SSIPMT RAIPUR

Note: - Attempt all questions. Part (a) from each question is compulsory. Carrying 2 marks. IS 456: 2000 is Permitted.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	COs
	Part- I			
(a)	Find out the values of design constant k & j and Q value for balanced section in working stress method, take M20 & Fe415 grade of concrete and steel.	[4]	Analyze	CO1
(b)	Differentiate between WSM and LSM.	[8]	Analyze	CO1
(c)	A concrete beam has 300 mm breadth and 500 mm effective depth; effective cover 50 mm, reinforced with 3 nos. 20 mm diameter steel bars at tension side. M20 concrete and Fe 415 grade steel are used. Determine the moment of resistance.	[8]	Evaluate	CO1
(d)	Calculate the maximum compressive stress in concrete and tensile stress in reinforcing steel for a R.C. beam of 3.6m effective span having a cross section of 300 x 600 Overall with 4 – 20 mm Ø and clear concrete cover of 25. The beam is loaded with a super-imposed u.d.l. of 80 kN. Use m = 19	[8]	Evaluate	CO1
	Part- II			
(a)	Define single reinforced &double reinforced beams with sketch.	[4]	Understand	CO2
(b)	A simply supported rectangular beam of 4 mt span carries an UDL of 26 kN/m. The width of the beam is 230mm.Find the depth and steel area for balanced design. Use M20 grade of concrete and mild steel reinforcement.	[8]	Evaluate	CO2
(c)	Design the shear reinforcement for a beam section of width 200 mm and effective depth 500 mm. The factored shear force is 100 kN and it is reinforced with 3 Nos 16 mm diameter bars on the tension side at the critical section. Use M20 concrete and Fe 415 steel.	[8]	Create	CO2
(d)	A doubly reinforced concrete beam 250mm wide and 600mm deep overall has to resist an external bending moment of 95kN-m. Find the amount of tensile and compressive steel required, if cover to the centre of steel on both sides is 50mm. M20, Fe 415 N/mm^2	[8]	Evaluate	CO2

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering

SSIPMT

Class Test – I	Session: July-December 2022	Month – December
Semester – 5th	Subject – Hydrology& WRE	Code – C020512(020)
Time Allowed: 2 hrs.		Max Marks: 40

Note- In Part-I, Question No. 1,2 and 3 are compulsory and solve any one from Question No. 4 and 5. In Part-II, all questions are compulsory.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
1)	Briefly explain the different stages of Hydrological Cycle	2	Understand	CO1
2)	What is meant by Probable Maximum Precipitation (PMP) over a basin?	2	Understand	CO1
3)	Define evaporation. Enlist the factors affecting the evaporation	2	Analyze	CO2
4)	Explain infiltration capacity. Discuss the factors affecting infiltration capacity	4	Analyze	CO2
5)	Describe in detail the working of any one recording type rain gauge with diagram	4	Understand	CO1
	Part II			
1)	Calculate the constant rate of withdrawal from a 1375 Hectare reservoir in a month of 30 days during which the reservoir level dropped by 0.75 m in spite of an average inflow of 0.5Mm³/day. During that month the average seepage loss from the reservoir was 2.5 cm, total precipitation was 18.5 cm and the total evaporation was 9.5 cm	6	Apply	CO1
2)	A sub-basin has six numbers of rain gauges. Annual rainfall recorded by the gauges are given below. Considering 12% error in the estimation of mean annual rainfall. Comment whether the present system of rain gauges is sufficient or not. If not, calculate the additional number of rain gauges required.	6	Apply	CO1
3)	The Normal annual rainfall at stations A, B, C, D and E are 80.97, 67.59, 76.28, 92.11 and 102.76 cm respectively. During the year 1985, the precipitation recorded by stations A, B, C and E were 91.11, 72.23, 79.89 and 86.75 cm respectively. Station D was inoperative. Estimate the rainfall at station D during the year 1985.	6	Apply	CO1
4)	The infiltration capacity for a catchment is represented by Horton's Equation as- $f_t = 0.5 + 1.2\ e^{-0.5t}$, Assuming the infiltration to take place at capacity rates in a storm of 4hours duration, Calculate-: i. Total infiltration depth ii. Average rate of infiltration	6	Apply	CO2
5)	Storm-I of duration 5 hours gives a direct runoff of 4cm and has an avg. intensity of 2cm/hr. Storm-II of 8 hours duration gives a direct runoff of 8.4cm. Calculate: - i. Value of Ø-index ii. Intensity of Storm-II for the same Ø-index	6	Apply	CO2

Table for Question 2 (Part II):

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

Shri Shankaracharya Institute of Professional Management & Technology, Raipur
Department of Civil Engineering
Class Test – I   Session: July- Dec, 2022   Month – December

SSIPMT

Semester – 5th   **Subject – Geotechncial 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 (also mention the range) (ii) Thixotropy (with neat behavior graph)	[4]	Understand	CO1
B.	An undisturbed soil sample has a volume of 100 cm^3 and mass of 195 gm. on oven drying for 24 hours, the mass is reduced to 163 gm. If the specific gravity of grains is 2.65, evaluate (i) water content (ii) void ratio, and (iii) degree of saturation of soil.	[8]	Analyze	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]	Understand	CO1
	Part II			
A.	(i) Define permeability and derive the expression of coefficient of permeability for fine grained soil using laboratory method.	[4]	Understand	CO2
B.	A soil sample of volume 320 cm^3 wights 600 gm. On oven drying, the weight of sample reduced to 90% and volume reduced by 12%, Calculate: (i) Shrinkage limit (ii) Shrinkage Ratio (iii) Specific Gravity	[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.	Write the equation of Poiseuille's law for the flow through soil pores and explain the factors affecting permeability.	[8]	Understand	CO2

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Class Test – I   **Session: July-Dec, 2022**   **Month – December**
SSIPMT   **Semester – 5th   Subject – Transportation Engineering**
Code – C020514(020)
Time Allowed: 2 hrs.   Max Marks: 40
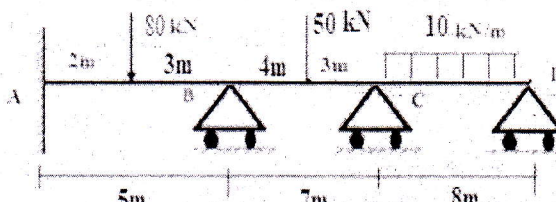*Note: - In Part I & II, Question A is compulsory and attempt any two from B,C & D.*

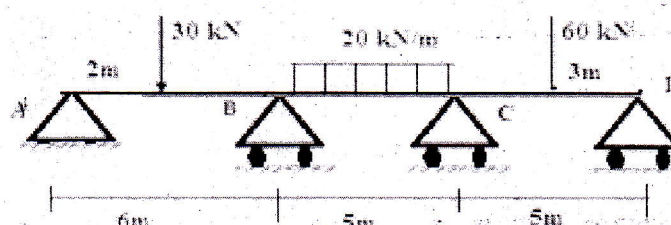| Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Calculate the braking distance and lag distance for a design speed of 80 kmph assuming the coefficient of friction as 0.35. Assume suitable data if necessary.	[4]	Analyze	CO1
B.	A two lane National Highway having design speed of 50 kmph passing through a hilly terrain has a horizontal curve of radius equal to ruling minimum radius. Design all geometric features of the curve. Calculate set back distance for SSD when it is measured from center of road.	[8]	Analyze	CO1
C.	A National Highway passing through rolling terrain in heavy rainfall area has a horizontal curve of radius 500m. Design the length of transition curve assuming suitable data.	[8]	Analyze	CO1
D.	Calculate the safe overtaking sight distance for a design speed of 96 kmph. Assume all other data suitably.	[8]	Analyze	CO1
	Part II			
A.	Write the types of parking facilities.	[4]	Understand	CO2
B.	Explain the various types of Traffic sign with neat sketch.	[8]	Understand	CO2
C.	Explain the terms: i) O & D Studies ii) Speed & Delay Studies iii) Rotary Island	[8]	Understand	CO2
D.	Write the Luminaire distribution of light. Design a street lighting system for the following conditions. Street width = 15 cm, Mounting Height = 7.5 m, Lamp size = 6000 lumen and Luminaire type = II. Calculate the spacing between lighting units to produce average Lux = 6.0.	[8]	Understand, Analyze	CO2

Shri Shankaracharya Institute of Professional Management & Technology, Raipur
Department of Civil Engineering

Class Test – I   Session: Jul – Dec, 2022   Month – December

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

Time Allowed: 2 hrs   Max Marks: 40

Note: - In every part Question A is compulsory, Attempt any two Questions from B,C and D .
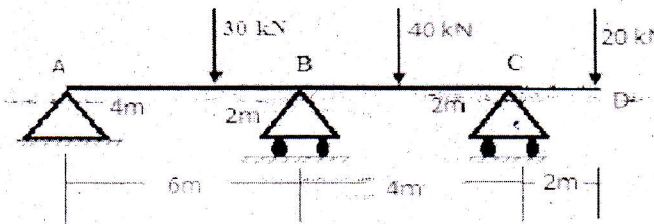
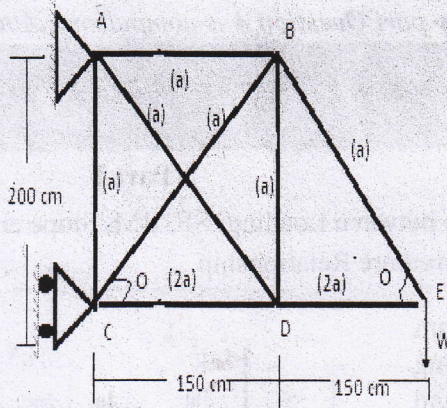| Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO.
	Part-I			
A.	I. Discuss the Relation between Loading, SF, BM, Slope and Deflection. II. Discuss Moment Curvature Relationship.	[4]	Understand	CO1 CO2
B	Analyze the continuous beam as shown in figure, using three moment equation and Draw the SFD and BMD. Take EI is constant.	[08]	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.	[08]	Analyse	CO1
D	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.	[08]	Analyse	CO1
	Part-II			
A	i. Discuss the Maxwell Reciprocal Theorem. ii. Discuss Castigliano's theorem of minimum strain Energy.	[04]	Understand	CO2

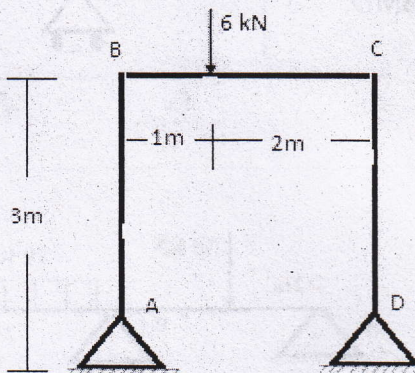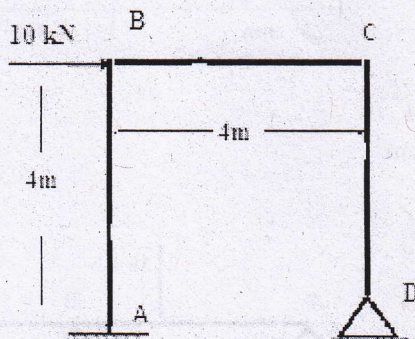|				
B	Find the axial force in the member BC of the truss shown in Figure. All the Members are of the same material.	[08]	Evaluate	CO2
C	A portal frame ABCD is hinged at A and D and rigid joint B and C. The frame is loaded as Shown in figure using method of min. strain energy Analyze the frame and plot the B.M.D.	[08]	Analyse	CO2
D	Using Castigliano's theorem of minimum strain energy, analyze the frame shown in figure and Draw the BMD. EI is constant for the whole frame.	[08]	Analyse	CO2

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