain the functions of Human Resource Management. -10M.

b) What is accounting? Explain generally accepted principles of an accounting. -10M.

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

- Job Layout
 - Work Breakdown Structure
 - Net Present Value
 - ISO 14000
 - Time Over-run & Cost Over-run
 - Contribution of Mr. Taylor.
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30/5/17

BE (Civl)(sem VIII) (CBSGS) (BDE)

Q. P. Code: 18226

Maximum Marks: 80

Duration: 3 Hours

Note: Q1 is compulsory. Attempt any three out of remaining five questions.

2. Assume suitable data if required and mention it clearly.
3. Answer and design must be in accordance to IRC and bridge rules.
4. Support answers and solutions with suitable sketches.

Q1. A] How the spacing between lattice girders and depth is decided for a broad gauge railway track? Sketch the minimum clearance diagram for the same. [05]

B] What are different types of bearings used to restrained and permit various movements in bridges? Explain in brief the functioning of one fixed type bearing. [05]

C] What is permissible limit for tilt and shift of a well foundation? Explain different methods to rectify tilt. [05]

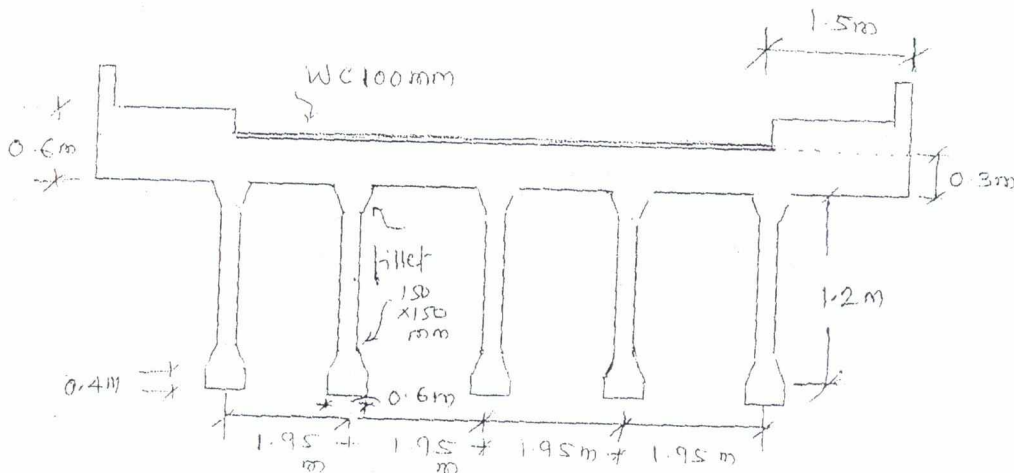
D] What are different methods of launching of girders? Explain incremental launching method. [05]

Q2. A] What are the provisions to account dynamic effect of imposed load while designing Roadway and Railway Bridges? Explain in detail how different factors influence on it? [10]

B] What do you mean by "Economic Span Length" of bridge? How it can be determined? Develop equation for the same. What are its limitations? [05]

C] What is a balanced cantilever bridge? What are its advantages? [05]

Q3. Determine design bending moment on longitudinal girder of a 24m span bridge, due to IRC Class AA tracked vehicle and self weight of bridge superstructure. Clear carriage width is 7.8m, footpath on either side is 1.5m and cross girders are provided at 4m c/c. Thickness of deck slab is 300mm, thickness of wearing coat is 100mm. Area of cross girder is 70% of area of longitudinal girder.



[20]

Q4. A simply supported post-tensioned prestressed concrete deck slab bridge of 12m effective span is designed to carry IRC-Class AA loading. Verify its safety in limit state of serviceability of cracking and flexure for the following specifications.

Carriage width: 7.5m; Footpath on either side: 1.5m; Depth of kerb above wearing coat is 300mm

Wearing coat: 100mm; Depth of deck slab: 500mm;

Initial strength of concrete is 50MPa and characteristic strength is 60MPa

Characteristic strength f_p of prestressing steel is 1600MPa

Cables are tensioned to 1000kN initially and spaced 300mm c/c at 100mm from soffit of the slab at mid span. Prestressing force in each cable accounting all losses is 800kN.

Consider Moderate environmental conditions.

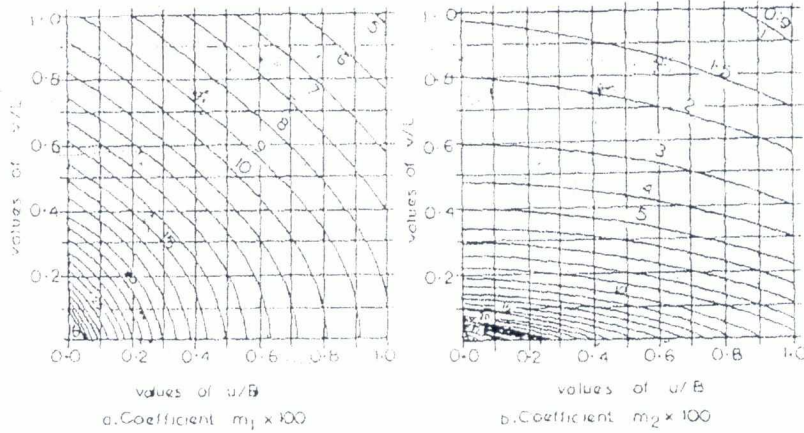
Value of α change linearly from 2.12 to 2.36 for b/l_0 from 0.7 to 0.9 respectively.

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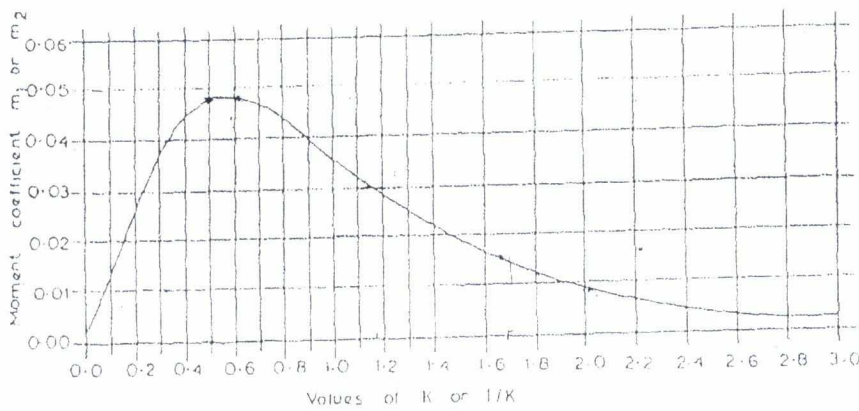
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Turn Over

Q5. Design an interior slab panel in RCC for flexure which has to carry IRC Class A wheeled vehicle. Cross girders are provided at 4m c/c and longitudinal girders are provided at 2m c/c. Thickness of deck slab is 250mm. Thickness of wearing coat is 100mm. Use M30 and Fe415. [20]
Refer Peguad's curves

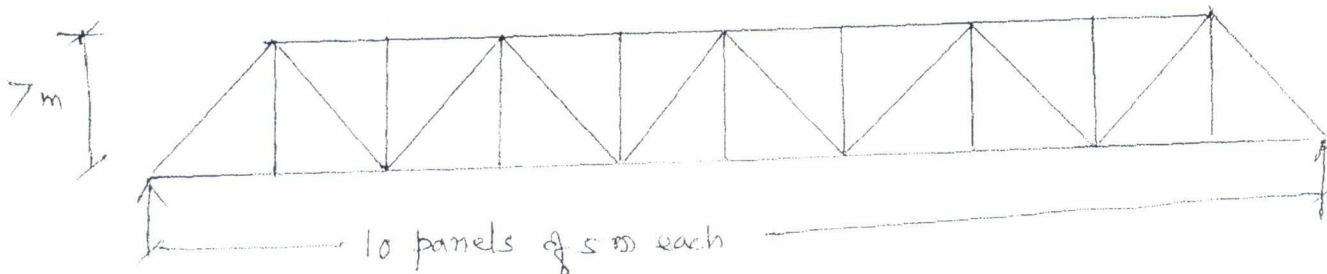


Moment coefficients m_1 and m_2 for $K = 0.5$



Moment Coefficients for Slabs Completely Loaded with Uniformly Distributed Load, Coefficient is m_1 for K and m_2 for $1/K$

Q6. Determine design forces in central top chord and bottom chord to dead and live load of a lattice girder bridge of 50m span as shown below.



Consider self weight of different elements (per track) as under:

Stringers; 3000N/m, Stock rails; 500 N/m, Guard rails; 400 N/m, Cross beams and bracings; 3000 N/m, Sleepers; 2000 N/m, Fasteners; 3000 N/m

Take self weight of each girder (top chord, bottom chord, diagonals and vertical members); 20000 N/m

Bridge is to be designed to carry a single track Broad Gauge Loading-1987 as under;

Consider total live load per track as 4253kN for 50m span. Consider appropriate CDA. [20]

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30/5/17

QP Code: 18082

(3 Hours)

[Total Marks: 80

- N.B:** 1. Question No.1 is compulsory
2. Attempt any three questions from remaining five questions.
3. Assume any suitable data where ever required.
4. Figures to the right indicate full marks.

- Q.1** Attempt any **four** 20
- a. What is Sulphitation process in Sugar Industry?
 - b. Write short note on potash recovery from Distillery waste.
 - c. Discuss effluent standards and stream standards.
 - d. What is a common effluent treatment plant? State the merits and demerits of it.
 - e. What is off-line Equalization?
- Q.2**
- a. 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
 - b. A waste water effluent of 620 lit/sec with a BOD =45 mg/lit, D.O.=3.0mg/lit and temperature of 24⁰C enters a river where the flow is 27 m³/sec, BOD=3.0 mg/lit, DO=8.2mg/lit, and temperature of 18⁰ C, K₁ of the waste is 0.10 per day at 20⁰C.The velocity of water in the river downstream is 0.18m/sec and depth of 1.2m.Determine the following after mixing of waste water with the river water.
i) Combined discharge ii) BOD iii) DO iv) Temperature 10
- Q.3**
- a. Explain with the help of flow sheet, the manufacturing process of cotton textile. Indicate on the flow sheet the point of addition of water and chemicals. 10
 - b. What are the effects of dissolved inorganic solids on river? Discuss the methods to control them with merits and demerits. 10
- Q.4**
- a. Explain in detail volume and strength reduction of industrial waste. 10
 - b. A city discharges 1700 liter per second of waste water into a river, whose minimum rate of flow is 6000 lit per second. The temperature of waste water as well as river water is 20⁰C. The 5day BOD of waste water at that temperature is 280 mg/lit and that of river water is 2mg/lit. The DO content of waste water is zero and that of the stream is 90% of the saturation D.O. If the minimum D.O.to be maintained in the stream is 4.0mg/lit. Find out the degree of waste water treatment, required. Assume the coefficient of de-oxygenation (K_D) as 0.1 and coefficient of re-oxygenation (K_D) as 0.4. 10
- Q.5**
- a. How the wastes from electroplating are treated? 10
 - b. What is Environmental Impact Assessment? Why EIA is done? Explain the same in the following context- i) Screening ii) Scoping iii) Prediction iv) Reporting 10

Q.6 Write short note on (Any four)

20

- a. Treatability study
 - b. Save all from Pulp and Paper Industry
 - c. Role of anaerobic treatment in Industrial Waste Treatment
 - d. Treatment of refineries waste
 - e. Factors to be considered in the designs of sampling program
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