Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Regular Examinations November 2018

Engineering Mathematics – III

(Common to All Branches)

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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UNIT–I

1. a) Find a real root of the equation $x^3 - 3x - 5 = 0$ by the method of false position correct to three decimal places. 7M

   b) Find the real root of the equation $x = e^{-x}$ using Newton-Raphson method. 7M

OR

2. a) Employ Taylor's method to obtain the approximate values of y at $x = 0.1, 0.2$ for the differential equation $\frac{dy}{dx} = x - y^2,\ y(0) = 1.$ 7M

   b) Apply Runge-Kutta method of order 4, compute $y(0.2)$ *and* $y(0.4)$ from the equation $\frac{dy}{dx} = x + y,\ y(0) = 1.$ 7M

UNIT–II

3. a) The population of a town in the decennial census was given below

Year : x	1891	1901	1911	1921	1931
Population: y (in thousands)	46	66	81	93	101

   Estimate the population for the year 1895. 7M

   b) Use Lagrange's interpolation formula to find the value of y when $x = 3.5$ from the following table

x	0	1	3	4
y	-12	0	12	24

7M

OR

4. a) Find the first and second derivatives of the function tabulated below at the point $x = 1.5$

x	1.5	2.0	2.5	3.0	4.0
y	3.375	7.0	13.625	38.875	59

7M

   b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using

   (i) Trapezoidal rule (ii) Simpson's $\frac{1}{3}$ rule, (iii) Simpson's $\frac{3}{8}$ rule with $h = 0.5$ *and* 0.25 7M

UNIT–III

5. a) Find the values of $a, b \, and \; c$ so that $y = a + bx + cx^2$ is the best fit to the data 7M

x	0	1	2	3	4
y	1	0	3	10	21

b) Solve $x^2\left(y-z\right)p + y^2\left(z-x\right)q = z^2\left(x-y\right)$ 7M

OR

6. a) Determine the values of $a \, and \; b$ by the method of least squares such that $y = ae^{bx}$ fits the following data 7M

x	0	1	2	3
y	1.05	2.10	3.85	8.30

b) Solve $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$ by employing the method of separation of variables. 7M

UNIT–IV

7. Prove that $x^2 = \frac{®^2}{3} + 4\sum_{n=1}^{\infty}(-1)^n \frac{\cos nx}{n^2}, \; -® < x < ®$ by using Fourier series and hence show that $\sum_{n=1}^{\infty}\frac{1}{n^2} = \frac{®^2}{6}$ 14M

OR

8. Obtain a half range cosine series for $f\left(x\right) = \begin{cases} kx, \; 0 \le x \le l/2 \\ k\left(l-x\right), \; l/2 \le x \le l \end{cases}$

and deduce the sum of the series is $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + ... = \frac{®^2}{8}$ 14M

UNIT–V

9. a) Find the Fourier transform of $f\left(x\right) = \begin{cases} a^2 - x^2, \; for\left|x\right| \le a \\ 0, \quad for\left|x\right| > a \end{cases}$ 7M

b) Find the Fourier cosine transform of $e^{-ax}\left(a > 0\right)$. Hence Evaluate $\int_0^{\infty}\frac{\cos \text{a} x}{x^2 + a^2}dx$ 7M

OR

10. Obtain the Fourier sine transfromation of

$$f\left(x\right) = \begin{cases} 4x, & for \; 0 < x < 1 \\ 4 - x, & for \; 1 < x < 4 \\ 0, & for \; x > 4 \end{cases}$$ 14M

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Hall Ticket Number :										

R-17

Code: 7G631

II B.Tech. I Semester Regular Examinations November 2018

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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UNIT–I

1.	a)	What is meant by quarrying state the methods of quarrying?	4M
	b)	Give the list of explosives used in blasting and explain their composition.	10M
		OR	
2.		Explain the process of manufacture of Bricks and differentiate Clamp Burning and Kiln Burning.	14M

UNIT–II

3.	a)	Describe in detail how lime is manufactured?	7M
	b)	Distinguish between quick, fat and hydraulic lime?	7M
		OR	
4.	a)	List different types of Cement?	4M
	b)	Discuss various methods of manufacturing of cement?	10M

UNIT–III

5.	a)	Explain briefly about alternative materials for wood.	7M
	b)	What is seasoning of timber? State the objects of seasoning.	7M
		OR	
6.	a)	Short note on teak wood?	4M
	b)	Explain the classification of wood used in buildings in detail?	10M

UNIT–IV

7.		List various types of foundations and Explain them?	14M
		OR	
8.		Explain English bond and Flemish bond with neat sketches.	14M

UNIT–V

9.	a)	What are the different types of roofs explain any two?	7M
	b)	Explain about form work and scaffoldings?	7M
		OR	
10.	a)	How do you classify various types of paints? Explain in detail each type.	7M
	b)	Explain coupled roof with sketch.	7M

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Hall Ticket Number :										

R-17

Code: 7G537

II B.Tech. I Semester Regular Examinations November 2018

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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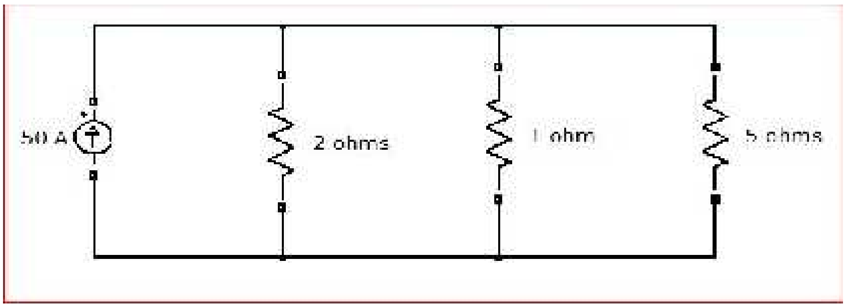
PART-A

UNIT–I

1. a) Define (i) Electrical circuit (ii) Potential Difference (iii) Power (iv) Energy 8M

   b) Determine current in all resistors.



6M

OR

2. a) Explain the principle of operation of DC generator. 6M

   b) Explain characteristics and applications of DC motors. 8M

UNIT–II

3. a) (i) Define Efficiency and Regulation of a transformer.
   (ii) Explain the losses present in a transformer. 8M

   b) A single-phase transformer has transformation ratio of 5. Primary is connected to 40 V, 50 Hz AC supply and N_1=100 turns. Find secondary voltage and N_2. 6M

OR

4. a) Differentiate salient pole and non-salient pole type rotors. 8M

   b) A 3-Φ induction motor is wound for 4 pole and supplied from 50 Hz supply. Calculate
   (i) Synchronous speed (ii) Speed of the motor when slip is 4%.
   (iii) Rotor frequency when speed of rotor is 900 rpm. 6M

PART-B

UNIT–III

5.	a)	Describe the working principle of gas welding. Discuss in brief the equipment required for Oxy – acetylene welding?	7M
	b)	Compare A.C. and D.C. arc welding	7M
		OR	
6.	a)	What are the essential characteristics of a flux?	7M
	b)	Explain submerged arc welding with a neat diagram and state advantages of it.	7M

UNIT–IV

7.	a)	Explain the working of a four stroke C.I. engine with the help of a neat sketch?	7M
	b)	Explain in detail splash lubrication system with a neat sketch.	7M
		OR	
8.	a)	Explain the principle of air compressor and discuss the working of a multi-stage reciprocating air compressor.	7M
	b)	Define IC engine. Compare SI and CI engines with respect to (**i**) Basic Cycle (**ii**) Fuel used (**iii**) Introduction of fuel (**iv**) Ignition and (**v**) Weight	7M

UNIT–V

9.	a)	Explain commonly used refrigerants in refrigeration systems with their properties?	7M
	b)	Explain the working of vapour absorption refrigeration system and state its advantages and disadvantages?	7M
		OR	
10.	a)	Define air-conditioning. Explain room air-conditioning system with a neat sketch.	7M
	b)	Sketch the layout of an air conditioning system and explain the functions of each component in it	7M

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Hall Ticket Number :										

R-17

Code: 7G632

II B.Tech. I Semester Regular Examinations November 2018

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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UNIT–I

1. a) At a depth of $8\ \mathrm{km}$ below the surface of ocean, the pressure is $82\ \mathrm{MN/m^2}$. Determine the density of sea water at this depth if the density at the surface is $1025\ \mathrm{kg/m^3}$ and $bulk\ modulus\ \mathrm{K} = 2350\ \mathrm{MN/m^2}$ for this pressure range. Calculate also the percentage change in specific volume and specific gravity.

   b) Calculate the capillary effect in glass tube of $5\ \mathrm{mm}$ diameter when immersed in (i) water and (ii) in mercury. Take

   $\sigma\ (\text{water in contact with air}) = 0.075\ \mathrm{N/m}$

   $\sigma(\text{mercury in contact with air}) = 0.52\ \mathrm{N/m}$

   $\rho(\text{water}) = 1000\ \mathrm{kg/m^3}$ and $\rho\,(\text{mercury}) = 13600\ \mathrm{kg/m^3}$

   The contact angle for water is $0°$ and for mercury is $130°$.

OR

2. A differential manometer is connected to two pipes whose centres are at $3\ \mathrm{m}$ difference in height. Higher level pipe is carrying liquid of specific gravity of 0.9 at a pressure of 1.8 bar and another pipe is carrying liquid at specific gravity of 1.5 at a pressure of 1 bar. The centre of pipe carrying low pressure liquid is $2\ \mathrm{m}$ above the higher level of the mercury in the manometer. Find out the difference in mercury level in the manometer.

UNIT–II

3. a) Write short notes on kinetic energy correction factor.

   b) Define stream line, path line, streak line and stream tube.

OR

4. $260\ \text{litres/s}$ of water is flowing in a pipe having a diameter of $300\ \mathrm{mm}$ If the pipe is bent by $135°$(that is change from initial to final direction is $135°$), find the magnitude and direction of the resultant force on the bend. The pressure of water flowing is $39.24\ \mathrm{N/cm^2}$.

UNIT–III

5. Derive Darcy's Weisbach equation.

OR

6. a) Compare and contrast venturimeter and orifice meter.

   b) Find the discharge through a fully sub-merged orifice of width 3 m if the difference of water levels on both sides of the orifice be 6$0\ \mathrm{cm}$. The height of water from top and bottom of the orifice are $3.5\ \mathrm{m}$ and $3.75\ \mathrm{m}$ respectively. Take $\mathrm{C_d} = 0.6$.

UNIT–IV

7. An oil of $sp.gr = 0.85$ and viscosity of $2.5\,poise$ is flowing through a $30\,cm$ diameter pipe. The length of pipe is $2.5\,km$ and head loss is $20\,m$.

Find out (a) Shear stress at the pipe wall.

(b) Shear stress at $r = 10\,cm$ from the centre of the pipe.

(c) The value of friction factor 'f' if the flow is laminar.

OR

8. a) Explain Reynold's experiment.

b) A pipe-line carrying water has average height of irregularities projecting from the surface of the boundary of the pipe as $0.15\,mm$. What type of boundary is it? The shear stress developed is $4.9\ N/m^2$. The kinematic viscosity of water is $.01$ stokes.

UNIT–V

9. Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of sound in the medium C.

OR

10. a) When can you apply the results of a model to a prototype

b) In 1 in 40 model of a spillway, the velocity and discharge are $2.5\ m/s$ and $3.0\,m^3/s$. Find the corresponding velocity and discharge in the prototype.

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Hall Ticket Number :										

R-17

Code: 7G633

II B.Tech. I Semester Regular Examinations November 2018

Strength of Materials

(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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UNIT–I

1. a) What are the fundamental loads? Give the expressions for stresses in these loads. 4M

   b) The cross section of the 10-m-long flat steel bar AB has a constant thickness of 20 mm, but its width varies from 40mm to 120mm. Calculate the elongation of the bar due to the 100-kN axial load. Use E = 200 GPa for steel. 10M

OR

2. a) When a material is called linear material. Enumerate the advantages of this model is mechanics of materials. 4M

   b) What is meant by beam of uniform strength and state its advantages. Derive an expression for the same. 10M

UNIT–II

3. a) Differentiate between deterministic and indeterministic beams with examples 4M

   b) A simply supported beam carries two point loads of 6kN magnitude, each at a distance of 2m from the supports. A UVL of intensity 0 to 5kN/m spreads between the two point loads. Draw the SFD and BMD. 10M

OR

4. a) Define shear force and bending moment at a section of a beam. Establish relationship between SF, BM and rate of loading. 6M

   b) A cantilever beam of length 3m carries a point load of 1kN at free end along with another point load of 2kN at distance of 2m from free end. UDL of 2kN/m is spread between the two point loads. Draw the SFD and BMD. 8M

UNIT–III

5. a) Define the terms Neutral axis, neutral plane and moment of resistance. 4M

   b) A hollow circular bar used as a beam has outside diameter twice of the inside diameter. It is subjected to a maximum bending moment of 60kN-m and allowable bending stress is 100Mpa, determine the inside diameter of the bar. Draw the bending stress distribution. 10M

OR

6. The shear force acting on a section of a beam is 120kN. The section of the beam is of T-shaped of 200X250X50mm. the flange and web thicknesses are 50mm. MOI about NA is $1X10^8 mm^4$. Find the shear stress at the neutral axis and at the junction of web and flange. Draw the shear stress distribution. 14M

UNIT–IV

7. A cantilever of length 4m carries a UDL of 1kN/m run over the whole length. The cantilever is propped at the free end. If E=200GPa and I=10^8mm^4, determine a) the deflection at the center and b) magnitude and position of maximum deflection. 14M

OR

8. A simply supported beam of 12m carries a point load of 20kN at a distance of 7m from one of the ends. Determine the deflection at load point and the slopes at the point load and at the ends using Mohr's, theorem. 14M

UNIT–V

9. a) Define principal stresses. Write the expressions for the same in 2D case drawing a stress element. 4M

   b) State of stress at point is given as $\sigma_x = 3MPa,\ \sigma_y = -2MPa\ and\ \tau = 7Mpa$. Draw the Mohr's circle and hence deduce principal stresses and maximum shear stress. Find also the inclinations of principal planes. 10M

OR

10. a) What are theories of failure? Explain the importance of them. 4M

    b) Discuss the Maximum shear stress theory of failure with neat diagram. 10M

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Hall Ticket Number :										

R-17

Code: 7G634

II B.Tech. I Semester Regular Examinations November 2018

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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UNIT–I

1. a) List out the principle of surveying 7M

   b) Explain briefly about classifications of survey based on object of survey 7M

OR

2. The following were observed in a compass traverse. Correct local attraction

Line	Fore bearing	Back bearing
AB	$68^0 15'$	$248^0 15'$
BC	$148^0 45'$	$326^0 15'$
CD	$224^0 30'$	$46^0 00'$
DE	$217^0 15'$	$38^0 15'$
EA	$327^0 45'$	$147^0 45'$

14M

UNIT–II

3. a) Discuss in detail the methods of direct and indirect contouring 7M

   b) Discuss the characteristics of contour lines with neat sketches 7M

OR

4. Following are the correlated latitudes and departures of lines of a closed traverse. Determine the area of traverse by the D.M.D method.

Line	Latitude (m)	Departure (m)
AB	-116.1	-44.4
BC	+6.8	+58.2
CD	+80.5	+17.2
DA	+28.8	-31.0

14M

UNIT–III

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

   b) Briefly explain about the temporary adjustments of a theodolite 7M

OR

6. a) Define horizontal angle and vertical angle in theodolite surveying 7M

   b) The observations were made on the top A of flag AB on a hill from two instrument stations P and Q, 150 m apart, the station P and Q being in the line with A. The angles of elevations of A at P and Q were $30^0 05'$ and $17^0 52'$ respectively. The staff reading upon the BM (RL=311.25 m) were, respectively 2.690 and 3.815 when the instrument was at P and Q the telescope being horizontal. Determine the elevation of the foot B of the Flag if AB is 4.5 m 7M

UNIT–IV

7. Describe briefly the methods involved in plane table surveying? 14M

OR

8. Determine the gradient form a point P to another point Q from the following observations made with Tacheometer fitted with an anallactic lens. The constant of instrument was 100 and the staff was held vertical. 14M

Instrument station	Staff station	Bearing	Vertical angle	Staff reading (m)
R	P	120^0	$+12^0 32^{'}$	1.255, 1.810, 2.365
	Q	210^0	$+7^0 06^{'}$	1.300, 2.120, 2.940

UNIT–V

9. Explain briefly about Two theodolite methods in setting out a curve? 14M

OR

10. a) Describe about total station and state its advantage over other methods of surveying 7M

b) State four uses and applications of GPS 7M

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