DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
WINTER SEMESTER EXAMINATION - Dec 2019

B. Tech. Civil Engineering **V Semester**
Subject: Design of Steel Structures (BTCVC501) **Marks: 60**
Date: 09/12/2019 **Time: 03 Hours**

Instructions to the Students

1. *Solve any five questions from Q. no. 1 to Q. no 6*
2. *Use of Non Programmable Scientific Calculator is allowed.*
3. *Assume Suitable data wherever necessary.*
4. *Use of IS 800:1984, IS 808, Steel table or IS handbook no. 1 and IS 875 is allowed.*

Q.1 A) i) Write down the advantages and disadvantages of welded connections. **(06)**

ii) Explain various failure modes possible in a riveted joint with the suitable diagrams.

B) A joint in a truss girder consists of a double cover butt joint used to connect two bracing flats (ISF 200 x 12). The thickness of each cover plate is 8 mm. The flats have been joined by 9 power-driven field rivets in chain riveting pattern at a gauge of 50 mm as shown in the Figure 1. The nominal diameter of the rivets used is 22 mm. The yield strength of the flats used is 260 MPa. Find the capacity of the joint. **(06)**

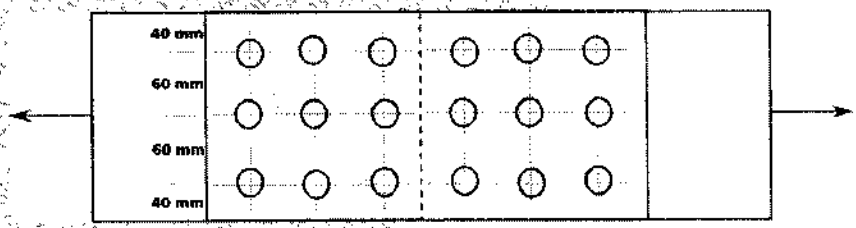

Figure 1

Q.2 A) A double angle tie ISA 150 x 115 x 10 mm (f_y= 250 MPa) with long leg connected to the same side of a gusset plate of 12 mm thickness by 18 mm diameter rivets, such that each angle is reduced in section by one rivets hole only. Determine the tensile strength of the member. **(06)**

B) A single angle discontinuous strut ISA 150 x 150 x 12 mm (f_y=250MPa) with single riveted connection is 3.5 m long. **(06)**

Determine the load carrying capacity of the compression member.

Q.3 Design a beam of 5m effective span carrying a uniformly distributed load of 15kN/m, if the compression flange is laterally unsupported. (f_y=250MPa) assume dead load of the beam = 500 N/m. **(12)**

Q.4 Solve any one one question. **(12)**

A) Design a column with two channel sections (placed back-to-back) laced together to support a load of 750 kN. The effective length of the column is 10m. Provide single lacing system with riveted connection. Assume (f_y=250MPa).

OR

B) A column section I.S.H.B 350 @ 674 N/m carries an axial load of 1100kN. Design a suitable gusset base using riveted connection. **(12)**

Q.5 A) Determine the design forces on the panel points of a steel roof truss (as shown in Figure 2) 16 m in span and resting on brick masonry walls. The trusses are placed at 8 m c/c. The rise of truss is 1/4 of span. The roofing is of asbestos cement sheets of weight 171 N/m^2. The wind normal to roof is 940 N/m^2. **(08)**

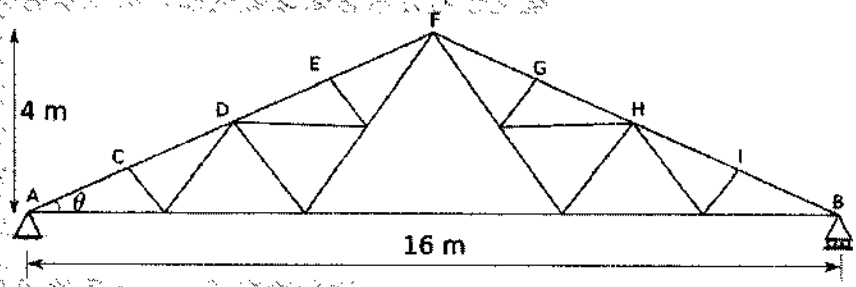

Figure 2

B) Explain in brief types of load acting on a gantry girder. **(04)**

Q.6 A) Define the plastic hinge. Find the length of plastic hinge for a simply supported rectangular beam subjected to a gradually increasing concentrated load P at the centre of its span. **(08)**

B) State the difference between working stress method and limit state method of design **(04)**

DR. BA_ .SAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Winter Examination – DecWinter 2019

Course: ***Civil Engineering*** **Sem: V**

Subject: ***Structural Mechanics II (BTCVC502)*** **Marks:60**

Date: 11/12/2019 **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*
5. *Solve All Questions in **Sequential** order.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**	**CO 3**	**12**
A)	The Frame ABCDEF shown in Figure 1 has a regular hexagon shape and is subjected to 60 kN vertical downward loads at A and D. All the members are of the same material and have the same cross-sectional area. Determine the forces in all the members.		**06**

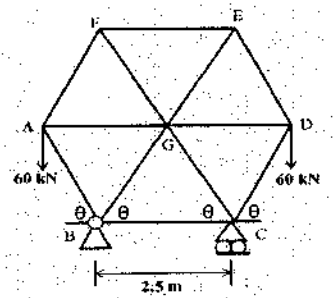

Figure -1

B) Find the forces in all the members of the truss shown in Figure 2.The cross sectional area and Young's Modulus of all the members are the same. **06**

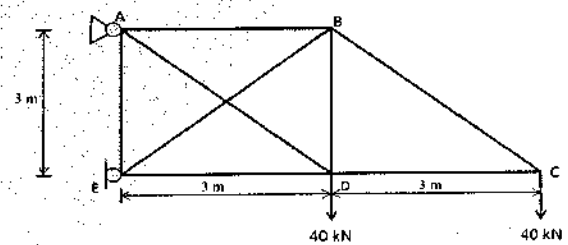

Figure -2

Q.2 Solve the following. CO 3 12

A) A train of 5 wheel loads as shown in Figure 3 crosses a simply supported beam of span 24 m from left to right. Calculate the maximum positive and negative shear force values at the centre of span and absolute maximum bending moment anywhere in the span. 06

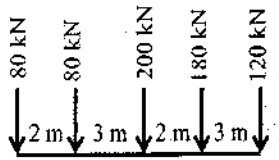

Figure 3

B) Draw the influence line diagram for the forces in the members L_0U_1, U_1U_2, U_2U_3, L_0L_1, L_1L_2, L_2L_3, U_1L_1, U_2L_2, U_3L_3, U_1L_2 & U_2L_3,of the Through type symmetric truss as shown in figure4.Determine maximum forces in these members when unit load traverses the span of 48 m. 06

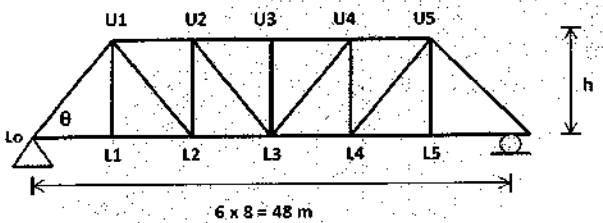

Figure 4

Q. 3 Solve the following. CO 1 12

A) A Three Hinged parabolic arch has a span of 30m and a central rise of 6m.Five wheel loads of 4kN, 5kN, 5kN, 3kN, 3kN spaced at 3m, 2m, 3m and 2m in order, cross the arch from left to right with the 4kN load leading. When the leading load is 20m from the left Hinge, calculate horizontal thrust in the arch. Also calculate the bending moment, normal thrust and shear force at section under tail load. 06

B) A Suspension Cable of 75 m horizontal Span and central dip 6m has a stiffening girder hinged at both ends. The dead load transmitted to the cable including its own weight is 1500kN.The girder carries a live load of 30kN/m uniformly distributed over the left half of the span. Assuming the girder to be rigid, calculate the SF & BM in the girder at 20m from the left support. Also Calculate the maximum tension in the cable. 06

Q.4 Solve the following. CO 1 12

A) A Fixed Beam ABC is Clamped at A & C subjected to UDL of 30 kN/m over entire span. Span of fixed beam ABC is 6 m. Flexural rigidities of AB and BC parts are EI and 2EI respectively. AB=3m, BC=3m. Determine the reactions & Moments at supports & Finally draw SFD and BMD. Use the flexibility method of structural analysis. 12

Q. 5 Solve the following. CO 1 12

A) Define Stiffness & write the procedure/steps to be adopted to solve any problem by using stiffness/displacement method of analysis. 06

B) Analyse the Continuous beam ABC having support A as Fixed and other are rollers as shown in figure 5.Assume that supports are unyielding. EI is constant for all members. Use Stiffness method for analysis. 06

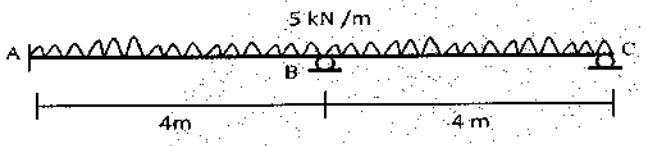

Figure 5

Q. 6 Solve the following. CO 2 12

A) Write & explain the procedure/steps to be adopted to solve any problem of structural analysis using Finite Element method. 06

B) Enlist, Explain and sketch the different types of Finite Elements. Also Explain guidelines for Discretisation. 06

***** End of the paper *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Winter Semester Examination – December - 2019

Branch: Civil Engineering **Sem.:- V**
Subject with Subject Code:- BTCVC 503 Soil Mechanics **Marks: 60**
Date:- 13/12/2019 **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

(Marks)

Q.1. a) Explain the three phase system of soil with neat diagram (06)

b) Explain the structure of the following soil minerals; (a) Montmorillonite, (b) Illite with neat diagram (06)

Q.2. a) What is bulk, dry, saturated and submerged unit weight of the soil? Also state the difference between bulk unit weight and bulk dry density (06)

b) Explain the plasticity chart as per IS 1498 Part I with neat drawing and detailing (06)

Q.3. a) Explain Constant head laboratory permeability test with neat diagram and equation to determine the co-efficient of permeability. (06)

b) A falling-head permeability test was performed on sample of clean, uniform sand. One minute was required for the initial head of 100 cm to fall to 50 cm in the stand pipe of the cross-sectional area 1.50 cm^2. If the sample was 4 cm in diameter and 30 cm long, calculate the coefficient of permeability of the sand. (06)

Q.4. a) Explain the procedure to conduct direct shear test on a soil specimen with neat diagram and representative results graphs. (06)

b) The following results were obtained from a consolidated-undrained ($C\bar{U}$) test on a normally consolidated clay. Plot the strength envelope in terms of total stresses and effective stresses and determine the strength parameters. (06)

Sample No.	Cell Pressure (kN/m^2)	Deviator Stress (kN/m^2)	Pore water pressure (kN/m^2)
1	250	152	120
2	500	300	250
3	750	455	350

Q.5. Solve any two of the following (06)

a) Explain the consolidation phenomenon with the help of spring analogy.

b) The following results were obtained from a Standard Compaction test on a sample of soil, the volume of the mould used was 950 ml. Make necessary calculations and plot the compaction curve and obtain the maximum dry density and the optimum moisture content.

Water content (%)	12	14	16	18	20	22
Mass of wet soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

(06)

Q.6. a) State and explain the active, at rest and passive state of earth pressure. Also calculate the active, at rest and passive earth pressure for soil with angle of internal friction equal to 33°. (06)

b) Determine the active pressure on the retaining wall shown in following fig. Take $\gamma_w = 10$ kN/m^3 (06)

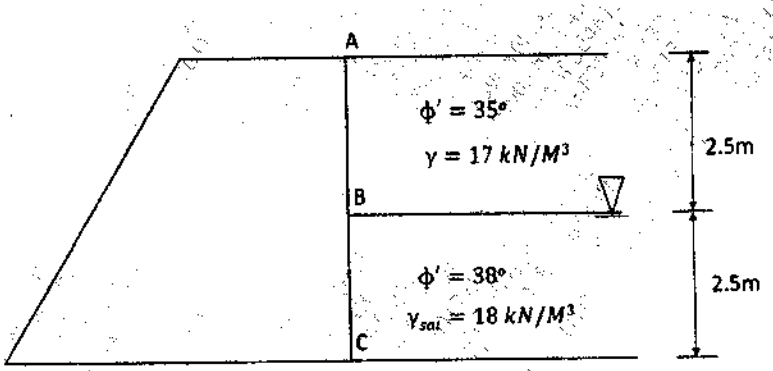

Fig. (a)

Paper End

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,

LONERE – RAIGAD -402 103

Winter Semester Examination – December - 2019

Branch: Civil Engineering **Sem.:- I**

Subject: - Environmental Engineering (BTCVC504) **Marks: 60**

Date: - 16/12/2019 **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some data is noticed to be missing, you may appropriately assume it and should mention it clearly

Q1. a) Explain in detail variation in rate of water demand. (6)
Give drinking water quality standards as per BIS 10500 for following parameters
i) pH ii) Hardness iii) Alkalinity iv) Chlorides v) MPN

b) Following figure represents census data for a town. Calculate the future population for the year 2020 by geometrical increase method. (6)

Year	1940	1950	1960	1970	1980	1990
Population in thousand	1,50,000	1,80,000	2.34,000	3,27,000	4,58,000	6,87,960

Q2. a) Derive an equation for Stokes equation to calculate settling velocity of spherical particle in sedimentation tank. (6)

b) A settling tank is designed for an overflow rate of 4000 lit/m^2/hr. Compute percentage of particles of diameter a) 0.05 mm and b) 0.02 mm, will be removed in this tank at 10^0 C? (6)

Q3. a) Explain any two types of water distribution layouts with its advantages and disadvantages. (6)

b) A water distribution network is an equilateral triangle in shape. If inflow at junction A is 60 units and outflow at B and C are 40 and 20 units respectively. Carry out hydraulic analysis of distribution system by using Hardy Cross method and find (6)

corrected flow in each pipe. Take initial value of discharge from A to B =15 units. Take the value of k in equation $h_f = k.Q^2$, for pipe AB= 4, BC = 1 and CA= 2. Take two trials.

Q4. a) Construct a typical flow diagram of sewage treatment plant with Activated sludge process as secondary treatment and explain the function of each unit. Show flow diagram with proper symbols. (6)

b) The BOD of sewage incubated for one day at 30°C has been found out to be 150 mg/Lit. Estimate 5 day BOD at 20° C? Assume k=0.12 /day, (Base 10). (6)

Q5. a) Classify solid wastes based on source. Give appropriate examples (6)

b) Explain following composting methods in detail (6)
   i) Bangalore method
   ii) Indore method

Q6. a) Enlist various control equipment used for particulate removal. Explain any two Control equipment in detail. (6)

b) What is Lapse rate and inversion? (6)
Write in detail different stability conditions affecting dispersion of air pollutants.

****End Paper****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Winter Semester Examination – December - 2019

Branch: Civil Engineering | **Sem.:- I**
Subject:- Transportation Engineering (BTCVC505) | **Marks: 60**
Date:- 18/12/2019 | **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Q.1.

AI) Explain in detail classification of road? (03 Marks)

AII) what do you mean by alignment of road? What are basic requirements of ideal alignment? (03 Marks)

BI) Explain in detail engineering surveys to be made for fixing alignment of road ? (03 Marks)

BII) Describe in detail (03 Marks)
1) Jaykar Committee and its recommendations
2) IRC

Q.2.

AI) Derive an expression for overtaking sight distance? Explain of overtaking zones with neat sketch? (06 Marks)

BI) While aligning a highway in buildup area, it was necessary to provide circular curve of radius 324 m. The design speed is 65 kmph, the length of wheel base is 6 m and width of pavement is 10.5 m. Design the following geometric features 1) Super elevation 2) Extra widening of pavement 3) length of Transition curve (03 Marks)

BII) What is Camber ? Explain its types with and mention IRC recommendations of it ? (03 Marks)

7E2479D4FF0A082B23F2979E1F3CD4DF

Q.3.

AI) Write a short note on (03 Marks)
1) Marshall stability test
2) CBR test

AII) What are different test to be carried out on Aggregate? Explain Shape test of aggregate in Details? (03 Marks)

BI) Differentiae between Tar and Bitumen (03 Marks)

BII) Explain the term (03 Marks)
1) Cutback Bitumen
2) Bitumen Emulsion

Q.4.

AI) What are various engineering studies to be carried out for collection of traffic data? Explain any traffic volume study in detail? (03 Marks)

AII) What are various traffic control device? Explain in detail traffic signs? (03 Marks)

BI) What is need of parking ? what are its types ? explain its type with neat sketch (03 Marks)

BII) What are objectives of accidental studies? Discuss causes of road accidents? (03 Marks)

Q.5.

AI) Differentiate between rigid pavement and flexible pavement? (03Marks)

AII) Enlist as method of design of Rigid pavement per IRC 37-2012? (03 Marks)

BI) What is pavement? What are requirement of good pavement? State Factors affecting on design of pavement? (03 Marks)

BII) Write a note on design guide lines of flexible pavement as per IRC37-2012 (03 Marks)

Q.6.

AI) Explain in detail importance of transportation? (03 Marks)

AII) Compare land transportation, water transportation and air transportation (03 Marks)

BI) What is role of transportation in development of nation? (03 Marks)

BII) Describe in detail (03 Marks)

1) 1) Rapid Transit system in Urban area :

2) Advantages and Disadvantages of Pipeline transportation

Paper End

7E2479D4FF0A082B23F2979E1F3CD4DF

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD - 402 103
Winter Semester Examination – December - 2019

Branch: Civil Engineering **Sem.:- V**

Subject with Subject Code:- Materials, Testing & Evaluation (BTCVE506A) **Marks: 60**

Date:- 20/12/2019 **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

	(Marks)
Q.1. Attempt the following questions	**(12)**
A) State various mechanical properties of metals and define any three.	06
B) Define each of the following:	06
a) Composite b) Ceramics c) Toughness d) Resilience	
e) Specific heat f) Nano materials	
Q.2. Attempt **any two** following questions	**(12)**
A) Explain concrete with grades and uses of each grade in construction.	06
B) Explain Bulking of sand with the help of graphical representation.	06
C) Propose the type of cements to be used in construction of following structures:	06
a) Dam, b) Skyscrapers, c) Canals lining, d) Highway Pavements,	
e) Marine structures, f) Bridges	
Q.3. Attempt the following questions	**(12)**
A) Explain FRC and its applications in detail.	06
B) Explain FRP structural insulated panels in detail.	06
Q.4. Attempt the following questions	**(12)**
A) Compare RCC and FRC.	06
B) Compare bricks and cement.	06
Q.5. Attempt the following questions	**(12)**
A) Explain 3D Printing with its applications in construction.	06
B) Explain Self-healing concrete.	06
Q.6. Attempt the following questions	**(12)**
A) Explain Ultrasonic test in detail.	06
B) Propose suitable type of tests for determining following:	06
a) Salt deposits on bricks, b) consistency of bitumen, c) Cracks in concrete,	
d) Welding defects, e) Compressive strength of concrete f) Corrosion of reinforcement	

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Winter Semester Examination – December - 2019

Branch : Civil Engineering **Sem.:- V**
Subject:- Business Communication & Presentation Skills (BTCVE506D) **Marks: 60**
Date:- 20/12/2019- **Time:- 3 Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1. a) What is Technical vocabulary? Explain with suitable examples (06)

b) Explain Simple, Compound, Complex sentence structures with examples (06)

Q.2. a) Differentiate between Personal letter and Business letter (06)

b) Prepare a 'office circular' informing employees about changes in office timings (06)

Q.3. a) What are essentials of a good business report? Explain (06)

b) Discuss the structure (sub-parts) of a Project report in detail (06)

Q.4. a) What is leadership? Which traits are essential to become a good leader? Explain (06)

b) What is team work? Discuss its importance with reference to group development. (06)

Q.5. a) What is a Business meeting? Explain its various types. (06)

b) Explain the points to be followed while conducting a business meeting (06)

Q.6. a) What are presentation skills? Explain its necessity and importance (06)

b) Write a note on presentation tools used in business meetings (06)

Paper End