Hall Ticket Number :

R-19

Code: 19A134T

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Define vapour pressure, capillarity, surface tension and compressibility.   10M

   b) If the specific gravity of a liquid is 0.9, determine its mass density and specific weight.   4M

OR

2. Define total pressure and centre of pressure. Also derive the expressions for the same for an inclined immersed surface.   14M

UNIT–II

3. a) State and prove the Bernoulli's Equation.   7M

   b) A 300 mm diameter pipe carries water under a head of 20 m with a velocity of 3.5 m/s. If the axis of the pipe turns through 450 find the magnitude and direction of the resultant force at the bend.   7M

OR

4. Given that u= x^2-y^2 and v= -2xy, determine the stream function and potential function for the flow.   14M

UNIT–III

5. a) Explain the laws of fluid friction.   7M

   b) A pipe 50 mm diameter is 6 m long and the velocity of flow of water in the pipe is 2.4 m/s. What loss of head and the corresponding power would be saved if the central 2m length of pipe was replaced by 72 mm diameter pipe the change of section being sudden? Take f=0.04 for the pipes of both diameters.   7M

OR

6. The inlet and throat diameter of a Venturimeter are 0.3 m and 0.15 m, respectively. The liquid flowing through the meter is water. The pressure intensity at inlet is 137.34 kN/m2, while the vacuum pressure head at the throat is 0.37 m of mercury. Find the rate of flow. Assume that 4% of the differential head is lost between the inlet and the throat. Find also the value of C_d for the Venturimeter.   14M

UNIT–IV

7. a) Derive an expression for coefficient of discharge by using venturi meter.   6M

   b) A rectangular notch of crest width 0.5 m is used to measure the flow of water in a rectangular channel 0.6m wide and 0.45m deep. If the water level in the channel is 0.225m above the weir crest, find the discharge in the channel. For the notch assume cd=0.63and take velocity of approach into account   8M

OR

8. Derive Hagen-Poiseullie equation from basics.   14M

UNIT–V

9. Explain the geometric, kinematic and dynamic similarities.   14M

OR

10. a) What is dimensional analysis? Explain Buckingham's pi theorem.   7M

    b) Explain Dimensionless numbers.   7M

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Code: 19AC34T

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Life Sciences for Engineers

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	Blooms Level
	UNIT–I			
1.	Describe the types of cells and write the differences between prokaryotes and eukaryotes cells?	14M	1	2
	OR			
2. a)	Explain the differences between Plant cell and Animal cell?	7M	1	2
b)	Describe is mitochondrion? Write their structure and important functions and draw the labelled diagram?	7M	1	2
	UNIT–II			
3.	Define the proteins? Write the structure and functions of proteins?	14M	2	1
	OR			
4.	Define the antibodies and Write the types and functions of antibodies?	14M	2	1
	UNIT–III			
5.	Explain the Glycolysis pathway and importance?	14M	3	2
	OR			
6.	Discuss the Clavin cycle/C_3 cycle?	14M	3	2
	UNIT–IV			
7. a)	Explain the three laws of inheritance with examples?	7M	3	2
b)	Briefly describe the transcription and translation?	7M	3	2
	OR			
8.	Explain the Process of DNA Replication in prokaryotic and eukaryotic animals?	14M	4	2
	UNIT–V			
9. a)	Write short notes on restriction enzymes?	7M	5	1
b)	Explain the Importance of DNA Cloning?	7M	5	2
	OR			
10. a)	Explain the applications of transgenic animals?	7M	5	2
b)	Discuss the tools of Recombinant DNA Technology?	7M	5	2

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R-19

Code: 19A133T

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Mechanics of Materials

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	BL

UNIT–I

1. A bar of 34 mm dia. is subjected to a pull of 72 KN. The measured extension on gauge is 220mm is 0.1mm & change in diameter is 0.004mm. Calculate young's modulus, poisson's ratio& bulk modulus.   **14M   1   4**

OR

2. A rod of diameter 30 mm and length 400 mm was found to elongate 0.35 mm when it was subjected to a load of 65 kN. Compute the modulus of elasticity of the material of this rod.   **14M   1   4**

UNIT–II

3. A simply supported beam AB of span 8 m is subjected to a uniformly distributed load of 30 KN/m over the left half of span and a concentrated moment of 48 KN-m acting at a distance of 6 m from left support A. Draw the shear force and bending moment diagrams. Also find the position and magnitude of maximum bending moment.   **14M   2   4**

OR

4. A Simply supported beam 6 meter span carries udl of 10 KN/m for left half of span and two point loads of 25 kN end 50 kN at 4 m and 5 m from left support. Find maximum SF and BM and their location drawing SF and BM diagrams.   **14M   2   1**

UNIT–III

5. A rolled steel joist of I section has top flange: 200×10 mm, bottom flange:150×10 mm, thickness of web 10 mm and overall depth : 400 mm. Find the maximum shear stress across the section if it is subjected to a shear force of 150 KN. Also, sketch the shear stress distribution across the cross section.   **14M   3   1**

OR

6. Derive the expression for the shear stress in circular section of radius R & also derive the maximum & average shear stress.   **14M   3   1**

UNIT–IV

7. A simply supported beam of 6m span is subjected to a concentrated load of 10kN at 4m from left support.   Calculate the position and value of maximum deflection using Macaulay's method. Take E = 200 GPa and I = 15 x 10^6 mm^4 **14M   5   4**

OR

8. Derive the expression for slope and deflection of a simply supported beam with central point load.   **14M   4   1**

UNIT–V

9. State the significance and application of theories of failure. Derive an expression for distortion energy theory of failure.   **14M   5   3**

OR

10. Explain about Maximum Distortion Energy theory.   **14M   5   1**

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Code: 19AC31T

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Partial Differential Equations and Complex Variables

(Common to CE, EEE, ME and ECE)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	BL

UNIT–I

1. a) Find the L.T of $f(t) = \begin{cases} \sin t, & 0 < t < f \\ 0, & t > f \end{cases}$

7M   CO1   L1

b) Find the L.T of $\sin(wt + r)$

7M   CO1   L1

OR

2. Using L.T, Evaluate $\int_0^\infty \dfrac{e^{-t} - e^{-2t}}{t} dt$

14M   CO1   L3

UNIT–II

3. a) Find $L^{-1}\left\{ \dfrac{3(s^2 - 2)^2}{2s^5} \right\}$

7M   CO2   L1

b) Find the inverse L.T of $\dfrac{4}{(s+1)(s+2)}$

7M   CO2   L1

OR

4. Using convolution theorem , find $L^{-1}\left\{ \dfrac{1}{s^2(s+1)^2} \right\}$

14M   CO2   L3

UNIT–III

5. Obtain the Fourier series expansion of $f(x)$ given that

$f(x) = k\, x(f - x)$ in $0 < x < 2f$ where k is a

constant.

14M   CO3   L3

OR

6. Find the half range Cosine and Sine series for the function $f(x) = x$ in the range $0 < x < f$ 14M   CO3   L1

7. Using the method of separation of variables, solve

$$\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$$

14M   CO4   L3

OR

8. A string is stretched and fastened to two points at a distance $"l"$ apart. Motion is started by displacing the string in the form $y = k(lx - x^2)$ from which it is released at time $t = 0$. Find the displacement at any point on the string at a distance x from one end at time t.   14M   CO4   L3

9. a) Prove that

$$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)\left|\operatorname{Re}al \; f(z)\right|^2 = 2\left|f'(z)\right|^2$$

where $w = f(z)$ is analytic.   10M   CO5   L5

b) Show that $f(z) = z + 2\bar{z}$ is not analytic anywhere in the complex plane.   4M   CO5   L1

OR

10. Evaluate $\int_c (y^2 + 2xy)dx + (x^2 - 2xy)dy$ where c is the boundary of the region by $y = x^2 \; and \; x = y^2$.   14M   CO5   L5

END

Code: 19A132T

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Surveying

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) What does traverse surveying mean?   7M

   b) Distinguish between closed and open traverse.   7M

OR

2. A steel tape 20m long, standardized at 15^0C with a pull of 12kg, was used to measure distance along a slope of $5^025'$. If the mean temperature during measurement was 12^0C, and the pull applied 18kg, determine the correction required per tape length. Assume coefficient of expansion as 114x 10^{-7}per^{0}C, cross-sectional area of tape = 0.08cm^2, E = 2.1 x 10^6 kg/cm^2.   14M

UNIT–II

3. The formulation width of a road is 10m and the side slopes is 2:1. The surface of the ground has a traverse slope of 1 in 10. If the depths of cutting at the centres of three sections 60m apart are 1.5, 2.5 and 2.0m respectively, determine the volume of earth work.   14M

OR

4. An excavation is to be made for a reservoir 26m long and 15m wide at the bottom, of side slope 2:1. Calculate the volume of excavation if the depth is 4m. Assume that the ground surface is level before excavation.   14M

UNIT–III

5. a) Describe the process of measuring the horizontal angle.   7M

   b) Describe how you would measure vertical angles.   7M

OR

6. What is temporary adjustment of a theodolite? Describe the process of such adjustment.   14M

UNIT–IV

7. a) Discuss the methods of tacheometry.   7M

   b) Explain the theory of stadia tacheometry.   7M

OR

8. a) What are the errors that may occur in plane tabling?   7M

   b) What are the precautions to be taken in plane table surveying?   7M

UNIT–V

9. What are the different types of curves? Draw neat sketches of each.   14M

OR

10. A road bend which deflects by 90^0 is to be designed for a maximum speed of 130km/hr, a maximum centrifugal ratio of ¼, and a maximum rate of change of radial acceleration of 35cm/s^3. The curve should consist of a circular arc combined with two cubic spirals. Calculate :

   a. The radius of circular arc,

   b. The requisite length of the transition curve, and

   c. The total length of the composite curve.   14M

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Code: 19A235T

R-19

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022
Basic Electronics, Electrical & Mechanical Technology
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units 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 terms Power and Energy?	7M	CO1	L1

OR

2.	a)	Describe with neat sketches the construction of a DC machine?	7M	CO1	L1
	b)	Explain the principle operation of DC motor?	7M	CO1	L1

UNIT–II

3.	a)	Explain the principle operation of single phase transformer?	7M	CO2	L1&L3
	b)	Describe various losses in single phase transformer?	7M	CO2	L1&L3

OR

4.	a)	Define voltage regulation of a transformer?	7M	CO2	L1&L3
	b)	Explain the principle operation of Alternators?	7M	CO2	L1&L3

UNIT–III

5.	a)	Explain the operation of P-N junction diode with neat diagram?	7M	CO3	L1&L3
	b)	Explain the operation of bridge rectifiers with neat diagram?	7M	CO3	L1&L3

OR

6.	a)	Explain the operation of CRO?	7M	CO3	L1&L3
	b)	Discuss the applications of CRO?	7M	CO3	L1&L3

PART-B

UNIT–IV

7.	a)	Why do we need a step Down Transformer in ARC Welding? Explain.	7M	CO4	L2
	b)	Describe How Acetylene Gas is produced by using Calcium Carbide in Acetylene cylinder?	7M	CO4	L2

OR

8.	a)	Mechanical compression process of vapor compression cycle is replaced by a thermal compression process in vapor absorption refrigeration system. Explain.	7M	CO5	L2
	b)	Contrast between air cooling and air conditioning	7M	CO5	L2

UNIT–V

9.	a)	Explain the working principle of two stroke diesel engine	7M	CO4	L2
	b)	Why Two Stroke IC Engines deliver more power compared to Four Stroke Engines? Discuss.	7M	CO4	L2

OR

10.	a)	Differentiate between pump and compressor. Where do we need compressed Air? Discuss.	7M	CO5	L2
	b)	Explain working principle of Air Compressor with neat sketch	7M	CO5	L2

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II B.Tech. I Semester Supplementary Examinations Nov/Dec 2022

Building Materials and Construction

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. Explain in detail various methods of manufacture of bricks?   14M

OR

2. a) "Kiln burning is better than clamp burning". Write a suitable comment on it?   7M

   b) Enumerate and briefly explain the characteristics to be considered for selection of stones for various civil engineering works.   7M

UNIT–II

3. a) Explain the ingredients of Cement?   7M

   b) Describe the field tests for cement.   7M

OR

4. Discuss about at least three materials for roofing purpose other than traditional tiles.   14M

UNIT–III

5. a) Describe the physical and mechanical properties of timber?   7M

   b) Differentiate between softwood and hardwood?   7M

OR

6. a) Write the alternate materials for wood?   7M

   b) Sketch the cross section of the trunk of a tree and indicate the different parts of a log of wood.   7M

UNIT–IV

7. a) Differentiate between rubble and ashlars masonry?   7M

   b) Explain in detail about English bond with neat sketches?   7M

OR

8. a) List the construction situations and choice of corresponding footings?   7M

   b) Describe the causes of failure of foundations? Explain the measures are to be taken to prevent such failures?   7M

UNIT–V

9. a) Explain the causes of dampness in buildings?   7M

   b) Explain coupled roof with sketch?   7M

OR

10. a) Mention the tools which are required in the plastering work   7M

   b) Explain the method of erection of centering for arch construction   7M

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