Code No.: **50318**

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

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Heat Transfer**

Branch: **ME**

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

PART – A

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

1. Explain the mechanism of heat conduction.
2. What are the ways to increase the fin effectiveness?
3. Explain the term dimensional homogeneity.
4. Why drop-wise condensation is preferred than film-wise condensation?
5. State and explain Wien's displacement law.

PART-B

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

1. What is Newtons Law of cooling? Derive an Expression for heat transfer coefficient "h" and Mention its significance.
2. Find out the amount of heat transferred though an iron fin of length 50 mm, width 100 mm and thickness 5 mm. Assume k=58 W/mK and h=12 W/m^{2}K for the material of the fin and the temperature at the base of the fin as 80 ^{o}C. Also determine the temperature at tip of the fin if the atmosphere temperature is 20 ^{o}C
3. Air at 20 ^{o}C and at a pressure of 1 bar is flowing over a flat plate at a velocity of 3 m/s. If the plate is 280 mm wide and at 56 ^{o}C calculate the following at x = 280 mm (i) velocity boundary layer thickness (ii) thickness of thermal boundary layer (iii) average convective heat transfer coefficient (iv) rate of heat transfer by convection (v) total drag force on the plate
4. a) Draw the pool boiling curve and explain briefly the various regimes of saturated pool boiling.

   b) Water is to be boiled at atmospheric pressure in a polished copper pan by means of an electric heater. The diameter of the pan is 0.38m and is kept at 115^{0}C. Calculate the following

      i. Power required to boil the water.

      ii. Rate of evaporation

      iii. Critical heat flux.

5. Calculate the net radiant heat exchange per m^2 area for two large parallel plates at temperatures 427 °C and 27 °C respectively. The emissivity of hot plate is 0.9 and cold plate is 0.6. If a polished aluminium shield of emissivity 0.04 is placed between them find the reduction in the heat transfer

6. a) A steam pipe 200 mm OD is covered with 25 mm thick layer of insulation material with an average thermal conductivity of 0.08 W/mk. The temperature of the pipe surface is 400^0C and that of outer surface of insulation is 50^0C. Find the loss of heat from a length of 10 m of the pipe line.

   b) The Biot number during a heat transfer between a sphere and its surroundings is found to be 0.02. Would you prefer lumped system analysis or transient temperature charts when determining the centre temperature of the sphere? Why?

7. a) Air at 30^0C is flowing over 2 cm long plate maintained at 70^0C at a velocity of 50 m/s. Determine heat transfer rate from the plate.

   b) Explain the development of hydrodynamic and thermal boundary layers on a vertical plate in natural convection.

8. **Answer any TWO Questions of the following** **5x2Marks= 10Marks**

   a) Explain Planck's and Stefan Boltzmann laws.
   b) Differentiate between pool boiling and forced convection boiling.
   c) Define Reynolds number and what is its significance?

Code No.: **50321**

MR15-2015-16 Batch

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

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Automobile Engineering**

Branch: **ME**

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

PART – A

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

1. Why piston rings used in automobile engine?
2. Why over cooling of IC engine is harmful?
3. State the diesel vehicle norms of Euro BS IV in g/km.
4. What is the function of clutch?
5. What is meant by bleeding of hydraulic brakes and where it done?

PART-B

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

1. a) Explain the working principle of Turbo charger with sketch
   b) Write short notes on Carburetor
2. a) Sketch and explain electronic type ignition system.
   b) Explain how the shunt coil of a cutout closes the contact points when the generator reaches a certain voltage.
3. a) Describe the advantages and disadvantages of CNG as alternative fuels.
   b) What are the merits and demerits of hydrogen fuel?
4. Explain in detail about the constant mesh gear box with neat sketch.
5. Describe the Ackermann and Davis steering mechanism with a neat sketch
6. a) Differentiate between Turbo charging and Super charging?
   b) Discuss the different methods of cooling systems in automobiles.
7. a) What is LPG? Write its merits and demerits used in automobiles.
   b) Sketch and explain the operation of a fluid coupling.

8. **Write a short note on any TWO of the following** **2x5 Marks= 10Marks**
   a) Vacuum brakes.
   b) Discuss the different tyre inflations with neat sketch.
   c) Spark advance and retard?

Code No.: 50320

MR15-2015-16 Batch

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III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Design of Machine Members-I**

Branch: **ME**

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

PART – A

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

1. What are the factors to be considered for the selection of materials for the design of machine elements?
2. What is meant by stress concentration? How do you take it into consideration in case of a component subjected to dynamic loading?
3. Classify the rivet heads according to Indian standard specification.
4. Why a hollow shaft has greater strength and stiffness than solid shaft of equal weight?
5. What is the function of a spring? In which type of spring the behavior is non-linear?.

PART-B

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

1. (a) State and explain the manufacturing considerations in design.
   (b) The load on a bolt consists of an axial pull of 10 kN together with a transverse shear force of 5 kN. Find the diameter of a bolt required according to (i) Maximum principal stress theory (ii) Maximum shear stress theory (iii) Maximum principal strain theory (iv) Maximum strain energy theory (v) Maximum distortion energy theory.

2. A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m^2 and – 150 MN/m^2. Determine the value of minimum ultimate strength according to (i) Gerber relation (ii) Modified Goodman relation (iii) Soderberg relation. Take yield strength = 0.55 Ultimate strength, endurance strength = 0.5 Ultimate strength and factor of safety = 2.

3. Design the longitudinal joint for a 1.25 m diameter steam boiler to carry a steam pressure of 2.5 N/mm^2. The ultimate strength of the boiler plate may be assumed as 420 MPa, crushing strength as 650 MPa and shear strength as 300 MPa. Take the joint efficiency as 80%. Sketch the joint with all dimensions. Adopt the suitable factor of safety.

4. Design and draw a knuckle joint to connect two mild steel bars under a tensile load of 25 kN. The allowable stresses are 65 MPa in tension, 50 MPa in shear and 83 MPa in crushing.

5. Design a helical spring for a spring loaded safety valve for the following conditions:
   Diameter of the valve seat = 65 mm
   Operating pressure = 0.7 N/mm2
   Maximum pressure when the valve blows off freely = 0.75 N/mm2
   Maximum lift of the valve when the pressure rises from 0.7 to 0.75 N/mm2 is 3.5 mm
   Maximum allowable stress = 550 MPa
   Modulus of rigidity = 84 kN/mm2
   Spring index = 6
   Draw a neat sketch of the free spring showing the main dimensions.

6. (a) A steel rod of 25 mm diameter is fitted inside a brass tube of 25 mm internal diameter and 375 mm external diameter. The projecting ends of the steel rod are provided with nuts and washers. The nuts are tightened up so as to produce a pull of 5 kN in the rod. The compound is then placed in a lathe and the brass is turned down to 4 mm thickness. Calculate the stresses in the two materials.

   (b) Determine the size of a piston rod subjected to a total load of having cyclic fluctuations from 15 kN in compression to 25 kN in tension. The endurance limit is 360 MPa and yield strength is 400 MPa. Take impact factor = 1.25, factor of safety = 1.5, surface finish factor = 0.88 and stress concentration factor = 2.25.

7. (a) A 125 × 95 × 10 mm angle is joined to a frame by two parallel fillet welds along the edges of 150 mm leg. The angle is subjected to a tensile load of 180 kN. Find the lengths of weld if the permissible static load per mm weld length is 430 N.
   (b) Design and draw a cotter joint to support a load varying from 30 kN in compression to 30 kN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically. Tensile stress = Compressive stress = 50 MPa, Shear stress = 35 MPa and crushing stress = 90 MPa.

8. **Write short notes on any two of the following** **2x5 Marks= 10Marks**

   (a) A concentric spring for an aircraft engine valve is to exert a maximum force of 5000 N under an axial deflection of 40 mm . Both the springs have free length, same solid length and are subjected to equal maximum shear stress of 850 MPa. If the spring index for both the springs is 6, find (i) the load shared by each spring (ii) the main dimensions of both the springs, and (iii) the number of active coils in each spring. Assume G = 80 kN/mm^2 and diametral clearance to be equal to the difference between the wire diameter.
   (b) A shaft is supported by two bearings placed 1 m apart. A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25 kN. Another pulley 400 mm diameter is placed 200 mm to the left of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both the pulleys is 180^0 and μ = 0.24. Determine the suitable diameter for a solid shaft, allowing working stress of 63 MPa in tension and 42 MPa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley.
   (c) Sketch and discuss the various types of welded joints used in pressure vessels. What are the considerations involved?

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MR15-2015-16 Batch

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III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Metal Cutting & Machine Tools**

Branch: **ME**

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

PART – A

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

1. Define Metal Cutting?
2. Distinguish between automatic and semi automatic lathe.
3. Explain the principle of quick return motion in shaper.
4. How is grinding wheel specified? Explain each term.
5. Explain Template jig.

PART-B

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

1. How many types of chips are formed in metal cutting? What factors are responsible for formation of these different types of chips?
2. What machining operations can be performed on centre lathe? Explain with neat sketches.
3. a) Explain with a sketch the working of jig boring machine.

   b) List and briefly explain various operations that can be performed on a drilling machine.
4. Explain some common methods of indexing in milling.
5. a) Sketch a broaching tool and explain various elements.

   b) Write a brief note on boring fixture.
6. a) Explain various factors affecting tool life.

   b) What are the difference between a face plate and a drive plate? Explain when you use them.
7. a) Explain the twist drill nomenclature and define various elements of twist drill with neat sketch.

   b) List various milling cutters and indicate their uses and applications.

8. **Answer any TWO Questions of the following** **2x5 Marks= 10Marks**

   a) Illustrate the 3-2-1 principle.

   b) Types of abrasives in grinding.

   c) Explain taper turning by taper attachment with neat sketch.

Code No.: **50H12** | **MR15-2015-16 Batch**

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III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Engineering Economics and Accountancy**

Branch: **Common to ME & Mining**

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

PART – A

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

1. State the determinates of Demand
2. What is the Least cost combination of inputs?
3. Explain Block Pricing.
4. State the purpose of Accounting Rate of Return (ARR).
5. What is Bad Debts and Provision for bad debts?

PART-B

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

1. Answer the following:
   (a) "Managerial economics is linked to the disciplines of economic theory, decision sciences and business functions" discuss the link of ME with other disciplines.
   (b) Demand Determinants
2. a) Explain managerial significance and limitations of Break-even Analysis (BEA).
   b) Explain about Controlled Experiments.
3. (a) What are the causes for the emergence of Monopoly?
   (b) How is the equilibrium position attained by a monopolist under varying cost Conditions?
4. Following are the Cash flows for two mutually exclusive projects which cost Rs.1,32,000 each. Assume the cost of capital to be 11%. Calculate NPV for both the projects and interpret the results.

Year	Cash Flows (A)	Cash Flows (B)
1	40,000	75,000
2	62,000	68,000
3	75,000	45,000

5. From the following information you are required to calculate.
   (i) Margin of Safety,
   (ii) Total sales
   (iii)Variable cost from the following figures;

Fixed costs	Rs. 12, 000
Profit	Rs. 1, 000
Break-Even Sales	Rs. 60, 000

6. a) Define managerial economics. Illustrate how it helps in solving managerial problems.
   b) What are its limitations BEP?
7. a) Explain Sealed bid pricing and Going rate pricing.
   b) Explain different kinds of partnership.
8. **Answer any TWO Questions of the following** **5x2 Marks= 10Marks**
   a) Define Ratio analysis and explain its importance.
   b) Analyses the Formation of Joint Stock Company?
   c) What are the features of Perfect Competition?