Hall Ticket Number :										

R-19

Code: 19A235T

II B.Tech. I Semester Regular Examinations March 2021

Basic Electronics, Electrical & Mechanical Technology

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *five* questions by choosing one question from each unit (5 x 14 = 70 Marks)

*Use separate booklets for **Part-A & Part-B***

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PART-A

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	State and explain the Kirchoff's laws?	7M	CO1	L1
	b)	Explain the principle operation of DC motor?	7M	CO1	L1
		OR			
2.	a)	Explain the principle operation of DC generator?	7M	CO1	L1
	b)	Mention applications of DC motor?	7M	CO1	L1
		UNIT–II			
3.	a)	Enumerate the various losses in a transformer?	7M	CO2	L1&L3
	b)	Explain the principle operation of single phase transformer?	7M	CO2	L1&L3
		OR			
4.	a)	Define the term of Efficiency and regulation of a transformer?	7M	CO2	L1&L3
	b)	Explain the principle operation of three phase induction motor?	7M	CO2	L1&L3
		UNIT–III			
5.	a)	Explain the VI characteristics of a diode?	7M	CO3	L1&L3
	b)	Explain the operation of full wave rectifier with neat diagram?	7M	CO3	L1&L3
		OR			
6.	a)	Explain the principle of CRT?	7M	CO3	L1&L3
	b)	What are the applications of CRO?	7M	CO3	L1&L3

PART-B

		UNIT–IV			
7.	a)	**Explain** TIG Welding with a neat sketch	7M	CO4	L2
	b)	**Differentiate** between TIG and MIG Processes	7M	CO4	L2
		OR			
8.	a)	**Restate** the following i) COP ii) Wet bulb temperature iii) Relative Humidity iv) Ton of Refrigeration v) temperature and humidity required for the comfort air conditioning.	7M	CO5	L2
	b)	**Discuss** about Room Air Conditioners.	7M	CO5	L2
		UNIT–V			
9.	a)	**Explain** the working principle of two stroke petrol engine	7M	CO4	L2
	b)	**Summarize** the functions of main components of an IC Engine	7M	CO4	L2
		OR			
10.	a)	**Interpret** Positive Displacement compressor with reference to Reciprocating Air Compressor	7M	CO5	L2
	b)	**Restate** the advantages of multi compression	7M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A131T

II B.Tech. I Semester Regular Examinations March 2021

Building Materials and Construction

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Briefly discuss classification of the building stones?	7M	CO1	L2
	b)	Briefly explain (i) stone quarrying and (ii) characteristics of good brick earth?	7M	CO1	L2
		OR			
2.	a)	What are the various methods of manufacture of bricks? Discuss any one method.	7M	CO1	L2
	b)	Briefly compare between clam burning and kiln burning of bricks?	7M	CO1	L2
		UNIT–II			
3.	a)	What are the uses of bituminous material and gypsum in construction work? Also explain their quality required for building works?	7M	CO2	L2
	b)	State the general properties of any two roofing materials?	7M	CO2	L2
		OR			
4.	a)	Briefly explain the use of colored cement, rapid hardening Portland cement, high alumina cement and low heat cement?	7M	CO2	L2
	b)	Briefly explain compare the binding material cement and lime?	7M	CO2	L2
		UNIT–III			
5.	a)	What are the properties of good timber for building works? Briefly explain.	7M	CO3	L2
	b)	Explain the characteristics of galvanized iron and Fiber-reinforced plastics for building construction?	7M	CO3	L2
		OR			
6.	a)	What are the different types of defects in timber?	7M	CO3	L2
	b)	Explain natural seasoning and artificial seasoning of timber?	7M	CO3	L2
		UNIT–IV			
7.	a)	Differentiate between cavity and partition wall with the help of sketches?	7M	CO4	L2
	b)	Explain with neat sketches different types of masonry works?	7M	CO4	L2
		OR			
8.	a)	Explain the various types of shallow foundation?	7M	CO4	L2
	b)	List various types of bonds in brick walls and briefly explain any two with the help of sketches?	7M	CO4	L2
		UNIT–V			
9.	a)	List different types of staircases and explain any two with neat sketch?	7M	CO5	L2
	b)	Explain different types of floors?	7M	CO5	L2
		OR			
10.	a)	What is plastering? Discuss different types of paints?	7M	CO5	L2
	b)	Differentiate the following with reference to roofs (i) flat and curved Roofs. (ii) King and Queen Post Trusses.	7M	CO5	L2

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Hall Ticket Number :										

R-19

Code: 19A134T

II B.Tech. I Semester Regular Examinations March 2021

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	A plate 0.0254 mm distant from a fixed plate, moves at 61 cm/sec and requires a force of 0.2 kg(f)/m^2 to maintain this speed. Determine the dynamic viscosity of the fluid between the plates.	7M	CO1	L1
	b)	An open tank contains water in its bottom up to 2 m depth and then oil of specific gravity 0.8 up to a depth of 1.5 m. Determine the pressure at the bottom of the tank and at the interface of water and oil.	7M	CO1	L1
		OR			
2.	a)	Determine the capillary rise in a glass tube of 3 mm diameter when inserted vertically in water and mercury (Hg). The values of surface tensions for water and Hg in contact with air are 0.073 N/m and 0.44 N/m, respectively. Assume the values of specific gravity of mercury as 13.6 and the angle of contact for Hg and water as 130° and 0°, respectively.	7M	CO1	L1
	b)	A wooden body of height 73 mm floats in a water tank of height 25 mm projecting above the water surface. The same wooden body when placed in glycerine tank is projected 37.5 mm above the surface of glycerine. Find (i) the relative density of the wooden body and (ii) the relative density of glycerine	7M	CO1	L1
		UNIT–II			
3.	a)	Define Pascal Law and derive the same.	7M	C02	L2
	b)	What are manometers? Give its classification, advantages and limitations.	7M		
		OR			
4.	a)	Define the terms (i) hydrostatics, (ii) total pressure and (iii) centre of pressure.	6M	CO2	L2
	b)	A metallic body weighs 500 kN in air and 250 kN in water. Determine the volume of body and its specific gravity.	8M	CO2	L2
		UNIT–III			
5.		The velocity vector in two different flow fields is given by the equations (i) V= (2xi- 2yj). Determine the equations of streamline when it passes through a point A (3,2).	14M	CO4	L2 &L4
		OR			
6.		A venturimeter has a diameter of 0.2 m at the inlet and 0.1 m diameter at the throat. It is fitted in a horizontal pipeline to measure the flow of oil of specific gravity 0.82. If 5900 kg of oil is collected in 2 minutes and the difference of levels in the U-tube differential manometer reads 0.185 m Hg, then determine the discharge coefficient for the pipe venturimeter. Take specific gravity of mercury as 13.6.	14M	CO3	L2

UNIT–IV

7.	a)	The diameter of a horizontal pipe suddenly reduces from 0.4 m to 0.2 m due to which pressure changes from 125 kN/m^2 to 105 kN/m^2. If the coefficient of contraction is 0.62, then find the flow rate of water.	10M	CO4	L2 &L4
	b)	Explain the principle of water hammer in pipes.	4M	CO4	L2&L4

OR

8.		Three pipes connected in series have diameters as 0.3 m, 0.2 m and 0.4 m and lengths as 400 m, 200 m and 300 m and coefficients of friction as 0.007, 0.0072 and 0.0074, respectively. If the pipes join two water reservoirs A and B having a difference in water surface levels as 15 m, then determine the discharge of water considering minor energy losses and neglecting minor energy losses.	14M	CO4	L2 &L4

UNIT–V

9.	a)	A closed tank partially filled with water discharges through an orifice of 12.5 mm diameter and has a coefficient of discharge of 0.65. If air is pumped into the upper part of the tank, determine the pressure required to produce a discharge or 36.6 litres/minute when the water surface is 1m above the outlet.	10M	CO5	L4
	b)	Define and compare a notch and a weir.	4M		

OR

10.		Show by method of dimensional analysis that the resistance R to the motion of a sphere of diameter D moving with uniform velocity V through a fluid having density ρ and viscosity μ may be expressed as $R = (\rho D^2 V^2)\,\phi\left(\frac{\mu}{\rho V D}\right)$	14M	CO5	L4

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Hall Ticket Number :										

R-19

Code: 19AC34T

II B.Tech. I Semester Regular Examinations March 2021

Life Sciences for Engineers

(Common to CE, ME & CSE)

Max. Marks: 70 Time: 3 Hours

Answer *any five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What is meant by classification and explain about living organisms based on their cellular life.	7M	1	2
	b)	Differentiate between prokaryotes and eukaryotes.	7M	1	4
		OR			
2.	a)	What is molecular taxonomy and how the organisms classify?	7M	1	2
	b)	Explain about biological organisms comparing with manmade systems.	7M	1	2
		UNIT–II			
3.		Explain the structure and functions of proteins.	14M	2	1
		OR			
4.	a)	Describe briefly about antibodies.	7M	2	2
	b)	Explain the process of fermentation and its industrial applications.	7M	2	2
		UNIT–III			
5.		Explain the reactions that occur in glycolysis.	14M	3	2
		OR			
6.	a)	What is synapse and describe about neuromuscular junctions?	7M	3	2
	b)	Explain about electron transport system.	7M	3	2
		UNIT–IV			
7.	a)	What are the characteristics of Mendal's laws and explain with suitable examples?	7M	4	2
	b)	Write the differences between mitosis and meiosis?	7M	4	4
		OR			
8.	a)	Describe briefly about eukaryotic DNA replication.	7M	4	2
	b)	Briefly explain about central dogma of molecular biology.	7M	4	2
		UNIT–V			
9.		Describe briefly about recombinant vaccines.	14M	5	2
		OR			
10.	a)	Write short notes on transgenic microbes.	7M	5	1
	b)	Explain the salient features of animal cloning.	7M	5	3

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Hall Ticket Number :										

R-19

Code: 19A133T

II B.Tech. I Semester Regular Examinations March 2021

Mechanics of Materials

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any *five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Draw a stress – strain curve for mild steel, indicate salient points and define them.	7M	1	1
	b)	A straight circular rod tapering from diameter 'D' at one end to a diameter'd' at the other end is subjected to an axial load 'P'. Obtain an expression for the elongation of the rod.	7M	1	3
		OR			
2.	a)	Derive the relation between Modulus of elasticity, Modulus of rigidity and Bulk Modulus.	5M	1	3
	b)	Derive an expression for the stress induced in a body due to suddenly applied load and hence find the value of extension produced in the body.	9M	1	3
		UNIT–II			
3.	a)	A simply supported beam of length 8 m rests on supports 6 m apart, the right hand end is overhanging by 2 m. The beam carries a uniformly distributed load of 20 kN/m over the entire length. Draw S.F. and B.M diagrams and find the point of contra flexure, if any.	9M	2	2
	b)	Write down the sign conventions for shear force and bending moment in general.	5M	2	1
		OR			
4.	a)	A cantilever 4 m long is loaded with a uniformly distributed load of 4 kN/ m run over a length of 1m from the free end. It also carries a point load of 3 kN at a distance of 0.5 m from the free end. Draw the Shear force Diagrams and Bending Moment diagrams.	9M	2	2
	b)	Derive the relation between Shear force and bending moment.	5M	2	3
		UNIT–III			
5.	a)	Derive the bending equation from fundamentals using standard notation.	7M	3	3
	b)	A timber cantilever 200 mm wide and 300 mm deep is 3 m long. It is loaded with a U.D.L of 3 kN/m over the entire length. A point load of 4 kN is placed at the free end of the cantilever. Find the maximum bending stress produced.	7M	3	3
		OR			
6.		Derive the stress distribution for circular section & plot shear stress distribution.	14M	3	3
		UNIT–IV			
7.	a)	Find an expression for the slope at the supports of a simply supported beam, carrying a point load at the centre.	7M	4	2
	b)	A cantilever of length 6 m is carrying a point load of 25 kN at the free end. if the moment of inertia of the beam (i.e. I) is given as equal to $8x10^5$ N/mm^2 and value of E=$2x10^5$ N/mm^2, find (i)slope of the cantilever at the free end (ii) deflection at the free end.	7M	4	3
		OR			
8.		A simply supported beam of span 10 m loaded point load of 14 kN at its centre, in addition to the UDL of 6 kN/m for the whole span. Find slopes at the supports and maximum deflection. Use double integration method.	14M	4	3
		UNIT–V			
9.		A body is subjected to direct stresses in two mutually perpendicular directions accompanied by a simple shear stress. Draw the Mohr's circle of stresses and explain how you will obtain the principal stresses and principal planes.	14M	5	2
		OR			
10.		Define and explain the following theories of failure: (i) Maximum principal strain theory (ii) maximum shear strain theory.	14M	5	2

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Hall Ticket Number :										

R-19

Code: 19AC31T

II B.Tech. I Semester Regular Examinations March 2021

Partial Differential Equations and Complex Variables

(Common to CE, EEE, ME & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Find the Laplace Transform of $f(t)=\begin{cases}\cos t\ , 0<t<\pi \\ \sin t, \quad t>\pi\end{cases}$	7M	CO1	L1
	b)	Find $L\left(\frac{\cos 2t-\cos 3t}{t}\right)$	7M	CO1	L1
		OR			
2.	a)	Find the Laplace transform of $e^{4t}(\sin 2t \cos t)$	7M	CO1	L1
	b)	Find the Laplace transform of $f(t)=\begin{cases}1 & , 0\le t<1 \\ -1 & , 1\le t<2\end{cases}$ having period 2	7M	CO1	L1
		UNIT–II			
3.	a)	Find the inverse Laplace Transform of $\frac{1}{(s^2+1)s}$	7M	CO2	L1
	b)	Apply Convolution theorem to evaluate $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$	7M	CO2	L3
		OR			
4.		Solve $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+2y=5\sin t$, *if* $y(0)=y'(0)=0$	14M	CO2	L3
		UNIT–III			
5.		Expand $f(x)=x-x^2$ as Fourier series in the interval $(-\pi,\pi)$ and hence obtain $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+....=\frac{\pi^2}{12}$	14M	CO3	L3
		OR			
6.	a)	Find a Fourier series to represent $f(x)=x\ \sin x, \quad -\pi<x<\pi$ and hence deduce that $\frac{1}{1.3}-\frac{1}{3.5}+\frac{1}{5.7}-....=\frac{1}{4}(\pi-2)$	7M	CO3	L1
	b)	Express $f(x)=x^2$ as half –range sine series in $0<x<4$	7M	CO3	L2
		UNIT–IV			
7.		If a string of length ℓ is initially at rest in the equilibrium position and each of its points is given , the velocity $V_0\sin^3\frac{\pi x}{\ell}$ find the displacement $y(x,t)$.	14M	CO4	L2
		OR			
8.		An insulated rod of length ℓ has its ends A and B maintained at 0°C and 100°C respectively until steady state condition prevails. If B is suddenly reduced to 0°C and maintained at 0°C, Find the temperature at a distance x from A at time t.	14M	CO4	L3
		UNIT–V			
9.		Show that the function $f(z)=\begin{cases}\frac{x^3(1+i)-y^3(1-i)}{x^2+y^2} & , if \quad z\neq 0 \\ 0 & , if \quad z=0\end{cases}$ is not analytic at origin, even though C-R equations are satisfied at origin.	14M	CO5	L2
		OR			
10.	a)	Show that the function $v(x,y)=\sin x\cosh y+2\cos x\sinh y+x^2-y^2+4xy$ satisfies Laplace equation and find the corresponding analytic function $u+iv$	7M	CO5	L1
	b)	Verify Cauchy's theorem for the function $f(z)=3z^2+iz-4$ taken over the boundary of the square with vertices $1\pm i$ *and* $-1\pm i$	7M	CO5	L4

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Hall Ticket Number :										

R-19

Code: 19A132T

II B.Tech. I Semester Regular Examinations March 2021

Surveying

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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Marks

UNIT–I

1. a) Explain the classification of survey 4M

   b) The distance between two points A and B measured along slope is 504 m. Find the horizontal distance between A and B when i) The angle of slope is 12˚ ii) The slope is 1 in 4.5 and , iii) the difference in elevation of A and B is 65 m. 10M

OR

2. With neat sketches, explain different types of obstacles in chaining 14M

UNIT–II

3. a) The following consecutive readings were taken with the help of dumpy level 1.904, 2.653, 3.906, 4.026, 1.964, 1.702, 1.592, 1.261, 2.542, 2.006 and 3.145. The instrument was shifted after fourth and seventh readings. The first reading was taken on the staff held on BM of RL 100 m. Determine the R.L. of the various points by rise and fall method. 12M

   b) Mention the uses of counter map. 2M

OR

4. Describe briefly methods involved in calculating the areas. 14M

UNIT–III

5. a) Explain the permanent and temporary adjustments of Verniar theodolite. 7M

   b) Explain the measurement of a horizontal angle by repetition method. 7M

OR

6. The following observations are lengths and bearings of the lines of traverse ABCDE, the length and bearing of EA have been omitted. Calculate the length and bearing of the line EA. 14M

Line	AB	BC	CD	DE	EA
Length (m)	204	226	187	192	?
Bearing	87˚ 30’	20˚ 20’	280˚ 0’	210˚ 3’	?

UNIT–IV

7. a) Explain the method of setting out a curve by radial offsets from tangents. 12M

   b) List the various types of curves. 2M

OR

8. a) Explain the principles and characteristics of EDM 6M

   b) Discuss about microwave and electro optical system adopted in total station. 8M

UNIT–V

9. a) Explain the three point problem in Plane Tabling. 10M

   b) List the instruments used in Plane Table Surveying. 4M

OR

10. a) Explain the difference between tangential and stadia tachometry 7M

    b) How will you determine the stadia constants? Explain. 7M

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