Note: -Part A of each question is compulsory. Attempt any 1 from Part B, C in each question. Use of IS 800:2007 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.	Write Short notes on Purlin. What is the purpose of the purlin in a roof truss?	[4]	Understand	CO5
B.	Design of Strut in roof truss for the following data. Design also its connection using 20 mm diameter bolts. • Factored compression force = 50 kN (due to DL and LL) • Factored tension force = 17.8 kN (due to DL and WL) • Length of rafter panel = 2.235 m • Grade of steel Fe410 and Grade bolt 4.6.	[16]	Analyze	CO5
C.	Design the principal rafter of a fink type roof truss for the following data. Design also its connection using 20mm diameter bolts. • Design Compressive load = 165 kN (due to D.L and L.L) • Design tensile load = 60 kN (due to D.L and W.L) • Length of rafter panel = 2.235 m • Grade of steel Fe 410; Grade of bolt 4.6 bolt	[16]	Analyze	CO5
	Part-II			
A.	Write the components of roof truss.	[4]	Understand	CO3
B.	Design a welded plate girder 20m in span and laterally supported throughout it has to support an uniform load of 80 kN/m throughout the span exclusive of self weight. Design the plate girder without intermediate vertical stiffener, assume steel of grade Fe-410, design connection also.	[16]	Analyze	CO2
C.	Design a stiffened seat connection for and ISMB 350 @ 514 N/m. transmitting an end reaction of 350 kN(due to factored load) to a column section ISHB 300 @ 576.8 N/m. The steel is of grade Fe410 and bolts of grade 4.6.	[16]	Analyze	CO1

Shri Shankaracharya Institute of Professional Management & Technology

Department of Civil Engineering

SSIPMT

Class Test – II   Session: July – December 2023 Month –December

Semester – 7th Subject – Design of Structure Code – 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.	Write detail step-step procedure for design of two-way slab.	[4]	Understand	CO1
B.	Design a simply supported one way slab of size 4 m X 7m consider support thickness 230 mm. It is subjected to a live load of 4 kN/m² and surface finish of 1 kN/m². Consider M-20 grade concrete and Fe- 415 steel.	[8]	Analyze	CO1
C.	Design an RC slab for a room having inside dimensions 3 m x 7 m. The thickness of supporting wall is 300 mm. The slab carries 75 mm thick lime concrete at its top. The unit weight of which may be taken as 20 kN/m³. The live load on the slab may be taken as 2 kN/m². Assume the slab to be simply supported at the ends. Use M-20 concrete and Fe-415 steel.	[8]	Analyze	CO1
D.	Design a cantilever slab to carry a live load of 3.00 kN/m². The overhang of the slab is 1.25 mt. (Use LSM)	[8]	Apply	CO1
Part II				
A.	Differentiate between strut and column.	[4]	Understand	CO4
B.	Design the reinforcement for a circular column of diameter 500 mm subjected to an ultimate load of 1600 kN and an ultimate moment of 125 kNm about the major axis. Use M20 concrete and Fe250.	[8]	Analyze	CO4
C.	Design a square column section subjected to concentric load of 1000 KN working state consider concrete of grade M-25 and steel of grade Fe-415.	[8]	Analyze	CO4
D.	A tie member of a truss consisting of an angle section ISA 70 70 x 6 mm of Fe 410 grade, is welded to a 8 mm gusset plate. Design á weld to transmit a load equal to the full strength of member. Assume shop welding.	[8]	Apply	CO5

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Class Test – II Session: July-December 2023   Month – December
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 two from B & C.

SSIPMT

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A)	Explain briefly various types of spillways.	4	Understand	CO2
B)	Discuss the various types of energy dissipater used below spillway in relation to the position of the tail water rating curve and jump height curve	16	Understand	CO2
C)	Design an ogee spillway for concrete gravity dam for the following data: (i) Average river bed level = 250.0 m (ii) R.L. of spillway crest = 350.0 m (iii) Slope of d/s face of gravity dam = 0.75:1 (iv) Design discharge = 6500 cumecs (v) Length of spillway = 5 spans with a clear length of 9m each (vi) Thickness of each pier = 2 m.	16	Create	CO2
	Part II			
A)	Explain the following: (i) Weir (ii) Barrage (iii) Canal fall (iv) Canal Drop	4	Understand	CO3, CO4
B)	Draw a layout of a Diversion Head Works and describe the different components of it.	16	Understand	CO3
C)	Design a Sarda type fall for the following data: (i) Full supply discharge = u/s / d/s = 45 cumecs (ii) Full supply level = u/s / d/s = 118.30/116.80 (iii) Full supply depth = u/s / d/s = 1.8 m/ 1.8 m (iv) Bed width = u/s / d/s = 28 m/ 28 m (v) Bed level = u/s / d/s = 116.50 m/ 115.00 m (vi) Drop = 1.5 m (vii) Bed width of distributary = 12 m (viii) Depth of water in distributary = 1.5 m (ix) Permissible exit gradient = 1/6	16	Create	CO4

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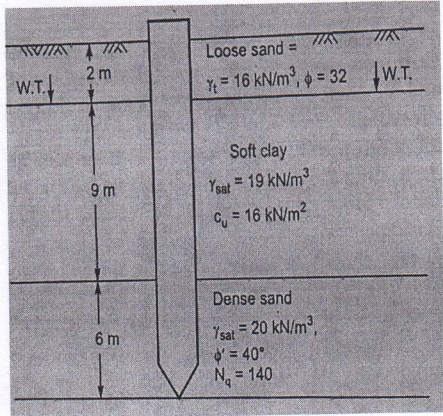## Department of Civil Engineering

Class Test – II   Session: July – Dec, 2023 Month – December

Semester – 7ᵗʰSubject – Construction Equipment & Techniques Subject Code- D020733(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	COs
	PART-I			
A.	Describe the mud jacking process through slab foundation.	[4]	Understand	CO5
B.	Describe tunneling Techniques. Classify with sketches, Tunnel in brief.	[8]	Understand	CO3
C.	Discuss the difference between driving a well and driving a caisson.Elaborate with suitable Sketches.	[8]	Understand	CO3
D.	Describe the various plant equipment used for underground excavation.	[8]	Understand	CO3
	PART- II			
A.	List step by step procedure carried out while dismantling or demolishing a high rise building	[4]	Understand	CO5
B.	Discuss the techniques for construction for continuous concreting operation in tall buildings of various shapes and varying sections?	[8]	Understand	CO4
C.	How would you recommend the erection of a tall lattice tower for communication use? Elaborate the steps in brief.	[8]	Understand, Apply	CO4
D.	What are sheet piles? How is a pipeline laid without damaging the sheet piles?	[8]	Understand	CO5

Shri Shankaracharya Institute of Professional Management & Technology
Department of Civil Engineering
Class Test – II   Session: July-December, 2023   Month – December
Semester–7th   Subject–Foundation Engineering   Code – D020713 (020)
Time Allowed: 2 hrs.   **Max Marks: 40**
NOTE- Question 1 of each part is compulsory
Solve any two questions from 2, 3 and 4 from each part

Q.No.	Questions	Marks	Levels ofBloom'staxonomy	CO's
	PartI			
1)	Explain the static and dynamic analysis used for pile foundations.	4	Understand	CO3
2)	Outline the different types of pile foundations with proper explanation and neat diagrams	8	Understand	CO3
3)	Determine the safe load carrying capacity for the 50 cm diameter driven pile as shown above	8	Analyze	CO3
4)	In a 25 pile group the pile diameter is 0.4 m, and center to center spacing of piles is 1.5 m, if undrained cohesion = 50 kN/m^2 determine whether the failure would occur as a block failure or when the piles act individually. All piles are 15 m long. Take adhesion factor = 0.7 for shear mobilization around each pile. Also calculate the safe load for this group. (FOS = 3.5)	8	Analyze	CO3
	Part II			
1)	Under what conditions a well foundation is adopted?	4	Understand	CO4
2)	Explain the types of caissons in well foundation	8	Analyze	CO4
3)	What types of soil conditions are favorable for underground construction.	8	Analyze	CO5
4)	What are the environmental considerations associated with underground constructions projects.	8	Analyze	CO5

Figure (Q.3):
Loose sand = $\gamma_t = 16$ kN/m^3, $\phi = 32$, W.T., 2 m
Soft clay $\gamma_{sat} = 19$ kN/m^3, $c_u = 16$ kN/m^2, 9 m
Dense sand $\gamma_{sat} = 20$ kN/m^3, $\phi' = 40°$, $N_q = 140$, 6 m