

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019**Subject: Engineering MechanicsBranch: **Common to CE, ME & MINING****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

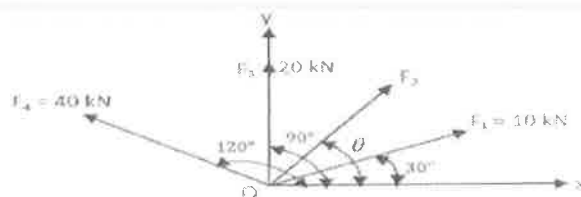
1. State the parallelogram law of forces.
2. State Lami's theorem.
3. Define centre of gravity.
4. Write the equations of translation.
5. Write Impulse-Momentum equation.

II. Answer ALL questions of the following**10x2Marks=20 Marks**

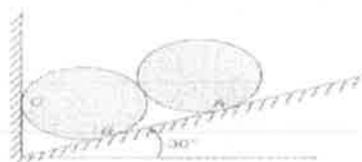
1. State polygon law of forces.
2. Define coplanar concurrent forces and coplanar non concurrent forces.
3. State the conditions for equilibrium of a rigid body in three dimensions.
4. What is the converse of the law of the triangle of forces?
5. Differentiate between polar moment of inertia and product of inertia.
6. State parallel axis theorem.
7. Define instantaneous center of rotation.
8. Write the equations of plane motion of a rigid body.
9. What are the equations involved in the connecting bodies considering impulse momentum method?
10. State the principle of angular momentum.

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

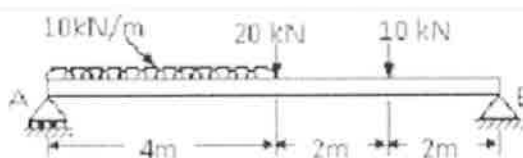
1. The resultant of four forces which are acting at a point O as shown in fig1 below is along Y axis. The magnitude of forces F_1 , F_3 , & F_4 are 10kN, 20kN & 40kN respectively. The angles made by 10kN, 20kN & 40kN with X-axis are 30° , 90° & 120° respectively. Find the magnitude & direction of force F_2 is resultant is 72kN.

**Fig-1****OR**

2. What is moment of a force? State and prove varignon's theorem.
3. Two identical rollers, each of weight 100N are supported by an inclined plane and a vertical wall as shown in the Fig.2. Determine the reactions at the points of supports A, B and C assuming all the surfaces to be smooth. Also find the reaction forces between the spheres.

**Fig-2****OR**

4. A beam AB is located supported and loaded as shown in Fig.3. Find the reactions at the supports.

**Fig-3**

5. Determine the centre of gravity of plane uniform lamina as shown in figure given below.

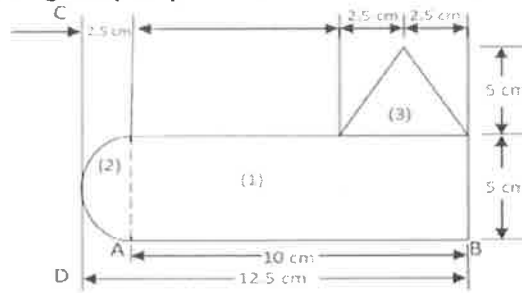


Fig-4

OR

6. Calculate the moment of inertia of the shaded area shown in Fig. 5 with respect to the x- axis.

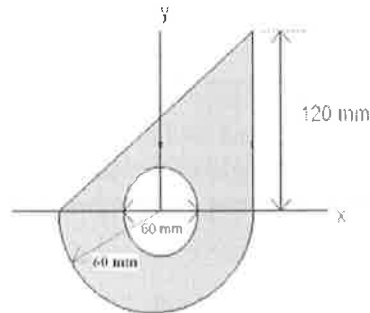


Fig. 5

7. A motorist is travelling at 80K mph, when he observes a traffic light 200mm ahead of him turns red. The traffic light is timed to stay red for 10 seconds. If the motorist wishes to pass the light without stopping, just as it turns green, determine: (a) the required uniform deceleration of the motor, and (b) the speed of the motor as it passes the light.

OR

8. A particle move along a straight line with an acceleration prescribed by the relation $a = 4t^2 - 3t + 2$ where a is m/s^2 and t is in seconds. The particle has a velocity of 10m/s at $t = 3$ seconds, and it is located 12m to the right of the origin at $t = 2$ sec. Determine the position and velocity of the particle after 5 sec's
9. A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane(Fig.6). If the initial velocity of the body is 1.5 m/sec and coefficient of kinetic friction is 0.2 ,what velocity will the body have after moving 6 m ?

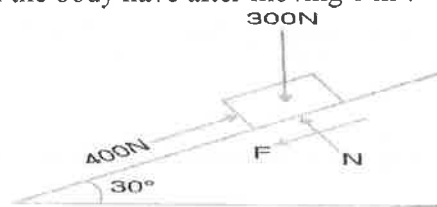


Fig-6

OR

10. A pile hammer, weighing 15 kN drops from a height of 600 mm on a pile of 7.5 kN.How deep does a single blow of hammer drive the pile if the resistance of the ground to pile is 140 kN?

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: **Engineering Drawing-II**Branch: **Common to CE, ME & MINING****Time: 3 hours****Max. Marks: 75****I. Answer ALL questions of the following****5x15=75 Marks**

- 1 Construct a scale to be used with a map, the scale of which 1cm=500m. The maximum length to be read is 5km. Mark on the scale, a distance of 3.85km.
(OR)
- 2 Construct a vernier scale of 1:50, showing meters, decimeters and centimeters and long enough to measure 5m. Mark distances of 2.435m and 3.275m on the scale.
- 3 A hexagonal prism of side of base 30 and length of the axis 75, is resting on a corner of its base on H.P, with the longer edge containing that corner, inclined to H.P at 30° . It is cut by a section plane parallel to H.P and passing through the midpoint of the axis. Draw the front and sectional top views of the solid.
(OR)
- 4 A vertical cylinder of 60 diameter , is penetrated by another cylinder of 45 diameter. The axes of the two cylinders are intersecting at right angle. Draw the projections of two cylinders, showing the lines (curves) of the intersection.
- 5 A square prism of side of base 40 and axis 80 long, is resting on its base on H.P such that, a rectangular face of it is parallel to V.P. Draw the development of prism.
(OR)
- 6 A Cube of 50 edge , is resting on a face on H.P Such that, a vertical face is inclined at 30° to V.P. It is cut by a section plane perpendicular to V.P and inclined to H.P at 30° and passing through a point at 12 from the top end of the axis. Develop the lateral surface of the lower portion of the cube.
- 7 Draw the perspective view of a square pyramid of base 50 side and 60 height. An edge of the base is parallel to and 10 behind P.P. The station point is situated at a distance of 60 in front of P.P, 40 above the ground and 40 to the right of the apex
(OR)
- 8 A hexagonal prism of side of base 30 and length of axis 60, rests with one of its rectangular faces on the ground such that, the axis is perpendicular to P.P. The nearest base is 10 behind P.P. The station point is 60 to the right of the centre of the prism, 65 in front of P.P and 70 above the ground. Draw the perspective view of the solid.
- 9 Write about editing and display commands used in Auto CAD.
(OR)
- 10 Explain about different types of dimensions given for the object in Auto CAD.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: **Data Structure and Software Tools**Branch: **Common to ECE, EEE & CSE****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark= 5Marks**

1. Write about linear search.
2. What is time complexity of quick sort?
3. What is an Array?
4. List out the different types of web tool.
5. Give an example for plug-ins.

II. Answer ALL questions of the following**10x2Marks=20Marks**

1. What is hot code replace?
2. Write about D-Queue.
3. Write short notes on XSL transform.
4. Explain steps for installation of eclipse and updating plug-ins.
5. Discuss about j2ee standard tool.
6. Explain how to calculate level of binary tree?
7. Discuss about PUSH and POP operations.
8. What is Space and Time complexity?
9. Discuss the applications of Queue.
10. Discuss about FRONT and REAR operations.

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. Explain the method to transform an expression from infix to postfix.

OR

2. Write a C program to implement a queue using array.
3. Write a C program to implement a circular queue using linked list.

OR

4. Describe the method of linked list over binary tree?
5. Distinguish between linear search and binary search. Write a C program to implement Fibonacci search.

OR

6. Explain the techniques used in insertion sort to insert a node or delete a node.
7. Discuss the issues in information exchange and write about basics of XML.

OR

8. Explain Java Development Tool.
9. What is debugger? Explain the applications of debugging.

OR

10. Write short note on

(a) Platform Architecture

(b) Web Standard tool

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: Engineering Chemistry -IIBranch: **Common to CE, ME,ECE, EEE,CSE & MINING****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Define Degree of Polymerisation.
2. Differentiate Fibre, Plastic and Elastomer
3. What is photochemistry?
4. What is triple point?
5. What is octane number?

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. PVC is soft whereas bakelite is hard. Give reasons
2. How do thermoplastics differ with thermo setting resins (any three?)
3. What is the mechanism of conduction of polyacetylene polymer.
4. Write the preparation of Polylactic acid.
5. How many types of electronic transitions are there?
6. Explain the principle involved in Lambert-Beer law.
7. Define Phase and component with example.
8. Define the terms Adsorption and Absorption with examples
9. What is meant by octane number and cetane number
10. Write characteristics of good fuel.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. a. What is FRP? Write its Characteristics and applications.
b. Write the preparation and applications of Bakelite.
OR
2. a. What is meant by compounding plastics? What are different constituents of compounding
b. Differentiate the thermoplastics and thermosetting resins
3. a. What are the Conducting Polymers? Write about preparation and mechanism of conduction in Polyaniline and applications of conducting polymers.
b. What are the liquid crystal polymers? Explain the properties and applications.
OR
4. a. Write brief note on vulcanization
b. Define doping and why conjugated polymers are electric conductors while all polymers (saturated) are insulators?
5. a. With neat block diagram explain the instrumentation and applications of uv-visible spectroscopy.
b. State and explain the Einstein-Stark law of Photo Chemical equivalence with example.
OR
6. a. What do you understand by the term quantum yield of a photo chemical reaction. How is it determined experimentally?
b. Explain Electronic, vibrational and rotational transitions in electromagnetic spectrum.
7. a. Define adsorption? Explain Langmuir adsorption isotherm graphically.
b. What is Phase rule? Explain the graphical lines in the phase diagram by taking one Component system i.e. Water.
OR
8. a. Derive Freundlich adsorption isotherm
b. Write a short note on i)Brownian movement ii)Tyndall effect
9. a. What is coal? Explain the ultimate analysis of coal and write its significance.
b. What are the flue gases? Explain analysis of flue gases by Orsat apparatus.
OR
10. a. What are the advantages of Natural gas?
b. Calculate the amount of air needed for complete combustion of 10 kg of coal containing 80% carbon 15% hydrogen and the rest oxygen

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Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. If $x = r \cos \theta$, $y = r \sin \theta$, find $\frac{\partial(x,y)}{\partial(r,\theta)}$
2. Evaluate $\Delta^2 \cos 2x$
3. Write the relationship between Beta and Gamma functions.
4. Evaluate $\int_0^1 \int_0^2 \int_0^3 xyz \, dx \, dy \, dz$
5. Define irrotational and solenoidal vectors.

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Write the geometrical interpretation of Lagrange's Mean Value theorem.
2. Find 'C' of Cauchy's mean value theorem for $f(x) = x^2$ and $g(x) = x$ in $[1,2]$.
3. If $u_0 = 3$, $u_1 = 12$, $u_2 = 18$, $u_3 = 2000$ find $\Delta^3 u_0$
4. Find the missing term in the following data:

x	0	1	2	3	4
y	1	3	9	---	81
5. Find a positive root of the equation $x^3 - 4x - 9 = 0$ by using bisection method.
6. Find the value of $B(\frac{3}{2}, \frac{1}{2})$
7. Evaluate $\iint_A xy \, dx \, dy$ where A is the domain bounded by the x-axis, ordinate $x=2a$ and the curve $x^2 = 4ay$.
8. Evaluate $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} \, dx \, dy$ by changing to polar coordinates.
9. Find $\text{div} f$ and $\text{curl} f$ where $f = \text{grad}(x^3 + y^3 + z^3)$
10. Find the greatest value of the directional derivative of the function $f = x^2 y z^3$ at $(2, 1, -1)$.

PART-B

Answer ALL questions of the following

5x10 Marks= 50Marks

1. Using the Taylor's theorem, express $\tan^{-1} x$ in powers of (x^{-1}) up to four terms.
OR
2. Determine whether the functions $u=x+y-z$, $v=x-y+z$, $w=x^2+y^2+z^2-2yz$ are functionally dependent are not. If so, find the relationship them.
3. Find the polynomial $f(x)$ by using Lagrange's formula for

x	0	1	2	5
f(x)	2	3	12	147

OR

4. Estimate $f(22)$ from the following data.

x	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

5. Show that $\int_a^b (x-a)^{m-1} (b-x)^{n-1} \, dx = (b-a)^{m+n-1} \beta(m,n)$
OR
6. Using Newton- Raphson method, find the real root of $x \log_{10} x = 1.2$. Go up to four steps.
7. Evaluate $\int \int x^2 y^2 \, dx \, dy$ over the circle $x^2 + y^2 = 1$
OR
8. Change the order of integration and evaluate $\int_0^\infty \int_0^x x e^{-\frac{x^2}{y}} \, dy \, dx$.
9. Verify Green's theorem for $\int_c (3x - 8y^2) \, dx + (4y - 6xy) \, dy$ where c is the boundary of the region bounded by $x=0$, $y=0$, and $x+y=1$.

OR

10. Verify Stoke's theorem for $\vec{F} = (x^2 + y^2) \hat{i} - 2xy \hat{j}$ taken round the rectangle bounded by $x=-a$, $x=+a$, $y=0$, $y=b$.

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- Find the Finite Fourier cosine transform of $f(x) = 1, 0 < x < 1$
- Find Z-Transform of n^r , ($0 \leq p \leq n$)
- Write Trapezoidal formula
- Write Picard's iterative formula
- Solve $p^3 - q^3 = 0$

II. Answer ALL questions of the following**10x2Marks=20 Marks**

- Expand $f(x) = x \sin x$ as sine series in $(0, \pi)$

$$\int_0^{\infty} \frac{\sin x}{x} dx = \frac{\pi}{2}$$

- Prove that
- State Initial Value theorem for Z-Transforms
- Find Z-Transform of unit step sequence
- Evaluate $\int_0^6 \frac{dx}{1+x}$ by Simpson's rule
- Find $\frac{dy}{dx}$ at $x=4$ from the following data

x	1	2	3	4
y	0	1	5	5

- Using Runge-Kutta method of fourth order, Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$ at $x=0.2$
- Find the value of y for $x=0.1$ by Picard's method given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$
- Form PDE from $F(xy + z^2, x + y + z) = 0$
- Solve $yzp - xzq = xy$

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

- Find a Fourier series expansion of $f(x) = 2x - x^2$ in $(0, 3)$
 - Express $f(x) = x$ as a half range sine series in $(0, 2)$

(OR)

- Find the Fourier sine transform of $e^{|x|}$, hence Show that $\int_0^{\infty} \frac{x \sin mx}{1+x^2} dx = \frac{\pi}{2} e^{-m}$, $m > 0$

3. Using $Z(n) = \frac{z}{(z-1)^2}$, show that $Z(n \cos n\theta) = \frac{(z^3 + z) \cos \theta - 2z^2}{(z^2 - 2z \cos \theta + 1)^2}$

(OR)

4. Using residue method, solve $y_k + \frac{1}{9} y_{k-2} = \frac{1}{3^k} \cos \frac{k\pi}{2}, k \geq 0$
5. Fit a least squares curve of the form $y = a + bx^2$ for the following data

x	1	2.5	3.5	4.0
y	3.8	15	26	33

(OR)

6. Find $y''(1.5)$ from

x	1.5	2	2.5	3	3.5	4
y	3.3	7	13.6	24	38.8	59

7. Solve by Modified Euler's method $y' = \log(x+y), y(0) = 2$ at $x = 1.2$ and $x = 1.4$ with $h = 0.2$

(OR)

8. Given $y' = x^2(1+y)$ and $y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979$ evaluate $y(1.4)$ by Adams-Bashforth method.

9. a) Solve $z = p^2x + q^2y$

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

(OR)

10. A rod of length L has its ends A and B maintained at 0° and 100° respectively until steady-state conditions reached. Then suddenly the temperature at A and B have been changed to 25° and 75° respectively. Find the subsequent temperature in rod.

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1. Write the Bragg's Law
2. Mention the pumping scheme employed in Ruby LASER
3. What is the magnetic susceptibility of Type-I Superconductors
4. Expand TEM
5. Write the limitations of Sabine's formula

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Write the conditions for producing good interference fringes
2. Why yellow and Black rings are formed in Newton's ring experiment?
3. Distinguish between spontaneous and stimulated emissions
4. Mention the Characteristics of LASERS.
5. Explain Ferro electricity with an example
6. Define (i) dipole moment and (ii) dielectric constant
7. Distinguish step index and graded index optical fibres
8. Explain the principle involved in Optical Fiber with suitable diagram.
9. How can ultrasonics are detected by Kundt's tube method?
10. Discuss any one method of Detection of Ultrasonic Waves.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. a. What is interference? (2M)
b. Explain interference in thin films. Obtain the conditions for maxima and minima for interference of reflected light in thin films (8M)

OR

2. a. What is double refraction? Differentiate ordinary and extraordinary ray (3M)
b. Explain Construction and working of Nicol prism. (7M)
3. a. Describe the construction and working of Ruby LASER
b. Explain three level and four level pumping schemes with an example

OR

4. a. What is stimulated emission (2M)
b. Obtain the relations among the Einstein coefficients (8M)
5. a. Derive Claussius - Mosotti equation
b. Explain different types of electric polarization mechanisms

OR

6. a. Prove that type- I superconductors are perfect diamagnetic materials (4M)
b. Write a note on Piezo-electricity and Ferro- electricity (6M)
7. a. Explain different attenuation mechanisms in optical fibres
b. calculate the refractive indices of core and clad, if the Numerical aperture and fractional refractive index change of an optical fibre are 0.22 and 0.012, respectively.

OR

8. a. Explain the propagation light through optical fibre and derive an expression for numerical aperture(7M)
b. Distinguish step index and graded index optical fibres (3M)
9. a. Mention the basic requirements for acoustically good halls.
b. What are the remedies affecting the architectural acoustics?

OR

10. a. Define the terms i) Acoustics ii) Reverberation iii) Reverberation Time (3M)
b. Deduce Sabine's Formula for reverberation Time. (7M)

