



# Bharatiya Vidya Bhavan's Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)  
Munshi Nagar, Andheri (West), Mumbai - 400058



END SEMESTER

November 2017

Program: T.Y.B.Tech. Civil Engineering  
Course code: BTC 306  
Name of the Course: OCIS  
Semester: V

Date: 24/11/2017

Duration: 2 hrs

Max. Marks: 50

Master file.

Question No.	<ul style="list-style-type: none"> <li>Question Number 1 is compulsory</li> <li>Out of remaining 5 questions attempt any 4</li> </ul>	Max Marks	CO	Module No.
Q1.	Attempt any 5 Questions out of 7			
	a. Discuss the advantages which you expect by becoming a member of an organization. b. What are Etiquettes? What is the basic difference between business and social Etiquettes? c. Explain the basic requirements of a valid meeting. d. "A good leader is one who understands his subordinates, their needs and their sources of satisfaction". Comment. e. What tips will you provide to your friend to appear for an interview? f. Identify and explain the evaluation criteria of a group discussion for recruitment. g. Elaborate on the different methodologies to be used for collecting data for technical writing. Bring out the difference between a Bibliography and List of Illustration.	20 (Each 04 marks)	1,2,3, 4,5	1,2,3, 4,5,6, 7,
Q2.	SPCE faculties were observing unrest amongst students. In a recent meeting the Director, Bhavan's Management instructed the Dean, Student Affairs to conduct a survey and find out the reasons for the Unrest. Imagine yourself as the Dean, Student Affairs and present a detailed report in Memo format along with your recommendations. Some common reasons are listed out here. You are free to add to the reasons. Students are requested to choose any five reasons and prepare a report. It is compulsory to write the methodology applied for collecting the data. <ul style="list-style-type: none"> <li>Fee Hike</li> <li>Student Teacher ratio</li> <li>Canteen Food</li> <li>Availability of hostel</li> <li>Discrimination</li> <li>Vernacular medium students facing the language problem</li> <li>Industry Institute interaction</li> <li>Hectic Academic Schedule</li> <li>Lack of Empathy.</li> <li>Lack of Internship provisions from the institute</li> </ul>	10	02,03, 05	04

Q.3.	<p>Company Details: Maharashtra Airport Development Company Limited</p> <p>Job Description: On contract basis for 3 years at Nagpur.</p> <p>Pay Scale: 40,000/- per month, as per Govt. of Maharashtra Policy</p> <p>Qualification: B.Tech Civil Engineer.</p> <p>Age limit 25 Years Maximum</p> <p>Experience: Work Experience of 2 years in State/ Central P.W.D. Preference would be given to candidate with good Interpersonal Skills and Leadership skills.</p> <p>Job Application Details: Apply with a covering letter and a detailed Resume' before 29<sup>th</sup> November, 2017 by speed post only to: The Vice Chairman and Managing Director, at the address: 8<sup>th</sup> Floor World Trade Centre, Cuffe Parade, Mumbai 400005</p>	10	03,04 .05	07
Q.4. A.	<p>Case Study:</p> <p>Megha was amongst the brilliant students in her MBA class. She was liked by all for her behavior and Merit. With a smiling face she would accept any responsibility entrusted to her by her teachers. However, there was one task, she would always run away from: giving a presentation. Whenever the teachers assigned a group task that she, she would do all the analysis, but would never give a presentation for fear of speaking in front of an audience. She somehow managed to avoid having to give a presentation during her two years as an MBA student. When she started working, things remained the same. She used to do all the behind-the-scenes work and hand over the responsibility of giving a presentation to someone else. Megha later realized that because of fear of addressing an audience she was not able to come to the limelight. The hard work was done by her, but some other person who presented took away the credit that was due to her.</p> <p>The situation continued for quite a few years. All her plans to improve failed, and she started out on losing out on promotions. The bosses never came to know that she was extremely hard in the background to get things done. Megha was frustrated and decided to leave the company.</p> <p>She started sending applications to companies. Finally, a company based in Noida wanted to interview her. Megha flew to Delhi and attended the interview. The chief executive officer (CEO) was extremely happy with what she had been doing and was looking for a person with a similar profile to fill a vacancy. The interview was almost over, but the CEO wanted to test her for last time. Megha was asked to give a presentation on a topic of her choice to all the senior managers of the company and was given a day to prepare. Megha chose the topic 'Functioning of the stock market: Recent trends' as the company was a big name among stock broking firm.</p> <p>However her fear of giving presentations, which she had been fighting for years, again came to haunt her. She could not run away anymore. This was a very good company and the profile was good. She first prepared the outline for the presentation on the topics that needed to be covered and then made the presentation. The CEO had given her 30 minutes for the presentation. She had made a mistake. She did not take in to account or ask the CEO as who would be the audience and whether he wanted something specific. To be covered.</p> <p>The first step she took was to get the slide deck in place. She prepared a very broad outline on her computer directly, for her presentation. She also did not spend sufficient time to plan her content. The outline looked something like this.</p>			

TOPIC: Functioning of the stock market: Recent Trends

SCOPE: discuss the recent trends in the market.

1. History of the stock Markets. (15 minutes)  
< History of the markets, Liberalization of the markets >
2. Functioning of the stock markets (10 minutes)  
< How stock markets function today, the electronic exchanges, and transparency >
3. Recent trends in the stock markets (5 minutes)  
< recent trends in the stock market and the interaction with SEBI ( Securities and Exchange boards of India), future of the stock markets, and conclusion >

Since the time left for her was very little she did not note down the details of what needed to be covered under each heads. Time was flying, and she had to do some surfing on the Internet to get the slide deck in place. She started searching the stock market sites and quickly collected the information and started putting them in one of the three categories. There was so much of information that she was not able to judge what was relevant and what was not relevant for the presentation. Megha had, until then, avoided presenting and she was not confident about how much to prepare. She gathered over 60 slides for her 30 minute presentation.

She also had to prepare the 'script' to deliver. Over the years, she had not practiced to deliver extempore talks and felt that memorizing a script would be the best way. She quickly drafted a script and practiced over and over again for the entire night.

The next morning, when the time for her presentation came, she realized that the PPT file got corrupted. She forgot to carry a backup with her and finally realized that she mailed this PPT to her friend for approval. She managed to retrieve the file and started her presentation. Due to her fear she faltered, she forgot what she had written down. Seeing the audience she became nervous and all big people Wizards in stock marketing, highly experienced people were in front of her. She started reciting her script like a parrot, missing important lines and showing appropriate slides corresponding to her talk. She started reading verbatim from her script avowing eye- contact with the audience.

The CEO, who was sitting in one corner along with some of the senior colleagues of his, noticed this. He began to lose confidence in Megha, because the job involved many client presentations. The CEO asked Megha three questions about her presenting skills.

- Why is the scope so vague? Does it speak of any particular period?
- Of the 30 minutes allotted, the actual presentation of trends came only after the first 25 minutes? Why?
- Why were so many slides prepared, when the presentation was supposed to be for 30 minutes?

Questions:

1. How do you suggest Megha should have approached the presentation?
2. What should Megha do to overcome her fear of Presentations? Provide ten effective tips for being a successful presenter.

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T.Y.B Tech. Civil. Sem V  
Bharatiya Vidya Bhavan's

## Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)  
Munshi Nagar, Andheri (West), Mumbai – 400058.  
End Semester Exam  
November 2017



Max. Marks: 100

Duration: 03 hours

Class: T.Y. B. Tech.

Semester: V

Program: Civil Engineering

Course Code: BTC303

Course – Development Engineering

Master file.

### Instructions:

- Attempt **any five** out of **seven** questions.
- Assume suitable data if required and state it in the answer sheet.
- Answer each question on a new sheet or page.
- Figures to the right indicate full marks assigned to the question.

Question		Max. Marks	Course Outcome	Module
Q.1.a	For achieving the goals of UBA / UMA, it is necessary for the educational institutes, like us, to develop 'Technology & development Supervised Learning (TDSL)' and 'Technology & Development Solutions Cell (TDSC)'. State the functions or activities, you think, that a TDSL and TDSC should carry out.	10	CO2	1
Q.1.b	Explain the 'SMART CITY – Mission Transformation' of India w.r.t. Objectives, Strategies, and Need. Enlist the basic infrastructure elements of SMART CITY planning. Explain the 'AREA BASED DEVELOPMENT MODEL' in detail	10	CO2	3
Q.2.a	Explain the importance of 'Green Building Certification (GBC)'. Enlist all Green building rating systems and describe the rating systems adopted in India.	10	CO1	2
Q.2.b	State the importance and challenges of RURAL DEVELOPMENT. List the KEY PROGRAMMES framed by the government towards the development of rural areas and explain PMGSY in detail.	10	CO2	4
Q.3.a	Explain the 'SLUM AREAS (IMPROVEMENT AND CLEARANCE) ACT' of 1956.	10	CO1	3
Q.3.b	Write a note on 'COMMUNITY DEVELOPMENT PROGRAMME (CDP)'. Explain the formation 'PANCHAYAT RAJ INSTITUTION (PRI)' – the three tier system' adopted in rural areas of India.	10	CO1	4



T.Y.B Tech, Civil, Sem IV

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## Sardar Patel College of Engineering

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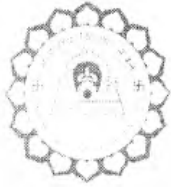
Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester Exam

November 2017



<b>Q.4.a</b>	State the major functions of 'TOWN AND COUNTRY PLANNING ORGANISATION (TCPO)' and the major on-going and new schemes of TCPO in India.	10	CO2	3
<b>Q.4.b</b>	Explain the concept of 'SUSTAINABLE DEVELOPMENT'. With a neat sketch describe the PILLARS of sustainable development. State the grand challenges of India towards sustainable development.	10	CO2	2
<b>Q.5.a</b>	List the DATA EXTRACTION tools available in geo-informatics (GIS, GPS and RS) system. Explain how 'DATA EXTRACTION' in geo-informatics can be used for mapping and decision making, especially for planning of urban areas.	10	CO1	5
<b>Q.5.b</b>	Based on your project work carried out in this course, describe the process of primary level mapping of the existing features of the village and identification of the problems or challenges faced by the village towards development.	10	CO1, CO2	6
<b>Q.6.a</b>	With the help of a case study explain the environmental initiatives to be taken by any construction project to achieve sustainability.	10	CO2	2
<b>Q.6.b</b>	Discuss the basic principles of GARDEN CITY CONCEPT and illustrate its merits and demerits	10	CO1	3
<b>Q.7.a</b>	State the necessity of a 'MASTER PLAN' and give the requirements of an 'IDEAL MASTER PLAN'. Define 'LAND USE PLANNING' and state its objectives.	10	CO1	3
<b>Q.7.b</b>	Describe the process (methodology) of preparation of MASTER PLAN (development plan) of the village that you have adopted in your project work along with the justification of how the developments that you have suggested will lead the village towards sustainable development.	10	CO1, CO2	6



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## End Semester Examinations (Civil Engineering) November 2017

Max. Marks: 100

Class: **T.Y. (Civil), Semester: V**

Name of the Course: **Hydraulic Engineering-I**

Q. P. Code:

Duration: Three Hours

Program: U.G. (B. Tech. Civil)

Course Code : BTC304

*Master file.*

### Instructions:

1. Attempt **Any Five** questions
2. All questions carry equal marks
3. Answer to each question to be started on the fresh page
4. Assume suitable data if necessary and mention it clearly.
5. Draw neat diagrams.

Qu. No.		Max. Marks	Course Outcome Number	Module No.
Q1	(a) Explain briefly the phenomenon of water hammer flow in pipe lines and distinguish clearly between rapid closure and slow closure of valve. Also derive an expression for pressure rise due to water hammer blow in the elastic pipe.	10	CO1	1
	(b) Three pipes connected in series discharge water from 85 meter level to 40 meter level. The details of piping system are as given in <b>Table 1</b> . Considering minor losses; determine discharge, velocity and head loss in each pipe.	10	CO1	1

Table 1.

Pipe	Length ( m )	Diameter ( cm )	Friction Factor (f)
1	950	25	0.020
2	800	15	0.018
3	900	20	0.022

Q2	(a) A pipe bend placed in a horizontal plane tapers from 30 cm diameter at inlet to 15 cm diameter at outlet. Water enters the reducing bend horizontal and gets turned through 45-degree in the clockwise direction. Measurements indicate that when oil (Sp. Gr. =0.85) flows at the rate of $0.18 \text{ m}^3/\text{s}$ , the pressure of $40 \text{ kN/m}^2$ at the inlet section drops to $24 \text{ kN/m}^2$ at outlet section due to frictional effects. Find magnitude and direction of resultant force on the bend.	10	CO3	2
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	(b) A lawn sprinkler has two nozzles of diameter 8 mm each at the end of the rotating arm and the velocity of flow of water from each nozzle is 10 meter/sec. Both the nozzles are discharging water in opposite direction to each other. The nozzles are at a distance of 30 cm. from the center of the rotating arm. Determine: (i) The torque required to hold the sprinkler stationary. (ii) The constant speed of rotation of arm, if it is free to rotate.	10	CO3	2
Q3	(a) Prove that for the jet striking at the center of the moving semi-circular curved vane; maximum efficiency is less than 60 %.	10	CO3	3
	(b) A 45 m/sec velocity jet of water strikes without shock on a series of vanes moving at 12 m/sec. The jet is inclined at an angle of $23^\circ$ to the direction of motion of vanes. The relative velocity of jet at outlet is 0.82 times the value at inlet and the flow is radial. Determine: (i) Vane angle at entrance and exit. (ii) Work done on vanes per second per unit weight of water. (iii) Hydraulic efficiency.	10	CO3	3
Q4	(a) Obtain an expression for unit speed, unit discharge and unit power for a turbine.	10	CO3	4
	(b) In an inward flow reaction turbine the diameter at inlet and outlet are 1.20m and 0.60 m. The hydraulic efficiency = 92%. Head = 45m. The velocity of flow at outlet = 2 m/sec. The discharge at outlet is radial. The vane angle at outlet is $15^\circ$ . Flow width is 0.10 m. at inlet and outlet. Determine (i) the guide blade angle (ii) vane angle at inlet and outlet.	10	CO3	4
Q5	(a) Explain: (i) Cavitations in centrifugal pump; and (ii) Head-discharge relationship for a centrifugal pump	10	CO4	5
	(b) The impeller of a centrifugal pump is 300 mm in diameter and 50 mm wide at the periphery. The blades are inclined backwards such that the blade tips make an angle of $60^\circ$ from the radius. The pump delivers $15 \text{ m}^3/\text{min}$ and the impeller rotates at 975 rpm. Assuming, radial flow. Determine: (i) Speed and direction of water as it leaves the impeller, (ii) Torque exerted by the impeller on water, (iii) Shaft power required, and (iv) Lift of the pump.	10	CO4	5
Q6	(a) Explain theory of Draft Tube and derive an expression for efficiency of draft tube.	10	CO4	4
	(b) A Kaplan turbine is to be designed to develop 5200 kW. The net available head is 18 m. The overall efficiency of the turbine is 72 % and the diameter of the boss is 0.35 times the diameter of shaft. Find the diameter of the runner, its speed and specific speed.	10	CO4	4
Q7	(a) Explain the working of hydraulic lift with a neat sketch.	06	CO3	6
	(b) State the principle of hydraulic press and explain its working with neat sketch.	06	CO3	6
	(c) Derive Hagen-Poiseuille equation for laminar flow through circular pipe.	08	CO1/CO2	7

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B.Tech. Civil. Sem V

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**END SEM EXAMINATION**

**NOVEMBER 2017**

**Program: Civil Engineering**

**B. Tech.**

**Course code: BTC 301**

**Name of the Course: Geotechnical Engineering-I**

**Semester: V**

**Instructions:**

**Duration: 3 hr**

**Maximum Marks: 100**

Master file.

1. Question number one is compulsory.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right side indicate full marks.
4. Assume Suitable data if necessary and state it clearly

Que. No.		Max. Marks	Course Outcome Number	Module No.
Q1(a)	Discuss the Importance of soil Exploration in construction Project.	5	CO4	7
(b)	Describe the permeability determination by falling head method.	5	CO2	3
(c)	A granular soil has a porosity of 42%. The specific gravity of soil particles is 2.7. Determine the critical hydraulic gradient of the soil.	4	CO3	4
(d)	Represent the soil as a three phase system & use it to derive relation between porosity and void ratio.	6	CO1	1
Q2(a)	In falling head permeability test the length and area of cross section of soil specimen are 0.17m and $21.8 \times 10^{-4} \text{ m}^2$ respectively. Calculate the time required for the head to drop from 0.25 m to 0.10m. The area of C/S of stand pipe is $2 \times 10^{-4} \text{ m}^2$ . The sample has three layers with permeabilities $3 \times 10^{-5} \text{ m/s}$ for first 0.06m, $4 \times 10^{-5} \text{ m/sec}$ for second 0.06m and $6 \times 10^{-5} \text{ m/sec}$ for the 0.05m thickness. Assume the flow is taking place perpendicular to the bedding plane.	8	CO2	3
(b)	State purpose of sieve analysis and its applications.	6	CO2	2
(c)	Define critical hydraulic gradient and derive expression for the same	6	CO2	4
Q3(a)	A sample of clay has a liquid limit of 80% and its plastic limit is 35%. How do you classify the soil as per the IS Classification	5	CO2	2
(b)	State and explain the factors affecting permeability of soils	8	CO1	3
(c)	A mass soil coated with thin layer of paraffin wax weighs 690.6 gm and the soil alone weighs 683 gm When the sample	7	CO2	1



	is immersed in water it displaces 350 ml of water. The specific gravity of the soil is 2.73 and that of wax is 0.89. Find out void ratio and degree of saturation, if it has got water content of 17%. Unit weight of water is 1000 kg/cu.m																																				
Q4(a)	Explain quick sand phenomenon	5	CO1	4																																	
(b)	A core cutter 12.6 cm in height and 10.2 cm in diameter weighs 1071gm when empty. It is used to determine the in situ unit weight of an embankment. The weight of core cutter full of soil is 2970 gms. If the water content is 6%, what are the in-situ dry unit weight and porosity? If embankment gets fully saturated due to heavy rains, what will be the increase in water content and bulk unit weight, if no volume change occurs? $G=2.69$	8	CO2	1																																	
(c)	Define flow net along with its characteristics.	7	CO1																																		
Q5(a)	Differentiate compaction from Consolidation and also explain effect of compaction on soil properties.	6	CO2	4&5																																	
(b)	The number of flow channels and head drops is 4 and 12 respectively. If the difference in upstream and downstream water table is 3 m, what is the discharge per meter width of a sheet pile wall if $K=0.1$ m/s	4	CO3	3																																	
(c)	Discuss the advantages and disadvantages of direct shear test.	5	CO2	4																																	
(d)	A long natural slope of cohesionless soil is inclined at $12^\circ$ to the horizontal. Taking $\phi=30^\circ$ , determine the factor of safety of the slope. If the slope is completely submerged, what will be change in the factor of safety?	5	CO2	7																																	
Q6(a)	A Series of triaxial test were conducted on 10 cm Diameter specimen of cohesionless soil and following readings were taken for Deviator load in N at different strain. Calculate deviator stress and plot deviator stress vers axial strain curve at a confining pressure of $50 \text{ kN/m}^2$ , and $100 \text{ kN/m}^2$ . Also calculate initial tangent modulus for both the cases.	10	CO3	6																																	
<table><tr><td>Strain (%)</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td><math>\sigma_3 = 50 \text{ kN/m}^2</math></td><td>150</td><td>270</td><td>360</td><td>430</td><td>490</td><td>540</td><td>570</td><td>610</td><td>630</td><td>640</td></tr><tr><td><math>\sigma_3 = 100 \text{ kN/m}^2</math></td><td>220</td><td>370</td><td>490</td><td>580</td><td>650</td><td>720</td><td>690</td><td>790</td><td>810</td><td>820</td></tr></table>					Strain (%)	1	2	3	4	5	6	7	8	9	10	$\sigma_3 = 50 \text{ kN/m}^2$	150	270	360	430	490	540	570	610	630	640	$\sigma_3 = 100 \text{ kN/m}^2$	220	370	490	580	650	720	690	790	810	820
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Q7(a)	Differentiate finite & infinite slope.	4	CO3	7																																	
(b)	In consolidation test void ratio decreased from 0.70 to 0.65 when the load as changed from $50 \text{ kN/m}^2$ to $100 \text{ kN/m}^2$ . Compute compression index and coefficient of volume change.	5	CO3	5																																	
(c)	Define Zero air Voids line. Describe procedure to plot the Zero air voids line on Dry Density – Moisture Content Curve.	6	CO1	5																																	
(d)	Explain Plasticity Index, Shrinkage Index, Liquidity Index, Consistency Index and Flow Index.	5	CO1	2																																	



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### END SEM EXAMINATION

NOVEMBER 2017

Program: Civil Engineering

B. Tech.

Course code: BTC 301

Name of the Course: Geotechnical Engineering-I

Semester: V

Instructions:

Duration: 3 hr

Maximum Marks: 100

Master file.

1. Question number one is compulsory.
2. Neat diagrams must be drawn wherever necessary.
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Que. No.		Max. Marks	Course Outcome Number	Module No.
Q1(a)	Discuss the Importance of soil Exploration in construction Project.	5	CO4	7
(b)	Describe the permeability determination by falling head method.	5	CO2	3
(c)	A granular soil has a porosity of 42%. The specific gravity of soil particles is 2.7. Determine the critical hydraulic gradient of the soil.	4	CO3	4
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Q2(a)	In falling head permeability test the length and area of cross section of soil specimen are 0.17m and $21.8 \times 10^{-4} \text{ m}^2$ respectively. Calculate the time required for the head to drop from 0.25 m to 0.10m. The area of C/S of stand pipe is $2 \times 10^{-4} \text{ m}^2$ . The sample has three layers with permeabilities $3 \times 10^{-5} \text{ m/s}$ for first 0.06m, $4 \times 10^{-5} \text{ m/sec}$ for second 0.06m and $6 \times 10^{-5} \text{ m/sec}$ for the 0.05m thickness. Assume the flow is taking place perpendicular to the bedding plane.	8	CO2	3
(b)	State purpose of sieve analysis and its applications.	6	CO2	2
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B.Tech. Civil - Sem V

	is immersed in water it displaces 350 ml of water. The specific gravity of the soil is 2.73 and that of wax is 0.89. Find out void ratio and degree of saturation, if it has got water content of 17%. Unit weight of water is 1000 kg/cu.m			
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(c)	Define flow net along with its characteristics.	7	CO1	
Q5(a)	Differentiate compaction from Consolidation and also explain effect of compaction on soil properties.	6	CO2	4&5
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Strain (%)	1	2	3	4	5	6	7	8	9	10
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(d)	Explain Plasticity Index, Shrinkage Index, Liquidity Index, Consistency Index and Flow Index.	5	CO1	2



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Munshi Nagar, Andheri (West), Mumbai - 400058.



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### End Semester Exam

November 2017

Max. Marks: 100

Class: T.Y. B.Tech.

Semester: V

Name of the Course: **Structural Analysis-II**

Duration: 3 Hours

Program: B.Tech. in Civil Engineering

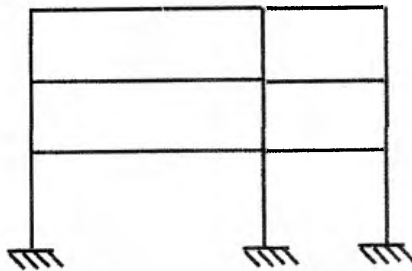
Course Code : **BTC 302**

Master file.

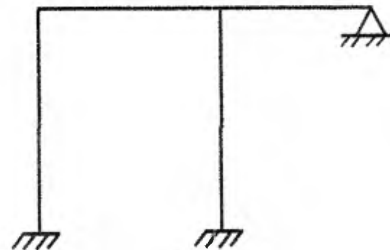
#### Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

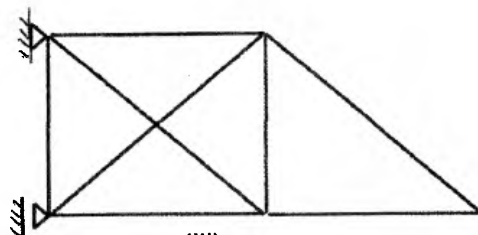
Question No		Max Marks	Course Outcome Number	Module No.
Q.1 (a)	<b>Determine the static and kinematic indeterminacy of the structures shown in figures below.</b>	(10)	1	2



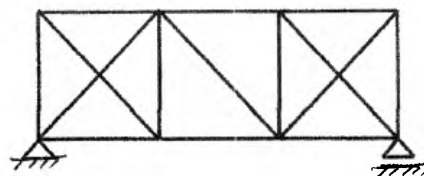
(i)



(ii)



(iii)



(iv)



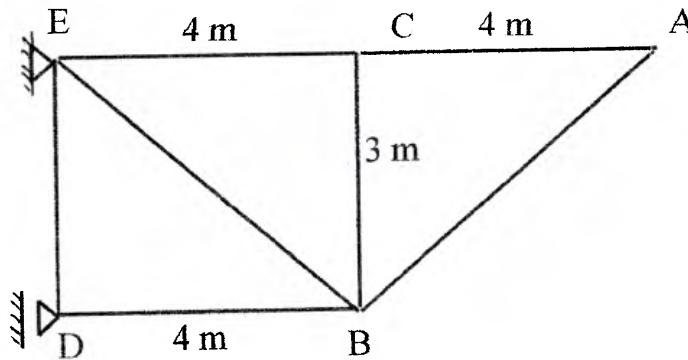
(v)



- Q.1 (b) The members of the truss shown in figure are subjected to temperature increase of  $40^{\circ}\text{C}$ . Calculate the vertical deflection of A due to the increase in temperature. Take  $\alpha = 12 \times 10^{-6}/^{\circ}\text{C}$ . (10)

1

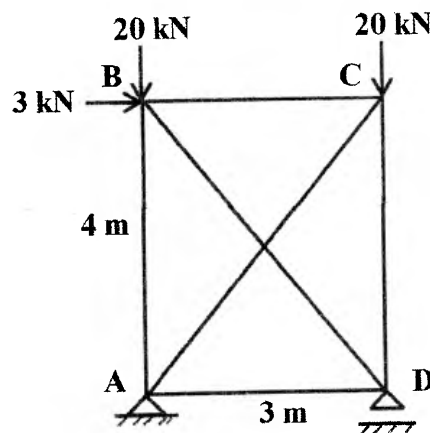
1



- Q.2 (a) Find the force in the redundant member AC of the truss loaded as shown in figure below by flexibility (compatibility) method. (Take force in member AC as the redundant force.) Assume AE to be same for all the members. (10)

2

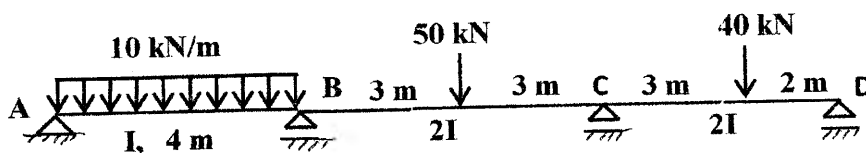
3



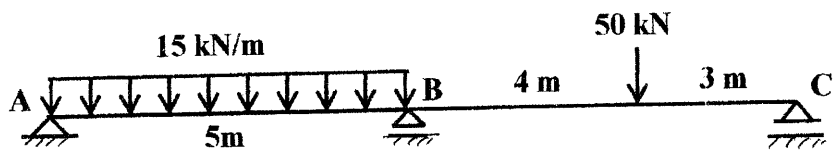
- Q.2 (b) Analyse the continuous beam shown in figure using three moment theorem. (10)

2

3

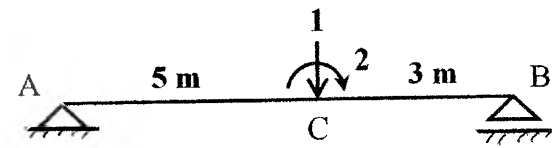


- Q.3 (a) Find the reaction at A in the beam shown in figure using the theorem of least work. Use vertical reaction at A as the redundant force. (10) 2 4

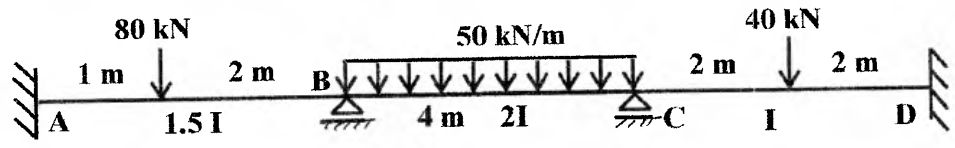


- Q.3 (b) A two hinged semicircular arch of span 40 m (i.e. of radius 20 m) carries an udl of 20 kN/m on the entire span. Determine the horizontal thrust in the arch. (10) 2 4

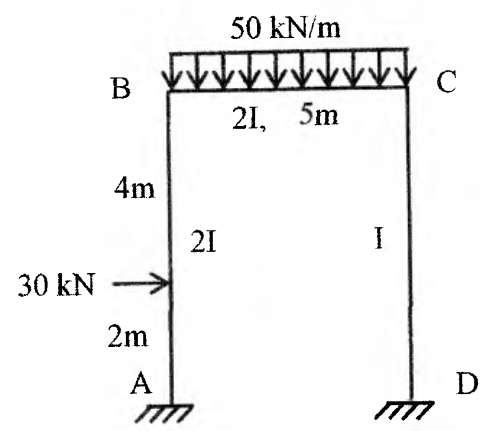
- Q.4 (a) Calculate the flexibility coefficients for the frame shown in figure w.r. to the coordinates indicated in figure. (10) 2 3



- Q.4 (b) Analyse the beam shown in figure by moment distribution method. (10) 3 5



- Q.5 Analyse the frame shown in figure by slope deflection method. Draw BMD. (20) 3 5

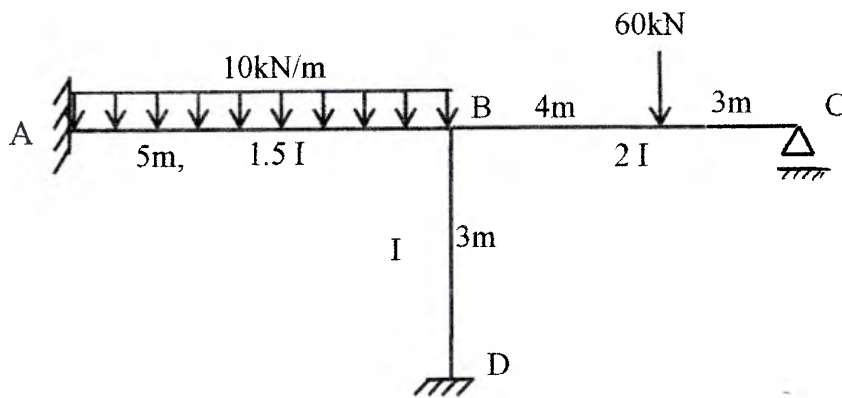


Q.6 (a) Analyse the frame shown in figure by stiffness method.

(12)

3

6



Q.6 (b) What are the conditions to be satisfied while analyzing a structure using

(06)

2,3,4

3,4,5,6  
7

- (i) Elastic analysis
- (ii) Plastic analysis

Q.6 (c) How is the information about the degree of static and kinematic indeterminacy useful in analyzing an indeterminate structure?

(02)

1,2,3

2,3,4,5  
6

Q.7 (a) Find the shape factor for the unsymmetrical I section with the following data.

(10)

4

7

Top flange - width = 250 mm, thickness = 20 mm

Bottom flange - width = 400 mm, thickness = 30 mm

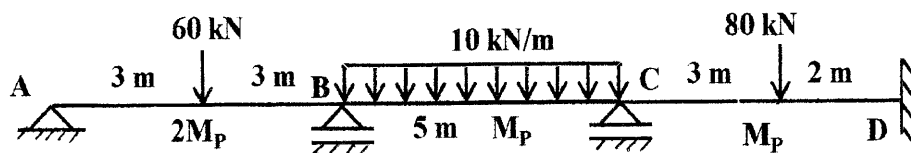
Depth of web = 300 mm, thickness of web = 25 mm.

Q.7 (b) A continuous beam is subjected to working loads as shown in figure below. If  $M_P = 90$  kN-m, calculate the (true) load factor for the beam.

(10)

4

7





T.Y.B. Tech. Civil - Sem V

Bharatiya Vidya Bhavan's

# Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai - 400058



End Semester Examination

November, 2017

Program : T. Y. B. Tech. Civil Engineering

Duration : 3 Hours

Course code : BTC 305

Maximum Marks : 100

Name of the Course : Transportation Engineering - I Semester : V

Master file.

## Instructions:

- Question Number 1 is compulsory
- Solve any four questions from remaining six questions
- Figures to the right indicate full marks and all questions carry equal marks
- Assume any data if required, stating them clearly

Question No.	Question	Max. Marks	Course Outcome Number	Module No.
Q.1.				
a	Discuss the requirement of railway station	5	2	4
b	Discuss why uniformity of gauge is required.	5	2	4
c	The length of runway under standard condition is 1100 m. the airport is to be provided at an elevation of 200 m above mean sea level. The proposed longitudinal section of runway using chain of 20 m is given in Table 1. If the airport reference temperature is $27.94^{\circ}\text{C}$ , Calculate the corrected length of runway.	10	1	2
Q.2.				
A	Discuss the term sleeper its function and requirements	5	2	4
B	State Advantages and disadvantages of timber Sleeper	5	2	4
4c	Estimate the cost required for construction of one Km long single line broad gauge railway track. (Assume following Data) i. Sleeper Density = $(n+5)$ ii. Cost of Steel Rail = 110 Rs/kg iii. Cost of Ballast = 400 Rs/m <sup>3</sup> iv. cost of timber for sleeper = 500 Rs/m <sup>3</sup> v. Cost of fish plate = 75 Rs/piece vi. Cost of Fish Bolt = 30 Rs/piece vii. Labour Charges = 40 % of Material Cost	10	2	4



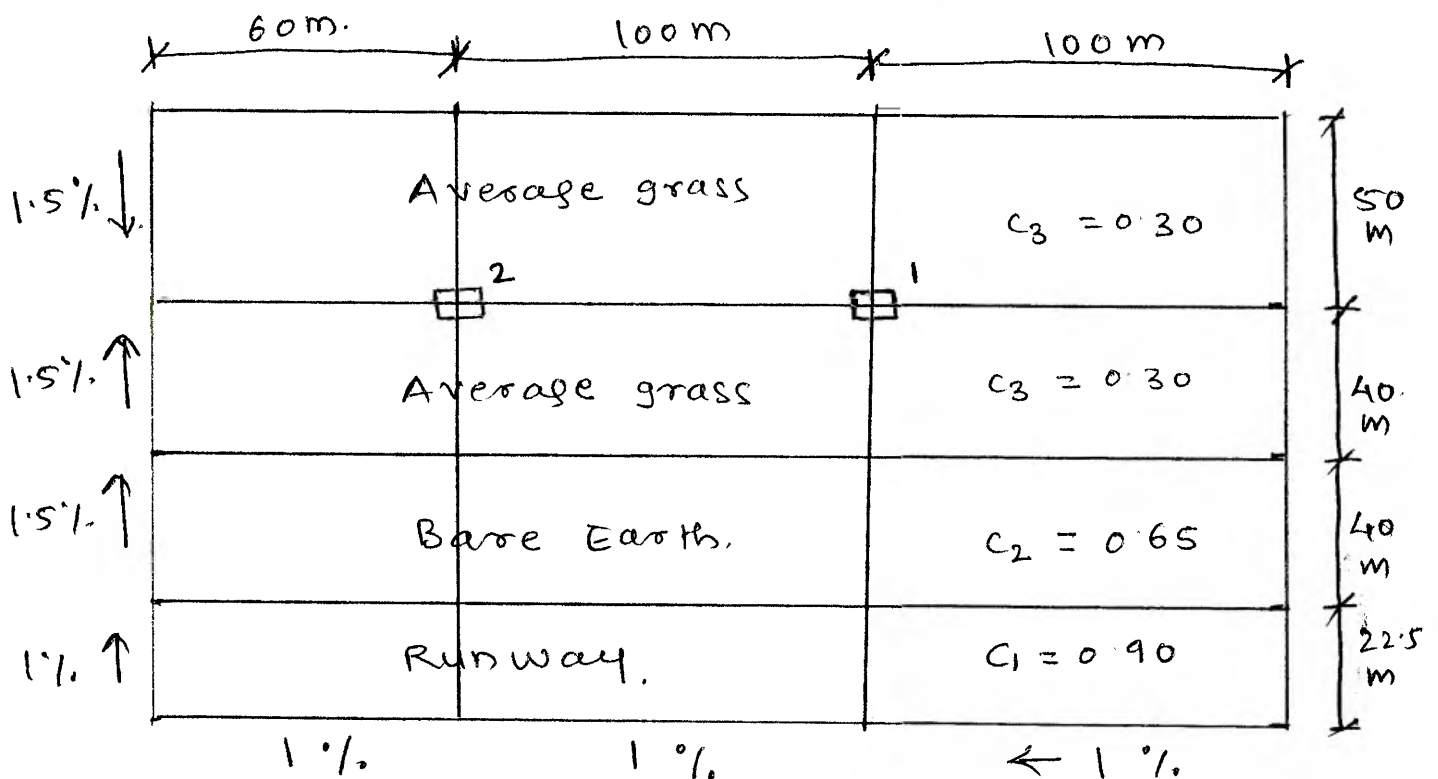
<b>Q.3</b>				
<b>a</b>	Discuss Classification of station based on operational characteristics.	6	2	5
<b>b</b>	A 5 <sup>0</sup> curve diverges from 2 <sup>0</sup> main curve in reverse direction in a layout of broad gauge yard. If the speed on branch line is restricted to 30 km/hr. determine the restricted speed on main line.	7	2	5
<b>c</b>	Explain with neat sketch coning of wheel and tilting of rail.	7	2	4
<b>Q.4</b>				
<b>a</b>	What are the steps for construction of Railway Track?	5	2	6
<b>b</b>	Draw a neat sketch of left hand turnout and discuss the component part of point and crossing	5	2	5
<b>c</b>	What do you meant by actual nose of crossing and theoretical nose of crossing.	5	2	5
<b>d</b>	Calculate Permissible speed and angle of crossing for broad gauge track when number of crossing is (i) 1:8.5 (ii) 1:12	5	2	5
<b>Q.5</b>				
<b>a</b>	Discuss the Characteristics of Aircraft.	6	1	1
<b>b</b>	Write short notes on (i) Cross wind component and its limiting value, (ii) Wind coverage (iii) Calm period, (iv) Wind rose diagram	8	1	2
<b>c</b>	A taxiway is to be design for Operating Boeing 707-320 which has following characteristics. Determine turning radius. Length of wheel base = 18 m, Turning speed = 45 km/hr, Lateral friction = 0.13 and Tread of main loading gear = 6.5 m.	6	1	2
<b>Q.6</b>				
<b>a</b>	The average wind data collected at particular site is given in Table 2. Determine calm period, orientation of runway and wind coverage. Assume permissible cross wind component = 25 km/hr. plot wind rose diagram considering (i) Direction and total duration (ii) Direction, duration and intensity of wind (iii) If another runway is oriented at right angle to above runway than what will be wind coverage.	10	1	2
<b>b</b>	Write short notes on weight component of aircraft.	3	1	2
<b>c</b>	Discuss with neat sketch different marking on Airport.	7	1	2
<b>Q.7.</b>				
<b>a</b>	Write short notes on: Solve any two (i) Breakwater (ii) Airport drainage (iii) Design of Super elevation (vi) Negative Cant	10	1 & 2	3
<b>b</b>	The drain inlet along a portion of runway length is shown in figure. Determine the design discharge at inlet 1. Also, design the drainage line 1-2. Given data C <sub>1</sub> = 0.90, C <sub>2</sub> = 0.65, C <sub>3</sub> = 0.30, where C is coefficient of runoff.	10	1	2

Table 1.

End to end runway length (m)	0 to 5 chain	5 to 15 chain	15 to 30 chain	30 to 45 chain	45 to 60 chain
Gradient (%)	+ 1.0	- 0.10	+ 0.50	- 0.60	+0.50

Table 2.

Wind direction	Duration of wind in percentage		
	6.4 to 25 km/hr	25 to 50 km/hr	50 to 75 km/hr
N	4.5	1.3	0.1
NNE	3.3	0.8	0
NE	1.8	0.1	0
ENE	2.7	0.3	0
E	2	0.4	0
ESE	5.3	0.1	0
SE	6.3	3.2	0.1
SSE	7.4	7.7	0.3
S	4.6	2.2	0
SSW	2.4	0.9	0
SW	1.1	0.1	0
WSW	3.6	0.4	0
W	1.8	0.3	0
WNW	5.9	2.6	0.2
NW	5.8	2.4	0.2
NNW	6.8	4.9	0.3



Q. 7. b.