Shri Shankaracharya Institute of Professional Management & Technology, Raipur

Department of Civil Engineering

Class Test – I Session: JULY – DEC, 2021 Month – OCTOBER

Semester – 5th Subject – STRUCTURAL ENGG. DESIGN – I, Code – C020511(020)

Time Allowed: 2 hrs. Max Marks: 40

Note: - Part A is Compulsory in each section. Attempt any two from Part B, C & D. Use of IS-456:2000 code is only permitted. Assume suitable data, if required, and mention it clearly. Draw neat sketches wherever required.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	SECTION I			
1A.	Explain modular ratio. What will be the modular ratio for M30 concrete? Give factor of safety for concrete and steel in W.S.M.	[4]	Understand	CO1
1B.	A RCC beam 200 mm wide has an effective depth of 350 mm. The permissible stresses in concrete and steel are 5 N/mm^2 and 230 N/mm^2 respectively. Find the depth of neutral axis, area of steel and percentage of steel, using working stress method.	[8]	Analyze	CO1
1C.	Find the tension reinforcement required for a beam of size 230X500 mm (effective depth) and effective cover to steel is 50 mm subjected to a B.M under working load is 80 KN-m. Use W.S.M	[8]	Analyze	CO1
1D.	Explain Various points on stress-strain curve for steel material.	[8]	Analyze	CO1
	SECTION II			
2A.	Why steel is used as reinforcement in RCC? What are conditions in which we design a doubly reinforced beam.	[4]	Understand	CO1
2B.	Design a singly reinforced beam to carry a ultimate load of 22500 N/m. The clear span of the beam is 5.5 meter. The bearing at each end is 300 mm. Use WSM.	[8]	Analyze	CO1
2C.	A beam of 300X600 mm overall depth and reinforced with four bars of 25mm on tension side and three bars of 22 mm on compression side. The bar is at 50 mm & 30 mm to the center of steel respectively from tension side and compression side of the beam. Calculate the moment of resistance of beam if M20 concrete and Fe415 steel used.	[8]	Analyze	CO1
2D.	Determine the moment of resistance of singly reinforced beam 180 mm wide and 300 deep to the center of reinforcement, if the stresses in steel and concrete are not to exceed 140 N/mm^2 and 5 N/mm^2. The reinforcement consists of 4 nos. of 16 mm dia. Bar. Take m=18. If the effective span of the beam is 5m, find the maximum load the beam can carry, inclusive of its own weight. Use WSM.	[8]	Analyze	CO1

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Online Class Test – I Session: July-December, 2021 Month – November
Semester – 5th Subject –T.E Code – C020514(020)
Time Allowed: 2 hrs. Max Marks: 40
Note: - In Part I & II, Question A is compulsory and attempt any two from B, C & D.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Define Pavement uneveness.	[4]	Understand	CO1
B.	Explain the importance of Second Twenty Year Road Plan in Highway planning of our country.	[8]	Understand	CO1
C.	Explain the following: 1)Kerb 2)Right of Way	[8]	Understand	CO1
D.	Derive an expression for analysis of super elevation.	[8]	Analyse	CO1
	Part II			
A.	What do you mean by cross slope?	[4]	Understand	CO1
B.	What do you mean by Stopping Sight Distance with diagram	[8]	Understand	CO1
C.	Explain Overtaking Sight Distance with Diagram	[8]	Understand	CO1
D.	Write a brief note on PIEV theory.	[8]	Understand	CO1

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Online Class Test – I Session: July-December, 2021 Month – November
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Note: - In Part I & II, Question A is compulsory and attempt any two from B, C & D.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Define Pavement uneveness.	[4]	Understand	CO1
B.	Explain the importance of Second Twenty Year Road Plan in Highway planning of our country.	[8]	Understand	CO1
C.	Explain the following: 1)Kerb 2)Right of Way	[8]	Understand	CO1
D.	Derive an expression for analysis of super elevation.	[8]	Analyse	CO1
	Part II			
A.	What do you mean by cross slope?	[4]	Understand	CO1
B.	What do you mean by Stopping Sight Distance with diagram	[8]	Understand	CO1
C.	Explain Overtaking Sight Distance with Diagram	[8]	Understand	CO1
D.	Write a brief note on PIEV theory.	[8]	Understand	CO1

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Department of Civil Engineering

Online Class Test – I Session: July-Dec, 2021 Month – October

Semester – 5th Subject – Geotech Engineering Sub. Code – C020513(020)

Time Allowed: **2 hrs.** Max Marks: **40**

Note: - In Part I & II, Question A is compulsory and attempt any two from B, C & D.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Explain the followings: (i) Activity of clay (ii) Consistency Index	[4]	Understand	CO1
B.	Discuss about the Atterberg's Limit or consistency limit.	[8]	Understand	CO1
C.	Explain IS Soil Classification system. Mention the equation and significance of A-line in plasticity chart.	[8]	Understand	CO1
D.	Derive the functional relationship of followings: (i) Relation between γ, G, e, and S. (ii) Relation between γ_d, G, w, n_a.	[8]	Apply	CO1
	Part II			
A.	(i) A soil has a bulk unit weight of 22 kN/m^3 and water content of 11%. Determine the dry density.	[4]	Evaluate	CO1
B.	A soil sample has a porosity of 45%. The specific gravity of solid is 2.65. Calculate the following: (i) Void Ratio (ii) Dry Density (iii) Unit weight if soil is 70% saturated (iv) Unit weight if soil is fully saturated	[8]	Evaluate	CO1
C.	The mass specific gravity of a soil is equal to 1.68. The specific gravity of solid is 2.65. Determine the void ratio under the assumptions that the soil is perfectly dry. What would be the void ratio if the sample is assumed to have water content of 12%.	[8]	Evaluate	CO1
D.	The void ratio and specific gravity of a sample of clay are 0.73 and 2.7 respectively. If the voids are 92% saturated, find the bulk density, dry density, and water content. What would be the water content for complete saturation, if the void ratio remains same.	[8]	Evaluate	CO1

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Department of Civil Engineering

Class Test – I Session: July-December, 2021 Month – October

Semester – 5th Subject –HYDROLOGY &WATER RESOURCES ENGINEERING

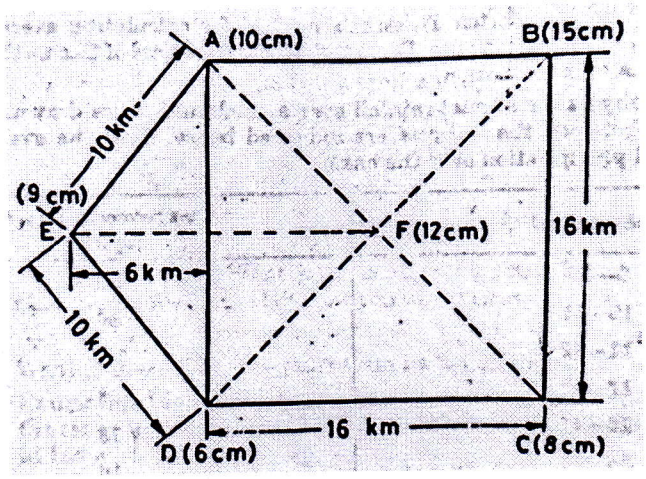
Code – C020512 (020) Time Allowed: 2 hrs. Max Marks: 40

Note: -Part A is compulsory in each section. Attempt any two from part B, C and D. Assume suitable data, if required, and mention it clearly.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Section I			
A	Explain the following with help of neat sketch i. Warm front precipitation ii. Cold front precipitation	4	Understand	CO1
B	Write Short notes on i. Location of Rain Gauge Station ii. Measurement of Precipitation iii. Forms of Precipitation	8	Understand	CO1
C	A sub-basin has six number of rain gauge. Annual rainfall recorded by the rain gauges is given below. Considering 10% error in estimation of mean annual rainfall calculates optimum number of rain gauges required for the sub-basin and check if the present network is sufficient.	8	Understand	CO1
D	Give the methods with corresponding formulae to find mean precipitation over a basin	8	Understand	CO1

Rain Gauge Name	**Annual Rainfall (In cm)**
A	110.3
B	82.8
C	98.8
D	136.7
E	180.3
F	102.9

Section II

A	Precipitation Station X was inoperative for part of a month during which a storm occurred. The respective storm totals at three surrounding stations A, B & C were 107, 89 & 122 mm. The normal annual precipitation amount of station X, A, B & C are respectively 978,1120,935 & 1200 mm. Estimate the storm precipitation for station X.	4	Analyze	CO1
B	Figure 1 represents a catchment area with the precipitation observed in a year. Calculate the mean precipitation by Thiessen polygon method and check the result roughly by arithmetic mean method  Fig. 1 Catchment Area	8	Analyze	CO1
C	The Isohyets for annual rainfall over a catchment were drawn. The areas of strips between the isohyets are indicated below in table. Find the average depth of annual precipitation over the basin.	8	Analyze	CO1
D	Describe with a neat sketch the construction and use of Float type recording Gauge.	8	Analyze	CO1

Isohyets (cm)	Area in sq.km	Isohyets (cm)	Area in sq.km
75-85	580	105-115	1000
85-95	2960	115-135	610
95-105	2850	135-155	160

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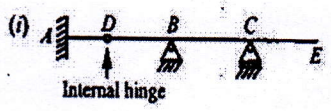
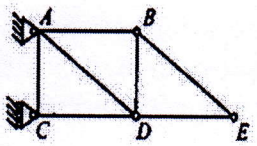
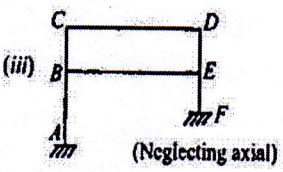
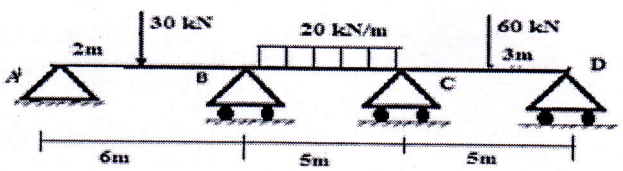
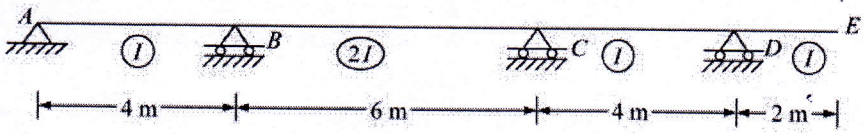
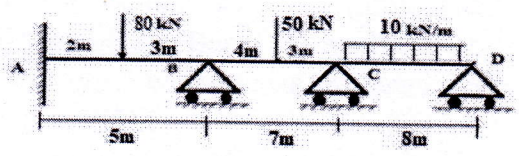
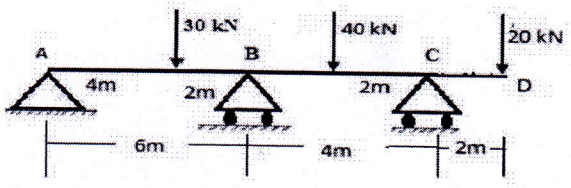
SSIPMT

Class Test – I Session: Jul – Dec, 2021 Month – October

Semester – 5th **Subject – Structural Analysis-II** **Code – C020531(020)**

Time Allowed: 2 hrs Max Marks: 40

*Note: - Attempt any **Four** Questions.*

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	COs
	Unit-1			
A.	I. Differentiate between static and kinematic indeterminacy. II. Discuss Degree of freedom. III. Discuss the Relation between Loading, SF, BM, Slope and Deflection. IV. Discuss Moment Curvature Relationship. V. Discuss the methods of Structural Analysis.	[10]	Understand	CO1 CO2
B	Determine the degree of Static and kinematic indeterminacy of the following structures: (i)  (ii)  (iii) 	[10]	Analyse	CO1
C	Analyze the continuous beam as shown in figure, using three moment equation, Draw shear force and Bending moment diagram, if support B sinks by 5mm under the given load. E=2.1x 10^5 N/mm^2 and I= 9300 cm^4. 	[10]	Analyse	CO1
D	 Analyze the continuous beam as shown in figure, using three moment equation and if support B sinks by 10 mm under the given load. E=15 kN/mm^2 and I=4x10^9 mm^4. Draw shear force and Bending moment diagram.	[10]	Analyse	CO1
E	Analyze the continuous beam as shown in figure, using three moment equation and Draw the SFD and BMD. Take EI is constant. 	[10]	Analyse	CO1
F	Analyze the continuous beam ABCD as Shown in fig. if support C settles down by 5mm. Take E=15 kN/mm^2. Moment of inertia is constant throughout and is equal to 5x10^9 mm^4. 	[10]	Analyze	CO1