Shri Shankaracharya Institute of Professional Management &Technology, Raipur

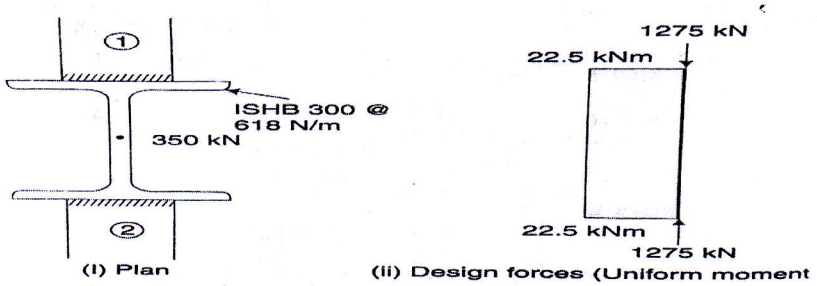
Department of Civil Engineering

Class Test – ISession: JULY – DEC, 2023 Month –OCTOBER

Semester – 7th Subject –Structural Engg. Design -IIICode –D020711(020)

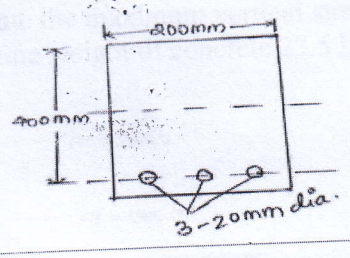
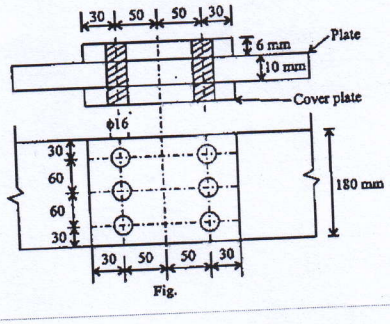
Time Allowed: 2 hrs. Max Marks: 40

Note: -Part A of each question is compulsory. Attempt any 1 from Part B, C in each question. Use of IS 800:2007& Steel Book is permitted. Assume the suitable data if required and mention if clearly.Draw neat sketches wherever required.

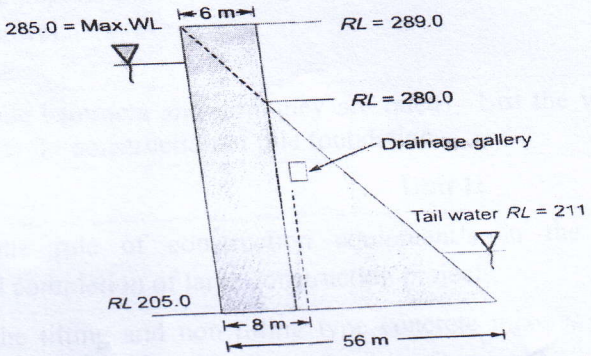
Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part-I			
A.	Describe the different types of column bases with neat sketch. Explain the classification of cranes according to crane manufactures Association of America with neat sketch.	[4]	Understand	CO3
B.	Design a suitable slab base for a column section ISHB 200@ 365.9N/m supporting an axial load of 500 kN. The base plate is to rest on a concrete pedestal of M20 grade concrete. The load is transferred to the base plate by welded connection.	[16]	Create	CO3
C.	A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable welded gusset base. The base rests on M-15 grade of concrete.	[16]	Create	CO3
	Part-II			
A.	Explain member subjected to combined forces with suitable examples.	[4]	Understand	CO4
B.	A non-sway column in a building frame with flexible joints is 4-m high and subjected to the following load and moment: Factored axial load = 500 kN Factored moment M_z at top = 27.0 kNm at bottom = 45.0 kNm Design a suitable beam column assuming $f_y = 250N/mm^2$. Take the effective length of the column as 0.8L along both the axes.	[16]	Create	CO4
C.	A column ISHB 300 @ 618 N/m in a framed building supports spandrel beams as shown in Fig. Ex. 10.1 at its top end. The beams are welded to the column flanges and transfer end reactions of 225 kN (beam 1) and 375 kN (beam 2) and an axial compressive force of 675 kN from the top storeys. The bottom end of the column has a similar beam-to-column arrangement as well as loading. Calculate the adequacy of the column if its effective length is 3.2 m about both the axes. The beam reactions and the loads have been computed from factored loads.  **Fig. Ex. 10.1**	[16]	Apply	CO4

SSIPMT

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Class Test – I Session: July – December 2023Month – October
Semester – 7th Subject – Design of StructureCode – D000703(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 assumptions in case of design of singly reinforced section?	[4]	Understand	CO1
B.	Calculate the Moment of resistance of a singly reinforced rectangular beam if (Take M-20, Fe 415) Width of beam = 200mm Effective Depth = 400mms Effective cover = 50mm 	[8]	Apply	CO1
C.	Explain in details what do you understand by balanced section, under reinforced section and over reinforced section.	[8]	Understand	CO1
D.	An R.C.C beam 250mm x 400mm effective is carrying a u.d.l of 16kN/m. The reinforced with 4 bars of 22 mm diameter. The clear span of the beam is 4m. Design the shear reinforcement. Use M-20 and Mild Steel bars.	[8]	Create	CO1
	Part II			
A.	Describe the pitch, edge distance in bolted connection with neat sketches.	[4]	Understand	CO5
B.	Explain the different types of lap joints and butt joints with neat sketches	[8]	Understand	CO5
C.	Explain in details of failure condition of bolted connection.	[8]	Understand	CO5
D.	Two plates 180 mm x 10 mm each are connected by a double cover butt joint with 16 mm diameter bolt as shown in Fig. The cover plate provided is 6 mm thick. Calculate the strength of the joint.  Fig.	[8]	Apply	CO5

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Class Test – ISession: July-Dec, 2023Month – October
Semester – 7th Subject – Design of Hydraulic Structures
Code –D020712 (020)Time Allowed: 2 hrs. Max Marks: 40
Note: - In Part I & II, Question A is compulsory and attempt any one from B & C.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Describe the various modes of failure in gravity dam.	[4]	Understand	CO1
B.	The figure below shows the section of a gravity dam (non-overflow portion) built of concrete. Calculate the maximum vertical stresses at the heel and toe of the dam. Assume weight of concrete 23.5 kN/m. Neglect earthquake effects.  	[16]	Apply	CO1
C.	Explain the schematic diagram of a gravity dam and the major forces acting on it. Draw the diagram of the uplift force when (i) drain is not provided and (ii) drain is provided.	[16]	Understand	CO1
	Part II			
A.	Explain the selection of suitable type of cross drainage work.	[4]	Understand	CO5
B.	Describe the different methods of designing channel transitions.	[16]	Understand	CO5
C.	Explain brieflythe cross drainage work? Describe the various types of cross drainage works with neat sketch.	[16]	Understand	CO5

Shri Shankaracharya Institute of Professional Management & Technology, Raipur

Department of Civil Engineering

Class Test – I Session: July – Dec, 2023 Month – October

Semester – 7th Subject – Construction Equipment & Techniques Subject Code- D020733(020)

Time Allowed: 2 hrs Max Marks: 40

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

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	COs
	Unit I			
A.	Classify the equipment for construction on a fundamental basis with sub-groupings.	[4]	Understand	CO1
B.	Discuss briefly the advantages of using conveying equipment and the situation in which they will be necessary.	[8]	Understand	CO1
C.	Describe in detail, the operation and application of the following types of excavating equipment with line-diagram showing the basic parts: i) Power Showel ii) Back Hoe	[8]	Understand	CO1
D.	What are pile hammers and how they are rated? List the various piling rigs available for construction of pile foundation.	[8]	Understand	CO1
	Unit II			
A.	Describe the role of construction equipment's in the speedy and economical completion of large construction projects.	[4]	Understand	CO1
B.	Compare the tilting and non tilting type concrete mixers. What are the different factors which govern the production of a mixer?	[8]	Understand	CO1 CO2
C.	Discuss about batching equipment and describe, what you mean by batching plant.	[8]	Understand	CO1 CO2
D.	What do you mean by hauling and what are the different types of equipment used as hauling equipment; describe briefly.	[8]	Understand	CO1

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Shri Shankaracharya Institute of Professional Management & Technology

Department of Civil Engineering

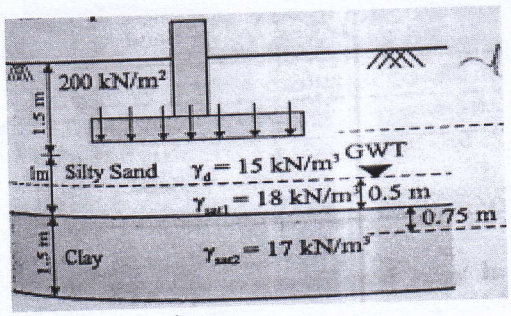
Class Test – I Session: July-December, 2023 Month – October Semester-7th

Subject–Foundation Engineering Code – D020713 (020)

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

Note:-1)In Part I & II, Questions1 is compulsory

2) Answer any two from 2,3,4 from Part I and II.

Q.No.	Questions	Marks	Levels ofBloom staxonomy	CO's
	PartI			
1)	Explain in briefab out General Shear Failure and Local Shear Failure	4	Understand	CO1
2)	A square footing 3m carries agross pressure of 350kN/m2 at a depth of 1.2 minsand. The saturated unit weight of sand is 20kN/m3 and the unit weight above the water table is17kN/m3. Calculate the factor of safety with respect to shear failure for the following cases:- a. When watertableis5mbelowGL. b. Whenwatertableis1.2mbelowGL. Consider Nq=22 and Ny=20	8	Apply	CO1
3)	Calculate the diameter of a circular footing. If a concentric column load of 825kN is acting and weight of footing is also to be considered. The depth of footingis1.5m. Thesoilis partly saturated and has c=55kN/m2 and Y= 19kN/m3. 20% of the total column load is equal to the weight of footing. Water table is at GL. Use Terzaghi's Analysis and FOS=3	8	Apply	CO1
4)	A square footing of size 2.5m×2.5 misbuiltina C-Ø soil of unit weight 17kN/m3 and having an internal angle of friction 25^0. The depth of base of footing is 1.2m below GL. Calculate the safe load carried by the footing for a FOS=3.UseTerzaghi's Analysis. C=39kN/m2,Nc=46.17,Nq =33.32,Ny =40.74,Nc'=42,Nq'=36,Ny'=39.	8	Apply	CO1
	Part II			
1)	Describe Housel's approach for analysis in foundations	4	Understand	CO2
2)	Generate the formulae for calculation for Consolidation settlement in Shallow Footing	8	Create	CO2
3)	Two different Contractors carried out Plate Load Test at the same site location as per IS Codal provisions. Details are as follows: - Parameters / Contractor 1 / Contractor 2 Size of plate / 45 cm × 45 cm / 75 cm × 75 cm Load / 100 kN / 175 kN Settlement at above load / 10 mm / 10 mm Calculate the maximum load which a footing of size 3m×3m can carry at the Settlement of 10mm at the same site location	8	Apply	CO2
4)	 **Given**: Size of Footing 2m×2m Pressure = 200kN/m^2 Specific gravity of clay = 2.65 Compression index = 0.3, water content of clay = 40%. Load distribution = 2V:1H, γ_w=10Kn/m^3 Calculate the Consolidation settlement	8	Apply	CO2