

(Please write your Exam Roll No.)

Exam Roll No.

END TERM EXAMINATION

EIGHTH SEMESTER [B.TECH] MAY- JUNE 2017

Paper Code: ETCE-406

Subject: Analysis and Design of Bridges

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.No1 which is compulsory. Make necessary assumptions wherever required and clearly state them.

- Q1 Write short notes on the following:- (5x5=25)
- (a) Factor affecting the selection of the bridge
 - (b) Various loads to be considered for the design of highway bridges
 - (c) Different types of joints in bridges
 - (d) Types of bearings
 - (e) Types of prestress bridges used in Delhi Metro.
- Q2 Write down the specification for various types of live load. How the load combinations are chosen for design. (12.5)
- Q3 What are the various methods used for the computation of design discharge in case of bridge? How the design discharge affects the design of the bridge components. (12.5)
- Q4 Design a box culvert having inside dimension 3m x 3m. This culvert is subjected to a dead load of 14000 N/m² and a live load of IRC class AA tracked vehicle. Assume the unit wt. of soil to be 18000 N/m³. The angle of repose of soil is 30°. Use M25 concrete and Fe 415 steel, Road width is 7.5m, Span is 3.3 m. (12.5)
- Q5 Write down the various components of plate girder bridges and their specification as per design consideration. (12.5)
- Q6 Design a mild steel rockers bearing for transmitting the superstructure reactive load of 1200kN. (12.5)
- Allowable pressure on bearing block: 3.8MPa
Permissible bending stress: 0.66 f_y = 165MPa
Permissible bearing stress: 100MPa
Permissible shear stress: 100MPa
- Q7 Describe the principle of prestressing. Write down the assembly of prestressing steel and grouting of duct. (12.5)
- Q8 (a) Write down the design steps for prestress bridge deck slab. (8)
(b) Explain different type of concrete bridges with neat sketch. (4.5)

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END TERM EXAMINATION

EIGHTH SEMESTER [B.TECH] MAY- JUNE 2017

Paper Code: ETCE-412

Subject: Ground Water Assessment,
Development and Management

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.No1 which is compulsory.
Select one question from each unit.

- Q1 Attempt all the questions:- (5x5=25)
- (a) Name the different techniques of surface investigation for assessing ground water condition. Describe anyone method in detail.
 - (b) Define with the help of suitable sketches and examples.
 - (i) Aquifer (ii) Aquitard (iii) Aquiclude (iv) Aquifuge
 - (c) What are the assumptions for steady state radial flow in confined aquifer. Write down the mathematical expression of "Well Function".
 - (d) Why is geophysical logging important for sub surface investigation of ground water? Draw an indicative sketch of any one type of log?
 - (e) What do you mean by tracer technique of ground water investigation? Draw an indicative profile of the time concentration curve in the case of continous injection and sudden injection of tracer?

UNIT-I

- Q2 (a) What are the principal chemical constituents in natural ground water? What are their usual concentrations and their effects on usability of groundwater. (6)
- (b) What are four major sources of groundwater pollution? Describe the components under each of these four major sources and the causes of pollution attributed to these components? (6.5)
- Q3 An unconfined aquifer having hydraulic conductivity of 3 m/day occurring on the top of a horizontal impervious layer connects two parallel water bodies 1100m apart. The water surface elevations measured above the horizontal impervious bed of water bodies on the right and left are 12m and 10 m respectively. (12.5)

UNIT-II

- Q4 (a) 10 cm diameter well penetrates a 10m thick confined aquifer. The steady state draw downs were found to be 2.5 m and 0.05m at distances of 10 m & 40m respectively from the center of well. When the well was pumped at a constant rate of 125 ltr/min. Calculate the transmissibility and hydraulic conductivity of the aquifer. (6.5)
- (b) Starting with the Solution of unsteady flow in a confined aquifer given by $s = \frac{Q}{4\pi t} \int_u^\infty \frac{e^{-u}}{u} du$, where $\int_u^\infty \frac{e^{-u}}{u} du = 0.577216 - \frac{u^2}{2.2!} + \frac{u^3}{3.3!} + \dots$ and describing the terms used in the above expression, derive the expression for the Copper & Jacob Method of solution. (6)
- Q5 (a) A well is located in a 30m thick confined aquifer of permeability 23m/day and storage coefficient 0.006. If the rate of pumping the well is 1800 lpm, calculate the drawdown at distances of (i) 120m & (ii) 30m from the well after 24 Hrs. (6)
- (b) Derive the expression for steady state radial flow into a well fully penetrating a confined aquifer. (6.5)

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UNIT-III

- Q6 Design the thickness of brick lining of an open well having a diameter of 2m for a depth of 5m from the ground surface considering different types of load. The angle of repose of soil is 25° and the specific weight of soil is 1600 kg/m^3 . Assume the safe compressive stress of first class brick masonry with 1:3 cement mortar as 15 kg/cm^2 , and adopt a factor of safety of 3. (12.5)
- Q7 (a) Describe any one method of well development. Why sanitary precautions should be adopted to protect water quality in a well? (6)
 (b) Why is step draw down test used? Describe the procedure? Derive an expression for the interference of two wells having equal radii & drawdown in a confined aquifer. (6.5)

UNIT-IV

- Q8 (a) Define formation loss and well loss in the case of groundwater well being pumped in a confined aquifer. Write down mathematical expression relating these two losses to total drawdown in a well. What is the importance of well loss in pump assessment? (6)
 (b) Write down the finite difference forms of the partial derivative expression of Darcy's Law and time derivative as applicable in case of two dimensional groundwater systems with the help of sketch of cell to cell water transfer. (6.5)
- Q9 Define specific speed of pump. Show that the expression for the outside diameter D_1 of the impeller of centrifugal pump is given by $D_1 = 84.67 K_u \sqrt{H_m} / N$, Where N is Speed of the pump Shaft and K_u is the speed ratio and H_m is the total head. (12.5)

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EIGHTH SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETCE-404 (NS)/
ETCE-404 (OS)Subject: Planning and Management of
Construction Projects

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory.

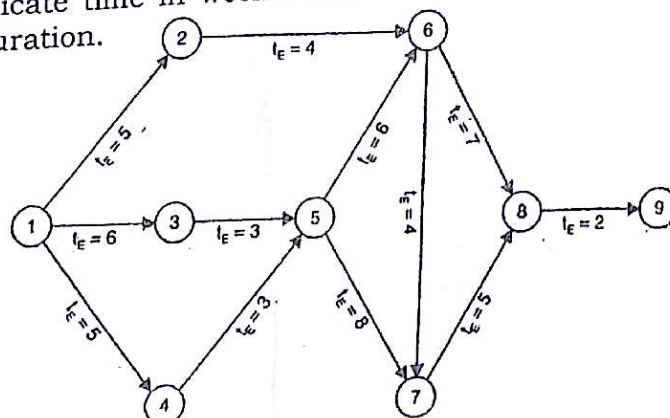
- Q1 Attempt **any five** of the following: (5×5=25)
- (a) Define and differentiate among optimistic, pessimistic and most likely time estimates. How they are estimated?
 - (b) Explain accounting procedure of Stores?
 - (c) What do you understand by work breakdown structure? What is its importance in network planning?
 - (d) Explain salient features of legally binding contract.
 - (e) Define 'float'. What is its importance? How is it determined? How it is different than slack.
 - (f) What are the advantages of (i) Crawler mounted tractors and (ii) wheel mounted Tractors?
- Q2 (a) What are the objectives and importance of master plan of the city, explain with reference to NCR Plan 2021? (6.5)
- (b) What are the factors affecting production efficiency of the projects? (6)
- Q3 Explain **any three** of the given following briefly: (12.5)
- (a) Material at site Account
 - (b) Sub-Heads of Stock
 - (c) Suspense Heads and Suspense Sub-Heads
 - (d) Muster Roll
 - (e) Cash book
- Q4 (a) The maintenance project of a building consists of ten jobs. The predecessor relationships are Identified by their node numbers, as indicated below:

Job	Identification	Job	Identification	Job	Identification	Job	Identification
A	((1,2)	D	(3,6)	G	(4,7)	J	(7,8)
B	(2,3)	E	(3,5)	H	(5,8)		
C	(2,4)	F	(4,5)	I	(6,8)		

Draw the network diagram for the project. (6.5)

(b) Explain and differentiate between CPM & PERT. (6)

- Q5 Determine the critical path for the network shown in Fig. below. Numbers indicate time in weeks. Also compute Float at all Nodes, and the project duration. (12.5)



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- Q6 (a) What are the differences between Administration approval and expenditure sanction? (6.5)
(b) Explain the main features of P.W.D. system of Accounts. (6)
- Q7 (a) What action is taken to remove the defects noticed in the work done by a Contractor? (6.5)
(b) What are the different methods of executing works? (6)
- Q8 (a) What are the factors affecting cost of Hauling equipments? (6)
(b) What are the different types of Earth Moving Equipments? Also explain the main Constituents of Tractor and its working principle. (6.5)

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END TERM EXAMINATION

EIGHTH SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETHS-402

Subject: Human Values and Professional Ethics-II

Time: 3 Hours

Maximum Marks: 75

Note: Attempt all questions as directed.

Q1 Write short notes on **any five** of the following: (5x5=25)

- (a) Collegiality
- (b) IPR
- (c) Cultural discrimination
- (d) Conflict of Interest
- (e) Hacking
- (f) Whistle-blowing
- (g) Morality

Q2 (a) Explain the importance of values in human life. (12.5)

OR

(b) Discuss the many aspects of harmony in life. How do you go about leading a harmonious life? (12.5)

Q3 (a) A television channel undertakes a sting operation. This involves recording the speech and actions of a person with a hidden camera without the person's knowledge. The objective of the operation is to bring out the corruption of the person concerned. Is the operation ethical? State views for and against this operation. (12.5)

OR

(b) Business and ethics do not go together. Discuss the statement giving reasons for and against it. (12.5)

Q4 (a) List the major problems in environmental ethics. As an individual, list the steps that you can take to save the environment. (12.5)

OR

(b) Enlist the professional responsibilities of a professional. Explain any two of them with examples. (12.5)

Q5 (a) Write about engineering as social experimentation. (12.5)

OR

(b) Discuss the broad categories of computer crimes. (12.5)

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END TERM EXAMINATION

EIGHTH SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETCE 422

Subject: Environmental Engineering

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.No. 1 which is compulsory. Assume any missing data suitably, if not given. Use of relevant Indian Codes/ Guidelines is permitted.

- Q1. Attempt the following: (5x5=25)
- Define: Dusts, Smokes, Mists, Fumes and Vapors? In what size range do particles most effectively reduce vision?
 - What do you understand by the term leachate? What problems are posed by leachates?
 - Enumerate the various methods which can be used for disposal of municipal solid waste, and explain the two most widely adopted methods in India?
 - Describe in detail the sources and classification along with basic rules of handling and transportation of hazardous waste?
 - Explain the theory of formation of photochemical smog? What are the factors affecting photochemical reactions?
- Q2. Describe the pollutants along with sources and effects. (2.5x5=12.5)
- Sulphur Dioxide
 - Carbon Monoxide
 - Hydrocarbons
 - Nitrogen Oxides
 - particulate Matter
- Q3. Explain in details the different Solid Wastes processing techniques used in management of municipal solid waste? (12.5)
- Q4. Estimate the overall chemical composition of a solid waste sample. Derive an approximate chemical formula for the organic portion of a solid waste sample with the composition given in Table below. Use the resulting composition to estimate the energy content? (12.5)

Component	Dry Mass (Kg)	Wet Mass (Kg)	Composition, Kg					
			C	H	O	N	S	Ash
Food wastes	5.5	20	2.16	0.29	1.69	0.12	0.02	0.23
Paper	45	50	18.40	2.54	18.61	0.13	0.08	2.54
Cardboard	10.5	15	4.18	0.56	4.24	0.03	0.02	0.48
Plastics	11.8	15	5.88	0.71	2.23	-	-	0.98
Garden	6	15	1.91	0.24	1.52	0.14	0.01	0.18
Trimming	6	10	1.98	0.24	1.71	0.01	-	0.06
Wood	6	10	1.98	0.24	1.71	0.01	-	0.06

- Q5. Explain the aerobic method of composting of solid waste in India? Determine the amount of air required to oxidize completely 1 tonne of waste having the chemical equation $C_{10}H_{16}O_6$. (12.5)

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- Q6. Describe the anaerobic method of composting of the organic solid wastes of a society, giving details of the digestion process of the method and its environmental impacts? Estimate the theoretical volume of methane gas that would be expected from the anaerobic digestion of 1 tonne of a waste having the composition $C_{35}H_{76}O_{36}N$. (12.5)
- Q7. (a) Describe transfer stations with neat diagrams. What is the use of transfer stations? Write down the advantage and disadvantages of transfer stations? (6.5)
 (b) During noise sampling the value for fluctuating noise level 60 dB(A) lasting for 15 minutes, followed by 80 dB(A) lasting for 35 minutes, followed by 70dB(A) lasting for 45 minutes, followed by 100 dB(A) for 5 minutes. What is L_{eq} of this noise? (6)
- Q8. Differentiate between Hauled Container System (HCS) and Stationary Container System(SCS) for solid waste collection of a city? Solid waste from a new industrial part is to be collected in large containers (drop boxes, some of which will be used in conjunction with stationary compactors. Based on traffic studies at similar parks, it is estimate that the average time to drive from the garage to the first container (t_1) and from the last container (t_2) to the garage each day will be 15 and 20 minutes respectively. If the average time required to drive between containers is 6 minutes and the one-way distance to the disposal site is 25 km (speed limit: 88 km/hr). Determine the number of containers that can be emptied per day, based on an 8 hour workday. Assume missing data suitably, if required. (12.5)

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