

--	--	--	--	--	--	--	--	--	--

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026

Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module – 1				M	L	C
Q.1	a.	What is Subsurface Exploration? Write the objectives of soil exploration.	8	L1	CO1	
	b.	Write a note on stabilization of bore holes.	6	L2	CO1	
	c.	With a neat sketch, explain Wash boring method.	6	L2	CO1	
OR						
Q.2	a.	Determine the area ratio for the following soil sampler and comment the nature of samples obtained in each sampler. i) Cone cutter 185 mm OD and 135 mm ID ii) Split Barrel 51 mm OD and 45 mm ID iii) Shelby tube 51 mm OD and 49 mm ID Which one you recommend to be used for getting least disturbed samples?	8	L3	CO1	
	b.	Classify and explain types of soil samples.	6	L1	CO1	
	c.	Define recovery ratio. If a soil sample was pushed into the soil for a depth of 600 mm and length of the sample obtained was 590 mm, determine recovery ratio. Comment on the type of soil sample obtained.	6	L3	CO1	
Module – 2						
Q.3	a.	Define Dewatering. List the different methods of dewatering. With a neat sketch, explain Vacuum method of dewatering.	10	L2	CO1	
	b.	Estimate the position of ground water table with following data by Hvorslev's method. Depth upto which water is boiled out = 10.5 m, water rise in 1 st day = 0.63 m, 2 nd day = 0.57 m, 3 rd day = 0.51 m.	10	L3	CO1	
OR						
Q.4	a.	What are flow nets? Write the properties of flow nets.	8	L2	CO2	
	b.	With a neat sketch, explain the method of locating phreatic line for a homogeneous earth dam with horizontal filter.	8	L2	CO2	
	c.	An earthen dam is built on a impervious foundation with a horizontal filter under the downstream slope. The horizontal and vertical permeability of the soil material in the dam are respectively 4×10^{-5} m/sec and 1×10^{-5} m/sec. Full reservoir level is 20 m above downstream filter. Flow net consists of 4 flow channels and 15 equipotential drops. Estimate the seepage loss per meter length of the dam.	4	L3	CO2	

Module – 3

Q.5	a.	Explain the following with the help of neat sketches : i) Active earth pressure ii) Passive earth pressure iii) Earth pressure at rest.	10	L2	CO3
	b.	A retaining wall 9 m high retains a cohesion-less soil with an angle of internal friction 33° . The surface is level with the top of the wall. The unit weight of the top 3 m of the fill is 21 kN/m^3 and that of the rest is 27 kN/m^3 . Find the magnitude and point of application of the resultant active thrust.	10	L3	CO3

OR

Q.6	a.	Write the assumptions made in Rankine's theory.	6	L2	CO3
	b.	What are the factors influencing lateral earth pressure?	6	L2	CO3
	c.	A retaining wall of height 10 m supports cohesionless soil with the following properties. $G = 2.65$, $e = 0.65$ and $\phi = 30^\circ$. Water table lies at 3 m depth. Surface of backfill is horizontal and carries surcharge of intensity 14 kN/m^2 . Draw lateral active earth pressure distribution diagram. Determine the total active earth pressure and its point of application.	8	L3	CO3

Module – 4

Q.7	a.	Explain the procedure for determination of factor of safety using method of slices for $C - \phi$ soil.	10	L2	CO3
	b.	Explain Fellenius Method for critical slip circle.	10	L2	CO3

OR

Q.8	a.	Explain causes for slope instability and also list the methods of stabilization of slope.	10	L2	CO3
	b.	A 7 m deep canal has side slope of 1 : 1. The properties of soil are $C_u = 20 \text{ kN/m}^2$, $\phi_u = 15^\circ$, $e = 0.9$ and $G = 2.75$. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion when canal runs full. also find the factor of safety in case of sudden draw down, if the Taylor's stability number for this condition is 0.137.	10	L3	CO3

Module – 5

Q.9	a.	What are the assumptions made in Boussinesq's analysis to determine the stresses in soil?	4	L2	CO2
	b.	A concentrated load of 22.5 kN acts on the surface of a homogenous soil mass of large extent. Find the stress intensity at a depth of 15 m using Boussinesq's analysis. i) Directly under the load ii) At a horizontal distance of 7.5 m.	6	L3	CO2
	c.	Define Isobar. Construct an Isobar for a vertical stress of 40 kN/m^2 , when the ground surface is subjected to a concentrated load of 1000 kN.	10	L3	CO2
OR					
Q.10	a.	Explain the types of settlements with equations.	8	L2	CO4
	b.	Estimate the immediate settlement of a footing of size $2 \text{ m} \times 3 \text{ m}$ resting at a depth of 2 m in a sandy soil whose compression modulus is 10 N/mm^2 and the footing is expected to transmit a unit pressure of 160 kN/m^2 . Assume $\mu = 0.28$ and $I_f = 1.06$.	4	L3	CO4
	c.	A soft normally consolidated clay layer 18 m thick. The natural water content, saturated unit weight, specific gravity and liquid limit are 45%, 18 kN/m^3 , 2.70 and 63% respectively. The vertical stress increment at centre of the layer due to the foundation load is 9 kN/m^2 . The ground water level is at the surface of the clay layer. Determine the settlement of the foundation.	8	L3	CO4

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BCV601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026

Design of RCC Structures

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. M : Marks , L: Bloom's level , C: Course outcomes.
 3. Use of IS456-2000, SP-16 is permitted.*

Module – 1			M	L	C
Q.1	a.	Compare Working Stress Method and Limit State Method of Design of R.C section.	4	L2	CO1
	b.	Briefly explain Under reinforced , Over reinforced and Balanced section with neat sketches.	4	L1	CO1
	c.	Develop the expression for stress block parameter.	12	L3	CO1
OR					
Q.2	a.	Explain : i) Short term deflection ii) Long term deflection.	6	L1	CO1
	b.	A simply supported beam of C/S 250 mm × 450 mm supported over effective span of 4 m. The beam is reinforced with 3 – 20 mm dia at bottom and 2 – 10 mm dia at top with effective depth of 400 mm. The beam supports 4 kN/m (Dead load) and 10 kN/m (live load). Using M – 25 concrete and Fe415 steel , determine Short term and Long term deflection.	14	L5	CO1
Module – 2					
Q.3	a.	A singly reinforced concrete beam 250 mm × 450 mm deep is reinforced with 3 – 16 mm dia at an effective cover 50 mm , effective span 6 m , M ₂₀ concrete Fe415 steel. Determine central point load that can be supported in addition to the self weight.	10	L5	CO2
	b.	A reinforced concrete beam has C/S 250 mm × 500 mm (effective depth). The section is reinforced with 3 – 20 mm dia bars and 8 mm dia 2 legged vertical stirrups at 200 mm C/C. use M ₂₀ grade concrete and Fe415 steel. Estimate shear strength of the section.	10	L5	CO2
OR					
Q.4	a.	A doubly reinforced beam section is 250 mm × 500 mm (effective depth) , reinforced with 2 – 16 mm dia as compression steel and 4 – 20 mm dia as tension steel. Effective cover for both is 50 mm. Use M ₂₀ grade concrete and Fe415 steel. Estimate ultimate moment of resistance.	10	L5	CO2
	b.	Determine the ultimate moment of resistance of the T – beam with the following data : Width of flange = 1200 mm , Depth of the slab = 110 mm , Effective depth = 600 mm , Width of the web = 300 mm , Area of Tension steel = 4 - 25 mm dia. Use f _{ck} = 20 N/mm ² and F _y = 415 N/mm ² .	10	L5	CO2

Module – 3

Q.5	Design a rectangular singly reinforced beam supported on two walls 300 mm thick, spaced at distance 5 m apart. The beam carries super imposed load of 10 kN/m. Use M ₂₀ grade concrete and Fe415 steel. Sketch the reinforcement details.	20	L6	CO3
------------	--	-----------	-----------	------------

OR

Q.6	A T – beam slab floor system has a slab of 125 mm thick spanning between T – beams which are spaced at 3.5 m apart. The beam have clear span of 8.15 m and end bearings are 300 mm walls. The live load on floor is 3 kN/m ² and floor finish is 0.6 kN/m ² . Design intermediate T – beam for bending and shear. Sketch the reinforcement details. Use M ₂₀ grade concrete and Fe415 steel.	20	L5	CO3
------------	---	-----------	-----------	------------

Module – 4

Q.7	a.	Distinguish One way and Two way slab.	4	L4	CO4
	b.	Design a simply supported slab for panel of size 3m × 4m to carry live load 4 kN/m ² and Floor finish 1000 N/m ² . Use M ₂₀ grade concrete and Fe415 steel. The corners are free to lift.	16	L5	CO4

OR

Q.8	Design a dog legged stair for an office building in a room measuring 2.8m × 5.8m clear, Vertical distance between the floor is 3.6 m. Width of flight is to be 1.25 m. Allow a live load of 3 kN/ m ² . Sketch the details of reinforcement. Use M ₂₀ grade concrete and Fe415 grade steel. Assume the stairs are supported on 230 mm walls at the end of outer edges of landing slab.	20	L5	CO4
------------	--	-----------	-----------	------------

Module – 5

Q.9	a.	A rectangular reinforced concrete column of cross section 300 mm × 600 mm is to be designed to support an ultimate axial load of 2000 kN. Design suitable reinforcement in the column using M ₂₀ grade concrete and Fe415 steel. Sketch the reinforcement details.	10	L5	CO5
	b.	Design the reinforcements in a rectangular column of size 300 mm × 500 mm to support a design ultimate load of 500 kN. Factored moment of 200 kN-m. Adopt $f_{ck} = 20 \text{ N/mm}^2$, $f_y = 415 \text{ N/mm}^2$. Sketch the reinforcement details.	10	L5	CO5

OR

Q.10	Design a square footing for a column size 400 mm × 400 mm to carry a load of 1200 kN. The SBC of the soil is 220 kN/m ² . Use M ₂₀ grade concrete and Fe415 steel. Sketch the reinforcement details.	20	L5	CO5
-------------	--	-----------	-----------	------------

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BCV503

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2026

Concrete Technology

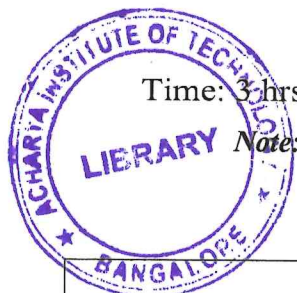
Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks, L: Bloom's level, C: Course outcomes.

3. Use of IS 10262-2019 is permitted.



Module – 1			M	L	C
Q.1	a.	Explain the dry process of manufacturing of cement.	8	L2	CO1
	b.	Explain the effect of following on the properties of concrete: i) Plasticisers ii) Air Entraining Admixtures	8	L2	CO1
	c.	What is bulking of fine aggregate? State the importance of it in concrete.	4	L1	CO1
OR					
Q.2	a.	List the different physical tests on cement. Discuss the method on finding compressive strength of cement.	10	L2	CO1
	b.	Explain the effect of flyash and silica fume on fresh and hardened properties of concrete.	10	L1	CO1
Module – 2					
Q.3	a.	Define workability and explain the compaction factor method of measuring workability.	10	L2	CO2
	b.	List the methods of controlling heat during mass concreting.	6	L2	CO2
	c.	What is Segregation and Bleeding?	4	L1	CO2
OR					
Q.4	a.	Discuss on manufacturing process of concrete.	12	L2	CO2
	b.	Explain the water curing methods with their applications.	8	L1	CO2
Module – 3					
Q.5	a.	With the neat sketch, explain the chloride induced corrosion. Mention the types of damage on concrete.	12	L2	CO3
	b.	What is Creep? Discuss the factors affecting the creep in concrete.	8	L2	CO3

OR

Q.6	a.	What is NDT? Discuss the principle, methods and criteria to judge quality of concrete as per ultrasonic pulse velocity test method with sketch.	12	L2	CO3
	b.	Compare the following: i) Plastic shrinkage and drying shrinkage ii) Penetration and Pullout Test	8	L2	CO3

Module – 4

Q.7	a.	Enlist the different types of exposure conditions as per IS 456:2000. Explain how exposure condition affects concrete mix design.	10	L2	CO4
	b.	Enumerate the procedure of mix-proportioning of concrete as per IS 10262 - 2019	10	L2	CO4

OR

Q.8	Solve for mix proportioning as per IS10262-2019 for the given details: Grade of concrete = M30 Type of cement – OPC 43 grade Exposure condition – moderate Quality control – Good ; workability – 75 mm slump Specific gravity of cement – 3.15 Specific gravity of super plasticizer – 1.115 Flyash replacement upto 30% Specific gravity of flyash – 2.2 Minimum cement content – 320 kg/m³ Maximum permissible w/c ratio = 0.45 Fine aggregate: M-sand confirming to zone II Coarse aggregate: 20 mm maximum nominal size (crushed angular) <table><tr><td></td><td>Coarse Aggregate</td><td>Fine Aggregate</td></tr><tr><td>Specific Gravity</td><td>2.72</td><td>2.62</td></tr><tr><td>Water Absorption</td><td>0.5%</td><td>1.0%</td></tr><tr><td>Moisture content</td><td>0%</td><td>0%</td></tr></table>		Coarse Aggregate	Fine Aggregate	Specific Gravity	2.72	2.62	Water Absorption	0.5%	1.0%	Moisture content	0%	0%	20	L3	CO4
	Coarse Aggregate	Fine Aggregate														
Specific Gravity	2.72	2.62														
Water Absorption	0.5%	1.0%														
Moisture content	0%	0%														

Module – 5

Q.9	a.	Sketch a typical layout of RMC plant with its functioning units and state advantages of RMC.	8	L1	CO5
	b.	List the mix design principles of self-compacting concrete.	6	L1	CO5
	c.	List the types of light weight concrete.	6	L1	CO5

OR

Q.10	a.	List any 4 advantages and disadvantages of high strength concrete.	8	L1	CO5
	b.	Compare Geopolymer concrete with conventional concrete.	8	L2	CO5
	c.	List the applications of fibre reinforced concrete.	4	L1	CO5

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

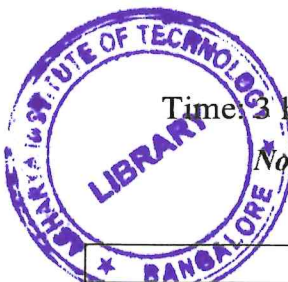
BCV515C

Fifth Semester B.E./B.Tech. Degree Examination, June / July 2026 Solid Waste Management

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*



Module – 1			M	L	C
Q.1	a.	Write a detailed note on 3R's in Integrated solid waste management.	10	L2	CO1
	b.	Discuss the role of stake holders in solid waste management.	10	L2	CO1
OR					
Q.2	a.	Briefly explain the need of solid waste management, also explain the classification of solid waste.	10	L2	CO1
	b.	Write a detailed note on global perspective of solid waste management.	10	L2	CO1
Module – 2					
Q.3	a.	List and explain the physical and chemical properties of solid waste.	10	L2	CO1
	b.	Describe various factors affecting solid waste generation.	10	L2	CO1
OR					
Q.4	a.	Briefly explain various biological methods of waste characterization.	10	L2	CO1
	b.	Describe the methods to estimate the quantity of waste generated.	10	L2	CO1
Module – 3					
Q.5	a.	Write brief note on the following: i) Types of storage containers ii) Collection vehicles	10	L2	CO2
	b.	Define transfer station. Explain any two types of transfer station.	10	L2	CO2
OR					
Q.6	a.	List different on – site processing techniques used for solid waste and explain any two techniques in detail.	10	L2	CO3
	b.	Explain the parameters to be considered in designing a stationery container system.	10	L2	CO3
Module – 4					
Q.7	a.	What is composting? With aid of neat sketch explain Bangalore method of composting.	10	L2	CO4
	b.	Briefly explain the following : i) Biogas recovery ii) Leachate management	10	L2	CO4
OR					
Q.8	a.	With help of a neat sketch, explain working of a municipal incinerator.	10	L2	CO4
	b.	Explain the factors to be considered while designing a landfill.	10	L2	CO4
Module – 5					
Q.9	a.	Write a detailed note on classification of biomedical waste.	10	L2	CO5
	b.	Describe briefly about usage of IoT in storage, collection and treatment of solid waste.	10	L2	CO5
OR					
Q.10	a.	Write a brief note on treatment and disposal of construction and demolition waste.	10	L2	CO5
	b.	What is electronic waste? Briefly explain the treatment and disposal of e – waste.	10	L2	CO5

