Code No.: **50305**

MR15-2015-16 Batch

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, EXAMINATIONS, DECEMBER-2018

Subject: **Mechanics of Solids**

Branch: ME

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

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

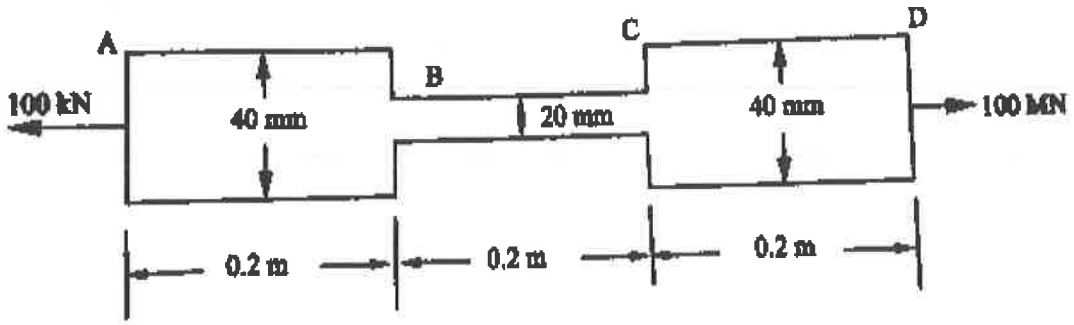
1. Define Longitudinal Strain and Lateral Strain
2. List the type of loads applied on a beam.
3. What do you mean by simple bending or pure bending?
4. Describe double integration method.
5. Define frame. Explain perfect frame.

PART-B

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

1. a) Derive an expression for ~~the bars~~ Total elongation of varying sections of composite bars.

   b) Compute the stresses at various sections and the total elongation of the bar shown in the figure. Take $E_s = 2.05 \times 10^5$ N/mm^2.



2. a) Derive slope and deflection equations for a cantilever beam with load at free end using double Integration method.

   b) Derive an expression for Strain energy due to sudden load.

3. A simply supported beam of length 8m rests on supports 6m apart. The right-hand end is overhanging by 2m. The beam carries a u.d.l of 1500Nm over the entire length. Draw SFD and BMD.

4. A over hanging beam of span 8m has two supports one at left support and the other at a distance 6m from left support. It is acted upon by U.D.L of 60KN/m over a of span 3m from left support and also by concentrated load of 15KN at right end of the beam. Draw S.F.D and B.M.D.

5. (a) A steel wire of 6mm diameter is bent into a circular shape of 6m radius. Determine the maximum stress induced in the wire. Take $E = 2 \times 10^5$ N/mm^2

   (b) Show that for a rectangular section the maximum shear stress is 1.5 times the average shear stress

6. a) For a given stress, compare the moments of resistance of a beam of a square section, when placed

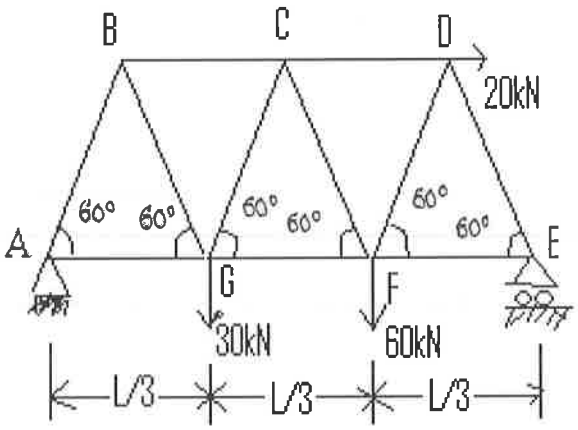
   (i) when its sides are horizontal (ii) when its diagonal is horizontal

   b) Draw the shear stress distribution for an I-section beam 350mm x 200mm has a web thickness of 12.5mm and a flange thickness of 25mm. It carries a shearing force of 200KN at a section.

7. a) Macaulay's method to find slope and deflection.

   b) A simply supported beam is 4m long and has a load of 200kN at the middle. The flexural stiffness is 300 MN/m^2. Calculate the slope at the ends and the deflection at the middle.

8. Calculate the forces induced in the members of the pin-jointed truss shown in the Figure.



Code No.: **50306** | **MR15-2015-16 & 2016-17 Batch**

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Theromodynamics**

Branch: **ME**

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

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Define Path, Process & Control Volume.
2. Write the limitations of first law of thermodynamics
3. What is the difference between characteristic and universal gas constant?
4. Explain processes of diesel cycle with the help of P-v diagram.
5. Draw layout of Vapour compression refrigeration cycle and mark various energy interactions.

PART-B

Answer any 5 questions of the following **5x 10 Marks= 50Marks**

1. a) Write short notes on CarnotsTheorm with P-V and T-s diagrams
   b) Write short notes on Steady flow process.
2. a) Prove that internal energy is a property.
   b) Write a short note on Thermodynamic Equillibrium
3. a) Write short notes on Gibbs & Helmholtz functions.
   b) Explain principle of increase of Entropy
4. a) Explain about Isothermal process.
   b) Discuss about PMM-I & PMM-II with suitable examples and Explain Carnot's Principle.
5. a) Explain about Isochoric process.
   b) A large insulted vessel is divided into two chambers, one containing 5 Kg of dry saturated steam at 0.2 MPa and the other 10 kg of steam, 0.8 quality at 5 Mpa. If the partition between the chamber is removed and the steam is mixed thoroughly and allowed to settle. Find the final pressure, steam quality and entropy change in the process.
6. a) Air in a cylinder is compressed reversibly and isothermally from 85 Kpa, 29^0C to 380 Kpa. The initial volume is 0.423 m^3 . Find the heat transfer and the entropy change of the air.
   b) A vessel of volume 0.05 m^3 contains a mixture of saturated water and saturated steam at a temperature of 250^oC. The mass of the liquid present is 10 kg. Find the pressure, mass, specific volume, enthalpy, the entropy and the internal energy.

7. a) An engine working on Otto cycle has a total volume of $0.5m^3$, pressure 1 bar and temperature 27^0C at the beginning of the Compression Stroke. At the end of the Compression Stroke, the pressure is 12 bar, and 250 kJ of heat is added at constant volume. Calculate a) The pressure, temperature and volume at the salient points in the cycle. b) Percentage clearance volume. c) Net work done per cycle.

   b) A gas mixture consists of 0.4 Kg of carbon monoxide,1.1 kg of carbon dioxide and 1.5 Kg of nitrogen. Determine i) Mass fraction of each component ii) Mole fraction of each component iii) Average molar mass of the mixture iv) Gas constant of the mixture.

8. a) Draw the Psychrometric chart and indicate all the property line. Explain the importance of Psychrometric chart

   b) Write short notes on combined cycles.

Code No.: **50307**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Metallurgy and Material Science**

Branch: **ME**

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

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Define a crystalline material.
2. State different phase diagram.
3. List various types of steels.
4. Define Cryogenic Heat Treatment process.
5. List out the different types of fibers.

PART-B

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

1. a) What are solid solutions? Sketch the classifications and briefly explain.
   b) Define grain size. Describe fine grained and coarse grained material.
2. a) Draw miller indices for (0, 0, 1) and (1, 0, 0).
   b) What are the factors affecting on the grain size? What is the effect of grin size on the mechanical properties?
3. a) Construct Fe-Fe_3C phase diagram and liable it.
   b) Briefly explain a phase diagram for two metals completely soluble in liquid but partially soluble in solid form by naming all parts
4. a) Draw and explain Peritectic phase diagram.
   b) Define ferrite, Pearlite, Ledeburite, Austenite, hypoeutectic and hypoeutectoid steels.
5. a) Explain the properties and applications of Gray Cast Iron and SG Cast Iron.
   b) Write short notes on stainless steels and heat resistant steels.
6. Write a short notes on following
   a) Low carbon steels.
   b) High carbon steels.
   c) Ferritic Stainless steel
   d) High speed steels
7. a) Explain various carburizing treatments given to low carbon steels?
   b) Sketch and differentiate between Induction hardening and Flame hardening.
8. a) Define Nano-materials. State their physical and chemical properties with applications.
   b) What is hand layup and Pultrusion process? Draw Sketches.

Code No.: **50308**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Machine Drawing**

Branch: **ME**

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

PART – A

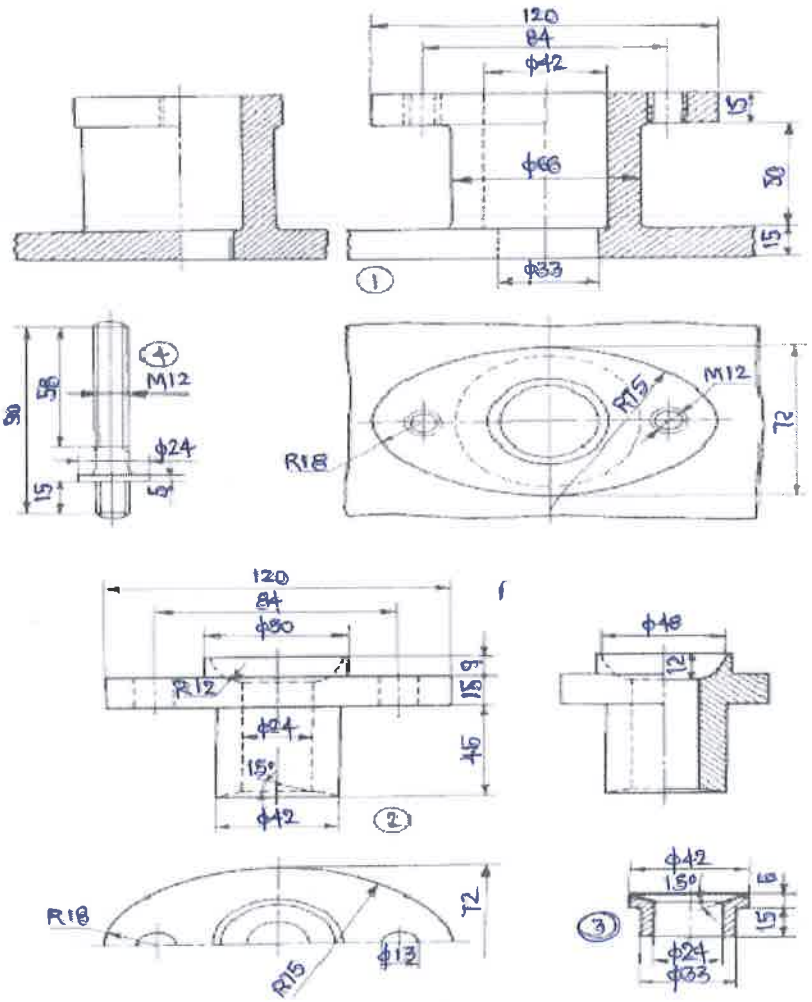
Answer Any TWO questions of the following **2x10Mark=20 Marks**

1. Draw the three views Hexagonal headed bolt of nominal diameter 25 mm and length 100mm with Hexagonal nut and washer.
2. Draw sectional front view and top view of the triple riveted butt joint with double straps (zig zag type) with dia of Rivet as 18 mm.
3. Draw the sectional front view and top view of the double riveted double strap zig zag butt joint with dia of the rivet as 14 mm.

PART-B

Answer the following question **1x40 Marks= 40Marks**

1. Assemble all parts of the stuffing box, shown in Fig. and draw the following Views: (*i*) Half sectional view from the front, and (*ii*) View from above.



Parts list

Part No	Name	Matl	Qty
1	Body	CI	1
2	Gland	Brass	1
3	Bush	Brass	1
4	Stud	MS	2
5	Nut, M12	MS	2

Stuffing Box

Code No.: **50309** | **MR15**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, EXAMINATIONS, DECEMBER-2018

Subject: **KINEMATICS OF MACHINES**

Branch: **ME**

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

PART – A

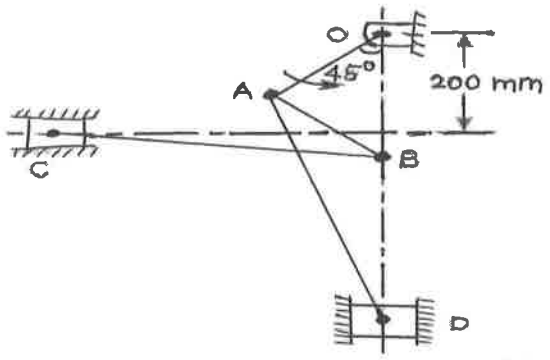
Answer ALL questions of the following **5x2Mark=10 Marks**

1. Explain different types of links.
2. Explain Robert mechanism?
3. Discuss the three types of instantaneous centres.
4. Define radial follower and offset follower.
5. What are the advantages of a cycloidal gear profile?

PART-B

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

1. Write short notes on any two of the following:
   a) Give the Kutzbach criterion for planar mechanisms.
   b) With a neat sketch explain any one quick return mechanism of single Slider crank chain
2. (a) Sketch and explain the various inversions of double slider crank chain.
   (b) Types of joints.
3. a) Sketch and Describe the Scott-Russel and Robert's straight-line motion mechanisms.
   b) Explain Ackerman steering gear mechanism.
4. (a) Distinguish between exact and approximate straight line motion mechanisms.
   (b) Explain Peaucellier straight line mechanism with a neat sketch
5. The dimensions of the various links of a pneumatic riveter, as shown in Fig. are as follows :OA = 175 mm ; AB = 180 mm ; AD = 500 mm ; and BC = 325 mm. Find the velocity ratio between C and ram D when OB is vertical.



6. a) Define cam and the follower, also clarify the follower according to the motion.
   b) Type of followers

7. A cam operating a knife-edged follower has the following data:
   (a) Follower moves outwards through 40 mm during 60° of cam rotation.
   (b) Follower dwells for the next 45°.
   (c) Follower returns to its original position during next 90°.
   (d) Follower dwells for the rest of the rotation.

   The displacement of the follower is to take place with simple harmonic motion during the outward and with Uniform velocity during return stroke. The least radius of the cam is 50 mm. Draw the profile of the cam when the axis of the follower is offset 20mm towards right from the cam axis. If the cam rotates at 300 r.p.m., determine maximum velocity and acceleration of the follower during the outward stroke and the return stroke.

8. What is a differential gear? Where is it used? b)Differential gear of an Automobile – Explain the working principle with sketch

Code No.: **50H11** | **MR15**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, EXAMINATIONS, DECEMBER-2018

Subject: **Human Values and Professional Ethics**

Branch: **Common to CE &ME**

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

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Explain different types of moral issues.
2. How courage is considered to be a virtue?
3. What element did Gilligan consider in her theory of moral development that was not fully addressed by Kohlberg?
4. How to value a time during any work?
5. . Explain the importance of Harmony in life.

PART-B

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

1. Write short notes on
   a) Goals in education
   b) Environmental ethics and computer ethics
2. What leads to issues and dilemmas in professional life? Explain.
3. a) What is moral dilemma? Explain steps involved in it.
   b) Distinguish between Kohlberg theory and Gilligan's theory
4. "Time and Tide waits for none" explain it importance with examples.
5. Write a short note on
   a). 'Employee rights'
   b). Occupational crimes.
6. . a). Professional rights and employee rights
   b). What are techniques for goal settings?
7. What is the meaning of respect? How do we disrespect others due to lack of right understanding.
8. What is the difference between respect and disrespect? Which of the two is naturally acceptable to you? Justify your answer with examples.

Code No.: **50B08** | **MR15-2015-16 & 2016-17 Batch**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

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 **5x2Mark=10 Marks**

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 Z-transform of n^2a^n.
3. Sketch the region of integration in the double integral $\int_0^{2a}\int_{\sqrt{2ax-x^2}}^{\sqrt{2ax}} f(x,y)\,dy\,dx$.
4. Sate Cauchy's Mean Value theorem.
5. State Green's theorem.

PART-B

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

1. Express the function $f(x)=\sqrt{1-\cos x}$ in $-\pi<x<\pi$ as Fourier series. **[10M]**
2. Find the Fourier series of the function $f(x)=\begin{cases}-a, & when\ -l<x<0\\ a, & when\ \ 0<x<l\end{cases}$ **[10M]**

3.a) Solve the partial differential equation (y+z)p – (z+x)q = x-y **[5M]**

b) Find the inverse Z-transform of $\frac{3z^2-18z+26}{(z-2)(z-3)(z-4)}$. (5 M)

4. a) Solve the partial differential equation: $q^2 = z^2 p^2(1-p^2)$. **[5M]**
   b) Form the partial differential equation from: $f(x^2+y^2, z-xy) = 0$. **[5M]**
5. Trace the curve r = a sin3θ, a>0
6. Trace the curve $x^2y^2 = a^2(y^2 - x^2)$
7. Using Lagrange Method of Multiplier, find the minimum values of the function A(r, h) = $3\pi r^2 + 2\pi r h$ subject to the constraint : $\pi r^2 h + \frac{2}{3}\pi r^3 - 400 = 0$.
8. a) By transforming to triple integral, evaluate $\iint_S (x^3\,dydz + x^2y\,dzdx + x^2z\,dxdy)$ where S is the closed surface consisting of the cylinder $x^2+y^2=a^2$ and the circular discs $z=0$ and $z=b$. **[5M]**

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