MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: ELEMENTARY CALCULUS & TRANSFORMS

Branch: CIVIL,EEE,ME,ECE

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

PART – A

I. Answer ALL questions of the following　　　　　　　　　**5x2M=10 M**

1. Find the Smallest positive period T of the following functions : cos x, sin x, cos 2x, sin 2x, cos πx, sin πx, cos 2πx, sin 2πx.

2. Find the complete solution of $z = px + qy + \sqrt{1 + p^2 + q^2}$.

3. Change the order of integration $\int_0^2 \int_0^{y^2/2} \frac{y}{\sqrt{(x^2 + y^2 + 1)}} dxdy$.

4. Write the Geometrical meaning of Lagrange's Mean value theorem.

5. Define Divergence.

PART-B

Answer ANY FIVE questions of the following　　　　　　　**5x10 M= 50M**

1. Find the Fourier series of the function f(x) = x + x^2 for $-\pi$ < x < π.

2. a) Find the Fourier sine transform of $\frac{e^{-ax}}{x}$.

   b) Find the Fourier cosine series for f(x) = $(x - 1)^2$ in the interval 0 < x < 1.

3. Solve the partial differential equation $(x^2 - y^2 - z^2)p + 2xyq = 2xz$.

4. a) Solve the partial differential equation: $q^2 = z^2 p^2 (1 - p^2)$.

   b) Form the partial differential equation from: $f(x^2 + y^2, z - xy) = 0$.

5. Trace the curve $y^2(a-x) = x^3$, a>0.

6. Find the maximum, minimum values of f(x, y) = $2(x^2 - y^2) - x^4 + y^4$.

7. If $\bar{F} = (x^2 + y^2)\bar{\imath} - 2xy\bar{\jmath}$. Evaluate $\oint_c \bar{F}.\overline{dr}$, where curve 'c' is the rectangle in xy-plane bounded by y = 0, y = b, x = 0, x = a.

8. a) By transforming to triple integral, evaluate $\iint_S (x^3\, dydz + x^2 y\, dzdx + x^2 z\, dxdy)$ where S is the closed surface consisting of the cylinder $x^2 + y^2 = a^2$ and the circular discs $z = 0$ and $z = b$.

   b) Using Green's theorem, evaluate $\iint_C (y - \sin x)dx + \cos x\, dy$, where C is the plane triangle enclosed by the lines $y = 0, y = \pi/2$ and $y = 2x/\pi$.

Code No.: **50101**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **STRENGTH OF MATERIALS**

Branch: **CE**

Time: **3 hours**   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. What is ductility of a material? How it is measured? Explain.
2. Draw the shear force diagram and bending moment diagram for a simply supported beam with uniformly distributed load over the entire span.
3. Find the section modulus of a hollow rectangular section of a beam having exterior width and depth of 80 mm and 120 mm, and thickness of 10 mm.
4. Deflection in a loaded beam at certain point is 12 mm. If the depth of the beam is doubled and width is halved what will be the deflection at the above point?
5. Define Torsion write the relation of maximum shear stress induced in a shaft subjected to twisting moment.

PART-B

Answer any FIVE questions of the following   5x10 M= 50M

1. a) A prismatic metallic bar of rectangular section 500mm x 250mm and 2m long is subjected to a load of 170kN applied gradually on it. If the stress at elastic limit of the bar material is 200N/mm^2, determine strain energy at given load, proof resilience and modulus of resilience.

   b) At a point in a strained material, the principal stresses are 400N/mm^2 and 300N/mm^2. The first one is tensile in nature and the second one is compressive in nature. Determine the following stresses on a plane inclined at 60° to the direction of the larger stress. (i) Normal stress. (ii) Shear stress. (iii) Resultant stress.

2. a) Derive an expression for change in length of a circular bar with uniformly varying diameter and subjected to an axial tensile load 'P'.

   b) At a given section a shaft is subjected to a bending stress of 20 MN/m^2 and shear stress of 40 MN/m^2. Determine (i) the principal stresses (ii) the direction of principal planes (iii) the maximum shear stress and the planes on which this acts.   .

3. a) Determine the resilience and toughness modulii of mild steel (E = 200 GPa) with a yield stress of 250 MPa and fracture strain of 28.5 percent. Neglect strain hardening effects. From these data determine the impact resistance of a bar of 12 mm diameter and 500 mm length.   (4M)

   b) A cantilever of length 8m carries a uniformly distributed load of 4kN/m run over the whole span and a point load of 6 kN at a distance of 2m from the free end. Draw the S.F and B.M diagrams for the cantilever.   (6M)

4. a) Define strain energy. Derive an equation for the strain energy of a uniform bar subjected to a tensile load of P Newton. Hence calculate the strain energy in a 50 mm diameter bar, 4 m long when carrying an axial tensile pull of 100 kN. Assume E=200 kN/ m^2.

b) An overhanging beam ABC of length 7 m is simply supported at A and B over a span of 5 m and the portion BC overhangs by 2 m. Draw the shearing force and bending moment diagrams and indicate the point of contra flexure, if it is subjected to uniformly distributed load of 5 kN/m over the portion AB and point loads of 10 kN and 15 kN at the middle of span AB and at C respectively.

5. a) A rectangular beam 100mm wide and 200mm deep is used over a span f 4m with a distributed load of 1500N/m. Determine (i) the maximum stress developed at a section 1m from the right hand support (ii) the position and magnitude of the maximum stress developed in the material of the whole length of the beam.

   b) Two wooden planks 120 mm x 40 mm each are connected to form a T-section of a beam. If a moment of 12 kNm is applied around the horizontal neutral axis, find the bending stresses at both the extreme fibres of the cross-section.

6. a) Determine the dimensions of a timber joist of span 8m carrying a uniformly distributed load of 20 kN/m. The maximum permissible stress is limited to 10 N/mm^2. The depth of the joist is twice its width.

   b) Derive from the basics simple bending equation(Flexure formula) and state the Assumptions made.

7. a) Write about Macaulay's method and moment area method and where they are used conveniently.

   b) A cantilever of length L carries a uniformly distributed load on its entire span. Show that the deflection at free end using conjugate beam method is $\delta = -\dfrac{wL^4}{8EI}$

8. a) A material subjected to a simple tension test shows an elastic limit of 240 MN/m^2. Using the maximum shear strain energy theory calculate the factor of safety provided if the principal stresses set up in a complex two dimensional stress system are limited to 140 MN/m^2 tensile and 45 MN/m^2 compressive.

   b) A close-coiled helical spring is to have a stiffness of 90 kN/m and to exert a force of 3 kN: the mean diameter of the coils is to be 75 mm and the maximum stress not to exceed 240 MN/m^2. Calculate the required number of coils and the diameter of the steel rod from which the spring should be made. Consider E=210 GMN/m^2 and G=70 GN/m^2.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **HUMAN VLAUES & PROFESSIONAL ETHICS**

Branch: COMMON TO CE,ME

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. What is Human consciousness?
2. What is Work Ethics?
3. What are the different types of inquiry?
4. What element did Gilligan consider in her theory of moral development that was not fully addressed by Kohlberg?
5. What is Humanistic education?

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. Discuss the models of professional roles with examples.

2. Write short notes on
   a) Saviour as a professional role.
   b) Profession-comprehensive human goal.

3. How moral, ethical and human values are related? Discuss.

4. a) "Honesty is the best policy". Comment and explain how it is favorable to an engineering student   to make the career.
   b) What is Work Ethic? Explain its significance in the engineering field.

5. "Time and Tide waits for none" explain it importance with examples.

6. Write a short note on   a). 'Employee rights'   b). Occupational crimes.

7. a) What are the foundational values of relationships? How can they be used to ensure strong and mutually relationships?
   b) What are the values in interaction of human beings with the material things? Give one example of each.

8. Write short notes on
           a)Human Relationship.   b) Humanistic Education.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **Engineering Economics And Accountancy**

Branch: **CE**

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. State the determinates of Demand.

2. What is the Least cost combination of inputs?

3. Define Monopolistic Competition

4. List the importance of payback method.

5. What is Trial Balance?

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. Write short note on the following:

   a) Judgmental approach to demand forecasting.

   b) Demand Determinants

2. a) Define managerial economics. Illustrate how it helps in solving managerial problems.

   b) What are Isoquants and Isocosts?

3. Differentiate fixed and variable cost.

4. What do you mean by explicit cost and implicit cost?

5. (a) Explain different types of competition.

   (b) Describe limit pricing, market skimming pricing and penetration pricing.

6. What do you mean by capital budgeting, how to estimate the fixed and working capital requirements? And brief on the methods of Capital Budgeting.

7. Consider the case of the company with the following two investment alternatives each costing Rs.9 lakhs. The details of the cash inflows are as follows:

Year	Rs in Lakhs **Project A**	**Project B** Rs in Lakhs
1	3	6
2	5	4
3	6	3

   The cost of capital is 10% per year. Which project will you consider under NPV method?

8. From the following Trial Balance, prepare Trading and Profit and Loss Account for the year ended 31" Dec. 2003 and Balance Sheet as on that date:

Debt Particulars	Amount (Rs.)	Credit Particulars	Amount (Rs.)
Purchase	2,75,000	Sales	5,20,000
Return Inwards	15,000	Return Outwards	9,000
Carriage	12,400	Rent Received	13,000
Wages	58,600	Creditors	62,100
Trade Expenses	2,200	Bills Payable	2,200
Insurance'	2,000	Commission	1,000
Audit Fees	1,200	Bank Loan	20,000
Bills Receivable	3,300	Capital	2,50,000
Advertising	5,500		
Opening Stock	36,000		
Cash in hand	12,800		
Cash at Bank	26,800		
Interest on Loan	1,500		
Drawings	15,000		
Fixed Assets	3,00,000		
Total	**8,77,300**		**8,77,300**

Adjustments

(1) Stock at the end Rs. 60,000/-

(2) Depreciation on fixed assets is 10%

(3) Commission earned but not received amounts to Rs. 400/-

(4) Rent received in advance Rs. 1,000/-

(5) Interest on bank loan @ 15% p.a. is unpaid for the last six months

(6) Allow 8% interest on capital and charge Rs. 900/- as interest on drawings

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **FLUID MECHANICS**

Branch: CE

Time: 3 hours   **Max. Marks: 60**

PART – A

Answer ALL questions of the following   **5x2M=10 M**

1. What is the use of manometers?
2. A stream function is given by $\Psi = 3x^2 - y$. Determine the magnitude of velocity components at the point (2, 1).
3. How will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend?
4. What is Magnus effect? Explain.
5. What are the different energies of a fluid? Explain each of them.

PART-B

Answer ANY FIVE questions of the following   **5x10 M= 50M**

1. a) Enunciate the Newton's law of viscosity. Explain the classification of fluids as per the Newton's law of viscosity.
   b) Oil of specific gravity 0.80 acts on a vertical triangular area whose apex is in the oil surface. The triangle is isosceles of 3 m high and 4 m wide. A vertical rectangular area of 2 m high is attached to the 4 m base of the triangle and is acted upon by a water. Find the magnitude and point of action of the resultant hydrostatic force on the entire area.

2. a) Find out an expression for the centre of pressure for a plane immersed in water and inclined by an angle "θ" to the free water surface.
   b) A simple U-tube manometer is used to measure the vacuum pressure of the liquid flowing through a pipe. One end of the manometer is connected to centre of the pipe and other end is open to atmosphere. The difference in mercury level in the two limbs is 30 cm and the height of the liquid in the limb connected to pipe is 20 cm from the centre of the pipe. Find the pressure in the pipe. Take specific gravity of liquid flowing through pipe as 0.85.

3. a) What are the different methods of drawing flow nets? Explain.
   b) The velocity components in a two-dimensional flow field for an incompressible fluid are expressed as u = x-4y and v = -y-4x . Obtain expressions for stream function and velocity potential function.

4. a) State and prove Euler's theorem.   (4)
   b) The head of water over an orifice of diameter 100 mm is 12 m. the water coming out from the orifice is collected in a rectangular tank 2m x 0.9m. The rise of water level in this tank is 1.2m in 30 seconds. Find the coefficient of discharge.   (6)

5. a) Derive the discharge equation through horizontal Orifice meter
    b) Explain the principle of Orifice meter with a neat sketch. Derive the expression for the rate of flow of fluid through it.

6. a) Why it is necessary to control the growth of boundary layer on most of the bodies. What methods are used for such a control.
    b) On a flat plate of 2m length and 1 m width experiments were conducted of 60Km / hr. The plate is kept at such an angle that the drag and lift coefficients are 0. 2 and 0. 7 respectively, Determine:
    i) Drag force ii) Lift force and iii) Resultant force.

7. A pipe network consists of two loops formed by five pipes AB, BC, CD, DA and BD. The inflow at **A** is 70 m³/s and that at **C** is 50 m³/s. The outflows at **B** and **D** are 40 m³/s and 80 m³/s. The values of **K** in the friction loss formula $h_f = KQ^2$ is given below:

Pipe	AB	BC	CD	DA	BD
K	4	3	1	2	2

    Determine the flow in each of the pipes using Hardy Cross method.

8. a) Mention the various empirical formulaes for discharge over wires. What are the various ways in which weirs are classified?
    b) A rectangular channel 2m wide has a discharge of 250 litre per second which is measured by right angled V-notch weir. Find the position of apex of the notch from the bed of the channel if maximum depth of water is not exceed 1.3 meters. Take $C_d = 0.62$.