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, MAY-2019
Subject: **Strength of Materials**
Branch: CE

Time: 3 hours   Max. Marks: 60
PART – A
Answer **ALL** questions of the following   **5x2Marks=10 Marks**

1. Define and explain the terms: Working stress and Factor of safety.
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 circular section of a beam having the external diameter of 120mm and thickness of 20 mm.
4. Draw the conjugate beam for a cantilever beam subjected to point load at free end.
5. What is the significance of Theories of failure?

PART-B
Answer any **FIVE** Questions of the following   **5x10 Marks= 50Marks**

1. 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 20MN/m^2 and shear stress of 40MN/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.
2. A rectangular bar made of steel 3m long and 15mm thick. The bar is subjected to an axial tensile load of 30kN. The width of the rod varies from 75 mm at one end to 30 mm at the other end. Find the extension of the rod. If E = 200GPa. a) Mohrs circle of stresses. The tensile stresses at a point across two mutually perpendicular planes are 120N/mm^2 and 60N/mm^2.Determine the Normal, tangential and resultant stresses on a plane inclined at 300C to the axis of the minor stress.
3. a) Determine the resilience and toughness modulii of mild steel (E=200 GPa) with a yield stress of 250MPa and fracture strain of 28.5 percent. Neglect strain hardening effects. From these data determine the impact resistance of a bar of 12mm diameter and 500mm length.   **(4M)**
   b) A cantilever of length 8m carries a uniformly distributed load of 4kN/m run over the whole span & a point load of 6kN at a distance of 2m from the free end. Draw the S.F&B.M diagrams for the cantilever.   **(6M)**
4. A simply supported beam of span 10m is subjected to uniformly varying load of 20kN/m at left end to 40kN/m at right end. Draw the shear force & bending moment diagrams indicating the salient points.
5. a) A strip of aluminum 900 mm long and 3mm thick is bent into an arc so that the angle subtended by the two ends of the strip at the center of curvature is 60°. If modulus of elasticity of aluminum is 130kN/mm2, find the maximum stress induced in the metal.
   b) Calculate the maximum stress induced in a cast iron pipe of external diameter 40mm, of internal diameter 20mm &of length 4m when the pipe is supported at its ends and carries appoint load of 100N at its centre.
6. a) Derive the bending equation according to the theory of simple bending of beams.
   b) A uniform I-section beam has flanges 150mm wide by 8mm thick & web 180mm wide and 8mm thick. At a certain section there is a shearing force of 120kN. Draw a diagram to show the distribution of shear stress across the section as a result of bending. What is the maximum shear stress?
7. a) Write about Macaulay's method & 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) Explain theory of failures: i) Maximum principal stress theory ii) Maximum principal strain theory   iii) Shear stress theory   iv)Strain energy theory   v) Shear strain energy theory
   b) Determine the diameter of a solid steel shaft which will transmit 120 kW at 200 r.p.m. Also determine the length of the shaft if the twist angle must not exceed 1.5o over the entire length. The maximum shear stress is limited to 55 N/mm2. Take modulus of rigidity = 8 x 104 N/mm2.

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

Subject: **Fluid Mechanics**

Branch: CE

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

PART – A

Answer **ALL** questions of the following   **5x2Marks=10 Marks**

1. What is the use of manometers?
2. Define the rotation of a flowing fluid & find out the required conditions for irrotational flow if the flow is 3D & 1D.
3. What are the applications of momentum equation?
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 Marks= 50Marks**

1. a) Define viscosity and derive the equation of it . Also draw rheological diagram.
   b) Determine the total pressure on a circular plate of diameter 1.5m which is placed vertically in water in such a way that the centre of the plate is 3m below the free surface of water. Find the position of centre of pressure also.

2. a) What do you understand by single column manometer? Deduce the expression for pressure measurement.
   b) A vertical dock gate is 5 m wide (perpendicular to the paper) has shown in figure given below. There is water 10m on one side and 4m to the other side. Find the resultant horizontal force on the gate and position of its action.
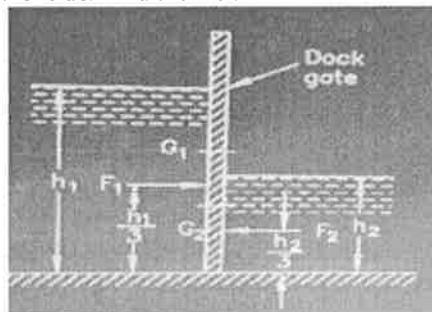
3. a) What are the different types of fluid flow? Explain.   (4M)
   b) A flow field is represented by a velocity potential function as given below: $\Phi = c\ (2x^2 - 3y^2)$ Verify whether it is a valid function or not? If valid, then find out the corresponding stream function.   (6M)

4. a) Distinguish between i)Laminar & Turbulent flow ii)Rotational & Irrotational flow
   b) The velocity potential function is given by $\phi = y^2 - x^2 - \frac{xy^3}{2} + \frac{x^3 y}{2}$ find the velocity components in 'x' and 'y' direction. Show that $'\phi'$ represents a possible case of fluid flow.

5. a) State and prove Euler's theorem.   (4M)
   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.   (6M)

6. a) Derive Continuity equation in 3 Dimensions
   b) Derive the discharge equation through horizontal Venturi meter.

7. a) Define displacement thickness. Derive an expression for the same.
   b) A thin flat plate measuring 75 cm x 25 cm is exposed parallel to a stream of water of uniform velocity 1. 2 m/s. the flow takes place parallel to 25 cm side of the plate. If the kinematic viscosity of water is 1.1 centistokes, determine the maximum boundary layer thickness, shearing stress at the trailing edge and the drag on both ides of the plate.

8. a) Derive an expression for head loss due to sudden enlargement in pipe diameter.
   b) A rectangular notch 50 cm long is used for measuring a discharge of 40 liters per second. An error of 2 mm was made in measuring the head over the notch. Calculate the percentage error in the discharge. Take Cd = 0.6.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019
Subject: **Engineering Economics and Accountancy**

Branch: CE

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

PART – A

Answer **ALL** questions of the following   **5x2Marks=10 Marks**

1. What is the scope of managerial economics?
2. Write the formula of BEP.
3. Write a note on Peak Load Pricing.
4. List the importance of payback method.
5. What do you mean by trial balance?

PART-B

Answer any **FIVE** Questions of the following   **5x10 Marks= 50Marks**

1. Explain the Law of variable proportions and briefly discuss the concept Returns to scale, increasing and decreasing returns to scale.
2. a) What is Managerial Economics? Explain its focus areas.
   b) How are costs classified? Explain any five important cost concepts useful for managerial decisions.
3. Write a note on the following:
   a) Out of pocket Vs. Imputed costs.
   b) Explicit costs Vs. Implicit costs
4. a) State and explain Break-Even analysis and explain its importance.
   b) What are its limitations BEP?
5. What do you understand by pricing and provide a detailed note on the pricing methods with appropriate illustrations?
6. a) What are the causes for the emergence of Monopoly?
   b) How is the equilibrium position attained by a monopolist under varying cost Conditions?
7. Following are the Cash flows for two mutually exclusive projects which cost Rs.1,00,000 each. Assume the cost of capital to be 10%. Calculate NPV for both the projects and interpret the results.

Year	Cash Flows (A)	Cash Flows (B)
1	30,000	70,000
2	55,000	62,000
3	65,000	38,000

8. Explain the following:
   a) Penetration pricing with suitable example.
   b) Payback Period Method.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019
Subject: Surveying
Branch: CE

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

PART – A
Answer **ALL** questions of the following   **5x2Marks=10 Marks**

1. Explain different corrections that can be applied to chain.
2. Define contour interval and horizontal equivalent.
3. Write the formula for calculating the capacity of a reservoir by trapezoidal and Simpson's rule?
4. What is multiplying constant?
5. Write any two applications of total station.

PART-B
Answer any **FIVE** Questions of the following   **5x10 Marks= 50Marks**

1. Examine the following notes on a compass survey for local attraction. Determine correct bearings. Also determine the included angles at A, B, C, D and E.

Station	FB	BB
A	S10°0'W	N85°0'E
B	S77°0'E	N10°0'E
C	N05°0' E	N75°0'W
D	N54°0'W	S02°0'W
E	S89°0'W	S50°0'E

2. The bearings of the sides of a traverse ABCDE are as follows :

Side	Fore bearing	Back bearing
AB	107° 15'	287° 15'
BC	22° 0'	202° 0'
CD	281° 30'	101° 30'
DE	189° 15'	9° 15'
EA	124° 45'	304° 45'

   Compute the interior angles of the traverse.

3. a. Explain about the effects of curvature of earth and refraction on the accuracy of leveling.
   b. Write about grid method of plotting contours.

4. a) Explain various methods of Contour Surveying.
   b) What is differential leveling? Explain in detail with figure.

5. a) The following perpendicular offsets were taken at 20 metres intervals from a survey line to an irregular boundary line. 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65. Calculate the area using average ordinate rule, trapezoidal rule and simpson's rule.
   b) Difference Theodolite Surveying and Tacheometry Surveying.

6. a) Write the general procedure for finding horizontal angle using theodolite.
   b) Explain about the Trapizoidal rule used for computation of areas.

7. a) Explain the use of 'Bowditch's rule' in traverse computation.
   b) Explain the difference between tangential and stadia tacheometry. How will you determine the stadia constants?

8. Calculate all the necessary data for setting out circular curve with the following data:
   Angle of intersection = 144°, Chainage of point of intersection =1390m, Radius of curve=300m.The curve is to be set by offsets from chords produced with peg interval of 20 m.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019
Subject: <u>**Human Values and Professional Ethics**</u>
Branch: **Common to CE, ME & MINING**

Time: 3 hours   Max. Marks: 60

PART – A

Answer **ALL** questions of the following   5x2Marks=10 Marks

1. What is empathy?

2. Define Empathy and Self- Confidence.

3. Explain the importance of commitment.

4. How do you differentiate Right and Wrong?

5. How to maintain relationship with family?

PART-B

Answer any **FIVE** Questions of the following   5x10 Marks= 50Marks

1. a) Discuss the stages of Lawrence Kohlberg's theory of moral development.

   b) What is moral inquiry? Discuss the various types of moral inquiry.

2. a) What is engineering ethics? Explain the different core values.

   b) Define character. What role does the character play in the conduct of an individual?

3. 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.

4. a) "Choosing a goal and sticking to it-changes everything". Comment

   b) Differentiate between Honesty and Courage.

5. a) Define a Goal and discuss the purpose of goal setting.

   b) Write short notes on types of goals and smarter goals.

6. Write short notes on: a) Valuing Time   b) Customs and religion

7. a) Write a note on human-human relationships.

   b) Write a note on humanistic education in detail.

8. 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.

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

Subject: **Elementary Calculus & Transforms**

Branch: **Common to CE, ME, EEE & ECE**

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

PART – A

Answer **ALL** questions of the following   5x2Marks=10 Marks

1. If $f(x) = x$ in $(-\pi, \pi)$ then find the value of a_2

2. State the Convolution theorem for Z transforms.

3. Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-x}}{x} dy dx$.

4. Explain the geometrical significance of Rolle's Theorem.

5. Define Divergence.

PART-B

Answer any **FIVE** Questions of the following   5x10 Marks= 50Marks

1. Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{x \cos x - \sin x}{x^3} \cos \frac{x}{2} dx$ [10M]

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. a) Solve $x(y-z)p + y(z-x)q = z(x-y)$

   b) Solve $x^2(y-z)p + y^2(z-x) = z^2(x-y)$

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. Calculate $\iint r^3 dr d\theta$ over the area included between the circles $r = 2\sin\theta$ and $r = 4\sin\theta$

6. a) Show that the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is $\frac{16}{3} a^2$

   b) Evaluate $\int_0^4 \int_0^{x^2} x^2 y^2 \, dx \, dy$

7. Find the dimensions of the rectangular box, open at the top, of maximum capacity whose surface area is 432 sq.cm.

8. Verify Green's theorem for $\int_C [(xy + y^2)dx + x^2 dy]$, where 'C' is bounded by $y = x$ and $y = x^2$