

**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-2017****SUBJECT: MATHEMATICS – III**

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer All Questions****5x1Mark=5Marks**

- 1) Write the fourier sine transform.
- 2) State linear property of Z-Transformation.
- 3) Write the normal equations  $y = ax^2 + bx + c$ .
- 4) Write Euler's Formula to solve initial value problem.
- 5) Write one dimensional heat equation.

**II. Answer All Questions****10x2Marks=20Marks**

- 1) Write Dirichlet's conditions.
- 2) Find half range cosine series of  $f(x) = x$  in  $0 \leq x \leq \pi$ .
- 3) Find Z-Transform of unit step sequence  $\langle H_n \rangle$  where  $H_n = \begin{cases} 1 & \text{for } n \geq 0 \\ 0 & \text{for } n < 0 \end{cases}$
- 4) Find  $Z^{-1} \left( \frac{z}{z-e} \right)$
- 5) Find a least squares straight line for the following data.

x	1	2	3
y	5	3	6

- 6) Write the first and second order derivative formulae at  $x = x_0$  using Newton's forward difference formula.
- 7) If  $\frac{dy}{dx} = y - \frac{2x}{y}$ ;  $y(0)=1$ ,  $h=0.1$  then find  $y(0.2)$  using Euler's method.
- 8) Write the merits and demerits of R-K method.
- 9) Solve  $p^2 - q^2 = npq$ .
- 10) Form P.D.E by eliminating the arbitrary constants a and b from  $z = (x - a)^2 + (y - b)^2$ .

## PART-B

Answer all questions

5x10 Marks= 50Marks

1. Obtain the Fourier cosine series of  $f(x) = x \sin x$  in  $(0, \pi)$  and show that  $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots = \frac{\pi-2}{4}$

[OR]

2. Find the Fourier sine transform of  $f(x) = \frac{1}{x(a^2+x^2)}$  and derive Fourier Cosine transform of  $\phi(x) = \frac{1}{(a^2+x^2)}$

3. Find  $Z^{-1} \left\{ \frac{z}{z^3-7z^2+14z-8} \right\}$

[OR]

4. Use Z-Transform solve the difference equation  $u_{n+2} - 6u_{n+1} + 9u_n = 3^n$  with  $y_0 = 0, y_1 = 1$ .

5. Pressure and volume of a gas are related by  $PV^\gamma = C$ . Fit it to the data,

Pressure (P) (kg/cm <sup>2</sup> )	0.5	1.0	1.5	2.0	2.5	3.0
Volume (V) (liters)	1.62	1.00	0.75	0.62	0.52	0.46

[OR]

6. Find  $\int_0^6 \frac{1}{1+x} dx$  by using (i) Trapezoidal rule (ii) Simpson's 1/3 rule (iii) Simpson's 3/8 rule. Compare with the actual value.

7. Using Runge-Kutta method of order 4 find y for x= 1.2, 1.4 given that  $\frac{dy}{dx} = x^2 + y^2$ ,  $y(1) = 1.5$ .

[OR]

8. Evaluate y (0.2) and y(0.4) correct to four decimals by Taylor series method if y(x) satisfies  $\frac{dy}{dx} = 1 - 2xy$  given y(0)=0.

9. Solve by the method of separation of variables  $4u_x + u_y = 3u$   $u(0, y) = e^{-5y}$ .

[OR]

10. Solve (i)  $z(p^2 - q^2) = x-y$ , (ii)  $q = px + p^2$

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**II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017****SUBJECT: STRENGTH OF MATERIALS-I**

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. Give the expression for strain energy due to axial force.
2. Define shear force.
3. Draw the qualitative deflected profile of a simply supported beam subjected to central point load.
4. Define conjugate beam?
5. Express the relation between Modulus of elasticity and Modulus of rigidity.

**II. Answer All Questions****10x2Marks=20Marks**

1. Name the stresses which are encountered by a deformable body.
2. Give the limitation of Hooke's law.
3. Give the number of point of contraflexures for a simply supported beam with two equal overhangs on either side subjected to udl throughout the beam.
4. Distinguish between ductile and brittle behavior of a material?
5. What do you mean by the term "The material is isotropic", which is happened to be one of the assumption in deriving the flexure formula.
6. Describe the significance of Mohr's circle.
7. Differentiate between Bending moment and static moment.
8. What is section modulus? What is the significance of this?
9. What is the significance of theories of failure?
10. Define principal stresses and principal planes.

**PART-B****Answer all questions****5x10 Marks= 50Marks**

1. a) Sketch the stress-strain diagram for Mild steel and indicate salient points. (4M)  
b) A simple tension member 3 m long and has a cross-sectional area of  $1290 \text{ mm}^2$  carries an axial load of 22 kN. Assume Modulus of elasticity as 204GPa. Determine the total elongation in the member due to applied load. (6M)

**(OR)**

2. Derive the relationship between the three elastic Modulii. (10M)

3.a) Define the terms ((i) Bending moment (ii) Couple (3M)

b) The intensity of loading on a simply supported beam of 4m span increases gradually from 20kN/m at left end to 40kN/m at right end. Draw the Shear force and Bending moment diagrams. (7M)

(OR)

4. A horizontal beam 10m long is carrying UDL of 2 kN/m. The beam is supported on two supports 6m apart. Find the position of supports so that the bending moment as small possible. Also draw the Shear force and Bending moment diagrams.

5. a) Derive the bending equation( flexure formula) stating the assumptions made. (6M)

b) A Rectangular beam 200mm X 400mm deep is used under simply supported condition over a span of 6m. The beam supports a udl of 20kN/m. Calculate the maximum stress developed in the beam and sketch the bending stress distribution. (4M)

(OR)

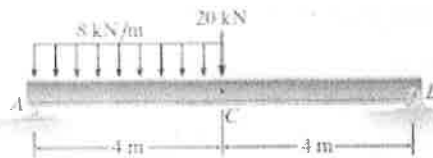
6. A T-section has a flange dimensions 400mm wide and 50 mm thick. The overall depth of the section is 500mm. At a section it supports a shear force of 150 kN. The width of the web is 50mm. Draw the variation in shear stress across the depth of the section. (10M)

7. State and Prove Mohr's theorems. (10M)

(OR)

8. Determine the vertical displacement of point C of the beam shown in fig.1.

Take  $E = 200 \text{ GPa}$  and  $I = 150 \times 10^6 \text{ mm}^4$ .



9. At a point in a strained material, there are normal stresses of 60Mpa(Compressive) and 40Mpa( Tensile) at right angles to each other with a shear stress 20MPa( negative). Determine the principal stresses, maximum shear stress and plane on which they act. Show them on the sketches of properly oriented elements. (10M)

(OR)

10. Discuss in detail various theories of failure. (10M)

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**II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017****SUBJECT: SURVEYING**

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART-A****I. Answer all the questions**

5x1=5M

1. What are the instruments used in the chain surveying ? [1M]
2. Write the formula of Simpson's rule for calculating the area of an irregular boundary ? [1M]
3. What are the sources of errors observed in a theodolite survey ? [1M]
4. Define tacheometry. [1M]
5. Explain how a simple circular curve is designated. [1M]

**II. Answer all the questions**

10x2=20M

- 1) Define surveying. What are the principles of surveying ? [2M]
- 2) Define following terms :- [2M]
  - a) True Bearing      b) Magnetic Bearing      c) True Meridian      d) Magnetic Meridian
- 3) What are the uses of contour maps for engineering purposes. [2M]
- 4) Calculate the volume of earth work in an embankment for which the cross section areas are given below: [2M]

Distance (m)	0	20	40	60	80	100	120
Cross Section Area (m <sup>2</sup> )	45	64	70	16	18	30	15

- 5) List out the various parts of the transit theodolite. [2M]
- 6) Mention any four cases for calculating the elevation of the top of an object in trigonometrical leveling. [2M]
- 7) What are the various methods employed in tacheometric survey ? [2M]
- 8) Write any differences between close and open traverses. [2M]
- 9) Describe the salient features of total station. [2M]
- 10) Explain the following terms: [2M]
  - (a) Deflection Angle    (b) Normal Chord    (c) Tangent Point    (d) Mid-ordinate

**PART-B****Answer all the questions**

5x10=50M

- 1) a) Following are the bearings taken in a closed compass traverse [7M]

Line	Fore Bearing	Back Bearing
PQ	N 62° 45' E	S 62° 15' W
QR	N 21° 00' E	S 20° 45' W
RS	N 71° 30' W	S 71° 30' E
ST	S 39° 00' W	N 38° 00' E
TP	S 54° 30' E	N 53° 15' W

Calculate the included angles after correcting for local attractions ?

- b) A 100m tape is suspended between the ends under a pull of 200 N. The weight of the tape is 30 N. Find the correct distance between tape ends ? [3M]

(OR)

- 2) a) What are the obstacles we come across while chaining. Explain in detail with neat sketches [7M]  
b) Draw the symbols of : Dam, Garden, Temple, Building, Wall, Benchmark [3M]
- 3) a) Explain in detail the temporary adjustments of a leveling instrument with neat sketches [6M]  
b) Write down the characteristics of contour lines with neat sketches [4M]

(OR)

- 4) Calculate the missing reading and RL of all the points and apply suitable checks [10M]

Station	B.S.	I.S.	F.S	Rise	Fall	R.L.	Remarks
1	2.150					450.00	B.M.I
2	1.645		X	0.500			
3		2.345			X		
4	X		1.965	X			
5	2.050		1.825		0.400		
6		X		X		451.50	B.M.2
7	1.690		X	0.120			
8	2.865		2.100		X		
9			X	X		452.25	B.M.3

- 5) a) Distinguish between the method of repetition and reiteration for measuring horizontal angles [4M]

- b) Write in detail about the temporary adjustments done to a theodolite [6M]

(OR)

- 6) a) List out the types of theodolites and explain anyone of them [5M +5M]  
b) Derive an expression for finding out the RL of top of an object when the base of an object is inaccessible and the instrument station and object are not at the same level
- 7) a) Explain the procedure to determine the tacheometric constants by fixed hair method  
b) A tacheometer is set at an intermediate point on a traverse course PQ and the following observations are made on a vertically held staff: [5M +5M]

Staff Station	Vertical Angle	Staff Intercept	Axial hair readings
P	+ 8° 30'	2.350	2.105
Q	+ 6° 6'	2.055	1.895

The instrument is fitted with an anallactic lens and the constant is 100. Compute the length of PQ and reduced level of Q, that of P being 321.50 meters.

(OR)

- 8) a) Write the differences between Bowditch and Transit rules [5M]  
b) How is the closing error of a traverse adjusted graphically [5M]
- 9) a) List the various methods of setting out a simple circular curve. Explain briefly any one method [6M+4M]  
b) Explain about the various electronic data recording devices after total station survey
- (OR)
- 10) Two straights AI & BI. Meet at a chain age of 4000meters. A simple circular curve of 250mts radius joins them. The reflection angle between the two straights is 50°. Take the chord interval as 20mts. Calculate all the data necessary to set out the curve by the Rankines method of deflection angle. [10M]

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**II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017**SUBJECT: Fluid Mechanics

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. What are the units of surface tension?
2. Define stream line
3. What is local acceleration?
4. How much is velocity gradient at verge of boundary layer separation?
5. Define Reynolds number

**II. Answer All Questions****10x2Marks=20Marks**

1. The velocity distribution over a plate is  $u=2y - y^2$ . If  $\mu = 0.01 \text{ Pa-s}$ , what is wall shear stress
2. A square plate of side 1.5 m is kept vertical in water such that top edge is touching water surface. Determine hydrostatic force on one side of plate.
3. If  $\psi = 2xy$ , find magnitude of velocity at (2,1)
4. Define steady and uniform flows.
5. What are surface and body forces give examples?
6. A jet of water is issued at 20m/s at  $30^\circ$  to horizontal, what is the maximum height attained by jet above horizontal?
7. A laminar boundary layer has velocity distribution  $u/U = y/\delta$ . What is the displacement thickness?
8. What is Karman momentum integral equation?
9. If flow Reynolds number is 500 in a pipe, what is Darcy's friction factor?
10. If there is 2% error in measurement of head over V-notch, what is the corresponding error in measurement of discharge?

**PART-B****Answer all questions****5x10 Marks= 50Marks**

- Q1. a)** Give detailed classification of fluids based on viscosity.
- b)** A vertical gate 2.0 m wide and 3 m high is subjected to water pressure at one side. The water surface coincides with top of the gate. The gate is hinged at bottom and is held by horizontal chain at top. Calculate tension in chain.

**(OR)**

- Q2. a)** Explain in detail difference between absolute and gauge pressure.
- b)** A differential manometer is connected to a  $30^\circ$  inclined pipe carrying water across points A and B. Points A and B are 5m apart. The deflection of mercury is 5cm. What is the pressure difference between A and B?

**Q3.** The velocity components in 2D incompressible flow are  $u = 2xy$  and  $v = a^2 + x^2 + y^2$ . Obtain relevant stream function. What is component of rotation at (2,2) if  $a=3$

(OR)

- Q4.** a) A water tank has top area  $1.5 \text{ m}^2$ . The inflow velocity through 3cm diameter pipe is 2m/s and outflow rate is 110 liter/min. What will be change of water level in tank?  
b) What is a flow net. Give detailed applications of flow net in civil engineering.

**Q5.** Derive Bernoulli's equation for 3D, incompressible flow from first principles.  
What are the situations when Bernoulli's equation is not applicable?

(OR)

- Q6.** a) A turbine has inlet pressure 300 kpa and exit pressure -4 m of water. The discharge through the turbine is  $0.4 \text{ m}^3/\text{s}$ . Assuming same velocity head at inlet and exit and efficiency as 90% estimate output power.  
b) In a horizontal pipe the diameter is reducing from 30cm to 15 cm. If the pressure and mean velocity at 15cm diameter section are 15 kpa and 6m/s respectively. Neglecting losses calculate reaction on transition

**Q7.** The velocity distribution in a laminar boundary layer over a flat plate is  $u/U = 2(y/\delta) - 2(y/\delta)^2 + (y/\delta)^4$ . Prove that  $\delta/x = 5.835/(\sqrt{Re_x})$  by Karman momentum integral equation.

(OR)

- Q8.** a) Explain in detail boundary layer growth over flat plate and boundary layer separation.  
b) A smooth flat plate 2.0 m wide and 2.5 m long is towed in oil of RD 0.8 at a velocity 1.5m/s along its length. Find boundary layer thickness and shear stress at trailing edge. Also determine power required to move the plate. Kinematic viscosity of oil is  $0.0001 \text{ m}^2/\text{s}$ .

**Q9.** A straight pipe 25 cm in diameter is connected between two reservoirs having elevation difference of 25 m. The length of pipeline is 5 km. Assuming Darcy's friction factor as 0.025 a) determine the discharge. b) To increase the discharge the same 25 cm diameter pipe is added in parallel to later half of existing pipe .calculate percentage increase in discharge.

(OR)

- Q10** a) Explain how to estimate friction factor with help of Moody's diagram.  
b) A culvert of diameter 0.9 m and length 20 m is used convey flood water. The flood discharge is  $2 \text{ m}^3/\text{s}$ . The d/s water surface elevation is RL 10.0m. Find water surface elevation on upstream of culvert. Consider all losses.



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**II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017****SUBJECT: Environmental Studies**

Branch: **Common to CE & Mining (MR14)**  
**CSE (MR13)**

**Time: 3 hours****Max. Marks: 75****PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. Define cybernetics.
2. What is meant by Genetic discovery?
3. List out the Primary and Secondary air pollutants.
4. What are the ozone depleting substances?
5. What is 3R approach?

**II. Answer All Questions****10x2Marks=20Marks**

1. Explain the significance of bio-magnification in food chains.
2. What are Ecological pyramids? Give a note on pyramid of Biomass.
3. What are the uses of various types of minerals?
4. Write the differences between Species, Habitat, Genetic bio diversity.
5. Enumerate the benefits of CETP.
6. Differentiate between point sources and non-point sources of water pollution.
7. Write a brief note on rain water harvesting.
8. Give a brief account on Montreal protocol.
9. Discuss about Clean Development Mechanism (CDM).
10. Write any four function of Pollution Control Board.

**PART-B****Answer all questions****5x10 Marks= 50Marks**

1. Explain energy flow in an ecosystem. Write a note on energy flow models with the help of diagrams.

**(OR)**

2. What are biogeochemical cycles? Explain the Carbon cycle with the help of neat diagram.
3. Briefly discuss growing energy needs and give an account of renewable energy resources in detail.

**(OR)**

4. Describe the following
  - a) Poaching
  - b) Loss of habitat
  - c) Remedial measures to reduce human animal conflict.
5. Explain about effect of water pollution in detail.

**(OR)**

6. Describe in detail about sewage treatment plants.
7. Define Green house Effect. Discuss the potential and contribution of these gases to global warming phenomenon.

**(OR)**

8. Explain methods of base line data acquisition.
9. Define various techniques an individual can follow to conserve natural resources.

**(OR)**

10. Define solid waste management and explain various methods of disposal for municipal and industrial solid wastes.



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**II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017****SUBJECT: Building Materials Construction & Planning**

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. What is the standard size of brick?
2. What is an admixture?
3. What is a lintel?
4. Name the defects in plastering?
5. What do you mean by roominess in principles of planning?

**II. Answer All Questions****10x2Marks=20Marks**

1. Define “quarrying” of a stone.
2. What is the importance of preservation of wood?
3. What is the chemical composition of cement?
4. Which admixture is used in RMC transit mixer and why it is used?
5. List the different types of arches?
6. Write down the characteristics of acoustics?
7. Name different types of pointing work?
8. What is the difference between formwork and scaffolding?
9. Name four principles of planning of buildings?
10. In a building, why kitchen has to be placed facing east?

**PART-B****Answer all questions****5x10 Marks= 50Marks**

- Q1. (a) What are the characteristics of a good building stone? (5m)  
 (b) What is meant by dressing of stone? Explain different dressed surfaces with neat sketches. (5m)  
 (OR)
- Q2. Explain the process involved in burning of bricks by Bull trench kiln with neat sketch. (10m)
- Q3. Explain about the different types of cement available? (10m)  
 (OR)
- Q4. List out different tests performed on cement. Explain any two in detail. (10m)
- Q5. Classify the types of foundations. Explain with neat sketches (10m)  
 (OR)
- Q6. What are the essentials of air-conditioning and explain the types. (10m)
- Q7. (a) What are the characteristics of a good paint? (5m)  
 (b) What are the constituents of paint? (5m)  
 (OR)
- Q8. What are the different types of scaffolding? Explain with the help of neat sketches. (10m)
- Q9. Explain about the various classification of buildings in detail. (10m)  
 (OR)
- Q10. Discuss in detail about building bye-laws? (10m)

