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 II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: TECHNICAL COMMUNICATION & PRESENTATION SKILLS

Branch: COMMON TO CE,ME

Time: 3 hours
Max. Marks: 60

PART – A

Answer ALL questions of the following
5x2M=10 M

1. Give meanings of the following words: i. Syndrome ii. Tool.

2. Discuss the significance of formal style in Technical writing.

3. Write the types of reports.

4. Write the 4P's of effective presentation.

5. Briefly explain 'Reading for Specific Purposes'.

PART-B

Answer ANY FIVE questions of the following
5x10 M= 50M

1. Define the following terms with example. a) Minimal pair b) Consonant cluster c) Stress

   d) Intonation e) Syllable.

2. How do you differentiate the technical writing from general writing?

3. Discuss the different types of writing in detail.

4. Explain the structure of a report.

5. a) Discuss the significance of the 4 P's in making an effective Presentation.

   b) Imagine that you are asked to make a presentation on the topic 'Noise Pollution'. Write a

   gist of the topic, which reflects your Preparation for the Presentation.

6. Discuss the characteristics of oral presentation.

7. What are the mechanics and methods of note-making?

8. Compare and contrast of note making and note taking.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: INDUSTRIAL MANAGEMENT

Branch: ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

1. What are the social responsibilities of management?
2. List the merits and demerits of lean and flat organization structure
3. Write short notes on ABC analysis
4. What is critical path?
5. What is meant by BSC?

PART-B

Answer ANY FIVE questions of the following

5x10 M= 50M

1. a) What support exists for the claim the management is a science
   b) What are the objectives of management?

2. a) Discuss about systems approach to management and nature of management.
   b) What were the conclusions drawn from Mayo's Hawthorne experiments?

3. a) Discuss any two types of organization based on authority relationship.
   b) Evaluate the merits and demerits of matrix organization.

4. a) Discuss the features of committee organization. For what type of activities it is best suited.

5. a) Explain the methods of production
   b) The following table gives the number of missing rivets noted in a newly fabricated bus. Construct C-chart.

Bus No	1	2	3	4	5	6	7	8	9	10
Number of Missing Rivets (C)	14	13	26	20	9	25	15	11	14	13

6. Explain in detail characteristics of various incentive schemes.

7. Describe the main elements of a TQM programme and state a few important objectives of TQM.

8. Explain the steps in strategy formulation and implementation.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **THERMAL ENGINEERING-II**

Branch: ME

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Draw diagram of reheat cycle.
2. Classify the Boiler Draught.
3. Give the classification of steam nozzles.
4. What are the losses in steam turbine.
5. Classify the Rocket Engines.

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. a) Explain the Working and analysis of the Regenerative Rankine Cycle with one feed water heater.

   b) In a thermal plant, the steam is supplied at a pressure of 30 bar and temperature of 300^0C to the high pressure side of Steam Turbine where it is expanded to 5 bar. The steam is then removed and reheated to 300^0C at a constant pressure. It is then expanded to the low pressure side of the turbine to 0.5 bar. Find the efficiency of the cycle with and without reheating.

2. a) Define High calorific value and Low calorific value of fuel.

   b) The calorific value of fuel oil is 52300 kJ/kg in the Oxygen bomb calorimeter at $15°$C. Calculate the calorific value of fuel at constant pressure at $15°$C. The average formula of the oil is $C_{16}H_{32}$.

3. a) A boiler plant supplies 5400 kg of steam per hour at 7.5 bar absolute and 0.98 dry from feed water at 41^0C. The boiler uses 670 kg of coal per hour having Calorific Value of 3100 kJ/kg. Determine the Thermal Efficiency of the Boiler and Equivalent Evaporation.

   b) Establish a condition for maximum discharge of flue gases through a chimney of given height.

4. a) Classify steam condensers. What are the differences between the jet Condensers and surface condensers? List out the advantages of condenser in a steam power plant.

   b) Discuss the process of super-saturation in steam nozzles with the help of enthalpy entropy diagram.

5. a) A convergent divergent nozzle is required to discharge 2 kg of steam per second. The nozzle is supplied with steam at 7 bar and 1800°C and discharge takes place against a back pressure of 1 bar. The expansion upto throat is isentropic and the frictional resistance between the throat and exit is equivalent to 63 KJ/kg of steam. Taking approach velocity of 75 m/sec and throat pressure of 4 bar, estimate: (i) suitable areas for the throat and exit. (ii) overall efficiency of the nozzle based on the enthalpy drop between the actual inlet pressure and temperature and the exit pressure.

    b) Explain the concept of flow of steam through a nozzle.

6. a) Explain the working principle of reaction turbines and explain how it differs from impulse turbine.

    b) The speed of single stage impulse turbine is 3000 rpm and means blade diameter is 1 meter. The nozzle of the turbine is inclined at 20°C to the plane of the wheel and the moving blade inlet and exit angle are 35^0 and 30^0. Assuming friction factor (blade velocity, coefficient) of 0.8. Determine.

    (i)   The power developed for a steam consumption rate of 9000 kg/hr.
    (ii) The blade diagram efficiency.
    (iii) The axial thrust assumes that the steam enters the blades without shock.

7. a) Explain the Ram-Jet engine with neat sketch.

    b) In an air standard regenerative gas turbine cycle the pressure ratio is 5. Air enters the compressor at 1 bar, 300 K and leaves at 490 K. The maximum temperature in thecycle is 1000 K. Calculate the cycle efficiency, given that the efficiency of regeneratorand the adiabatic efficiency of the turbine are each 80%. Assume for air, the ratio ofspecific heats is 1.4. Also show the cycle on T-S diagram.

8. The air supplied to a gas turbine plant is 10kg/sec. The pressure ratio is 6 and the pressure at the inlet of the compressor is 1 bar. The compressor is 2 stage and is provided with perfect intercooling. The inlet temperature of the air is 300K and the maximum temperature is limited to 1073 K. A regenerator with an effectiveness of 0.7 is included in the plant. Neglecting the mass of air. Determine the thermal efficiency of plant.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: DESIGN OF MACHINE MEMBERS-II

Branch:ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. What are the desirable properties of a good bearing material?

2. What are the basic functions of piston rings?

3. State the advantages and disadvantages of the chain drive over belt and rope drive.

4. Define the pitch angle and cone distance.

5. What is self locking property of threads and where it is necessary?

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. A tentative design of a journal bearing results in a diameter of 75 mm and a length of 125 mm for supporting a load of 20 KN. The shaft runs at 1000 r.p.m. The bearing surface temperature is not to exceed 75°C in a room temperature of 35°C. The oil used has an absolute viscosity of 0.01 kg/m-s at the operating temperature. Determine the amount of artificial cooling required in watts. Assume $d/c = 1000$.

2. a) The following data is given for a 360^0 hydrodynamic bearing: Journal diameter = 100 mm ; Bearing length = 100 mm Radial load = 50 KN ; Journal speed = 1440 rpm Radial clearance = 0.12 mm ; Viscosity of lubricant = 16 cp Calculate
   (i) Minimum film thickness (ii) Coefficient of friction and (iii) power lost in friction.
   b) Explain the lubricants and materials used in sliding contact bearings.

3. a) Write a short notes on whipping stress in connecting rod.
   b) Design a cast iron piston for a single acting four stroke engine for the following
   Specifications: Cylinder bore =100mm, Stroke=120mm, Maximum gas pressure =5 N/mm2
   Indicated mean effective pressure=0.65 N/mm², Fuel consumption= 0.227 kg/KW/hr
   Speed=2200 rev/min, Assume suitable data HCV = 44,000 KJ/kg.

4. Design an overhung crank shaft for the following data.
   Maximum load on the crank pin for maximum torque position=50KN
   Crank radius=200 mm
   Distance between crank pin centre and nearby bearing centre=300 mm
   Allowable stress in Bending: 70mpa, Shear: 50mpa, Bearing: 7mpa.

5. A compressor, requiring 90 kW, is to run at about 250 r.p.m. The drive is by V-belts from an electric motor running at 750 r.p.m. The diameter of the pulley on the compressor shaft must not be greater than 1 meter while the centre distance between the pulleys is limited to 1.75metre. The belt speed should not exceed 1600 m / min.Determine the number of V-belts

required to transmit the power if each belt has a cross-sectional area of 375 mm², density 1000 kg / m³ and an allowable tensile stress of 2.5 MPa. The groove angle of the pulleys is 35°. The coefficient of friction between the belt and the pulley is 0.25. Calculate also the length required of each belt.

6. Two shafts whose centers are 1 meter apart are connected by a v-belt drive. The driving pulley is supplied with 95 kw power and has an effective diameter of 300 mm. It runs at 1000 rpm while the driven pulley runs at 375 rpm. The angle of groove on the pulleys is 40^0. Permissible tension in 400 mm² cross sectional area belt is 2.1 mpa. The material of the belt has density of 1100kg/m³. The driven pulley is overhung, the distance of the centre from the nearest bearing being 200 mm , the coefficient of friction between belt and pulley rim is 0.28. Estimate 1. The no.of belts required and 2. Diameter of driven pulley shaft, if permissible shear stress is 42 mpa.

7. A motor shaft rotating at 1500 rpm has to transmit 15 kW to a low speed shaft with a speed reduction of 3:1. The teeth are 14 $1/2^0$ involute with 25 teeth on the pinion. Both thepinion and gear are made of steel with a maximum safe stress of 200 MPa. A safe stress of 40 MPa may be taken for the shaft on which the gear is mounted and for the key. Design a spur gear drive to suit the above conditions. Also sketch the spur gear drive. Assume starting torque to be 25% higher than the running torque.

8. a) Triple threaded worm has teeth of 6 mm module and pitch circle diameter of 50 mm. If the worm gear has 30 teeth of 14½° and the coefficient of friction of the worm gearing is 0.05, find
    i) The lead angle of the worm   ii) Velocity ratio   iii)Center distance
    iv)Efficiency of the worm gearing.
   b) What are screws? Explain it briefly.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **REFRIGERATION & AIR CONDITIONING**

Branch: ME

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

PART – A

Answer ALL questions of the following   5x2M=10 M

1. What is refrigeration and list its applications?

2. Differentiate between primary and secondary refrigerants.

3. What are the functions of generator and analyzer in a vapour absorption system?

4. Show psychometric process on psychometric chart.

5. Explain use of filters & grills used in air conditioning system.

PART-B

Answer any FIVE questions of the following   5x10 M= 50M

1. An air refrigerator works between the pressure limits of 1 bar and 5 bar. The temperature of the air entering the compressor and expansion cylinder are 10°C and 25°C respectively. The expansion and compression follow the law $pv^{1.3}$ = constant. Find the following:

    i) The theoretical COP of the refrigeration cycle

    ii) If the load on the refrigeration machine is 10 TR, find the amount of air circulated per minute through the system assuming that the actual COP is 50% of the theoretical COP.

    iii) The stroke length and piston diameter of single acting compressor if the compressor runs at 300 rpm and the volumetric efficiency is 85%.

    Take L/D = 1.5, c_p = 1.005 kJ/kg.K, c_v = 0.71 kJ/kg.K.

2. a) Explain the working of a simple air cycle cooling system used for air craft's.

    b) The capacity of refrigerator is 600TR when working between -5°C and 20°C.Find the mass of ice produced within 24 hours when water is supplied at 10°C. Also find the minimum kW required to run the system.

3. a) What are the merits and demerits of vapour compression system over air refrigeration system?

    b) A simple vapour compression plant produce 5tonnes of refrigeration. The enthalpy values at inlet to compressor, at the exit and at exit from the condenser are 183.19, 209.41 and 74.59kJ/kg respectively. Estimate:

    i) The refrigerant flow rate

    ii) COP

iii) Power required to drive the compressor

iv) The rate of heat rejection to the condenser.

4. a) Explain about nomenclature of refrigerants with examples.

   b) Explain about flooded evaporator and dry expansion evaporator.

5. a) Draw neat diagram of lithium bromide water absorption system and explain its working.

   b) Explain the working of vortex tube refrigeration system with neat sketch?

6. a) 30 m^3 of air at 15°C DBT 13°C WBT is mixed with 12 m^3 of air at 25°C DBT and 18°C WBT.
   Assuming barometric pressure as 1 atm, determine the DBT and WBT of the resulting mixture.

   b) Moist air at 32°C DBT and 50% RH enters a cooling coil at 10,000m^3/h. It is desired that the
   air leaving the cooling coil has a DBT of 20°C and WBT of 18°C? Determine the following

   i) By pass factor

   ii) Total heat removed

7. a) List out the factors effecting human comfort.

   b) The air enters a duct at 10°C and 80% RH at the rate of 150m^3/min and is heated at 30°C
   without adding or removing any moisture. The pressure remains constant at 1 atm. Determine the
   relative humidity of air at exit from the duct and the rate of heat transfer.

8. a) Write a short note on the requirements of industrial air conditioning

   b) Explain about Dehumidifiers

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **CNC TECHNOLOGY**

Branch: ME

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. What is the right-hand rule in NC and where is it used?
2. Explain the arrangement of recirculation of balls in lead screw and state their advantages.
3. What is Cutter diameter compensation? How does it differ from tool length offset?
4. Define Direct Numerical Control and their applications.
5. Define Micro Controllers. List the advantages and disadvantages.

PART-B

Answer any FIVE questions of the following   5x10 M= 50M

1. a) What is the difference between absolute positioning and incremental positioning?

   b) The positioning table for a CNC machine uses a stepping motor and lead- screw mechanism. The design specifications require a table speed of 0.4m/s and an accuracy = 0.02mm. The pitch of the lead screw = 5.0mm, and the gear ratio = 2:1(two turns of the motor for each turn of the lead screw). The mechanical errors in the motor, gear box, lead screw, and table connection are characterized by a normal distribution with standard deviation = 0.0025mm. Determine

   i) the minimum number of step angles in the stepping motor and

   ii) frequency of the pulse train required to drive the table at the desired maximum speed.

2. a) Write a short note on parametric programming?

   b) Write a short note on basic concepts of manual programming.

3. Explain the different types of feed drives used in CNC machine tools with neat sketches.

4. Develop the part program for the following figure using APT language
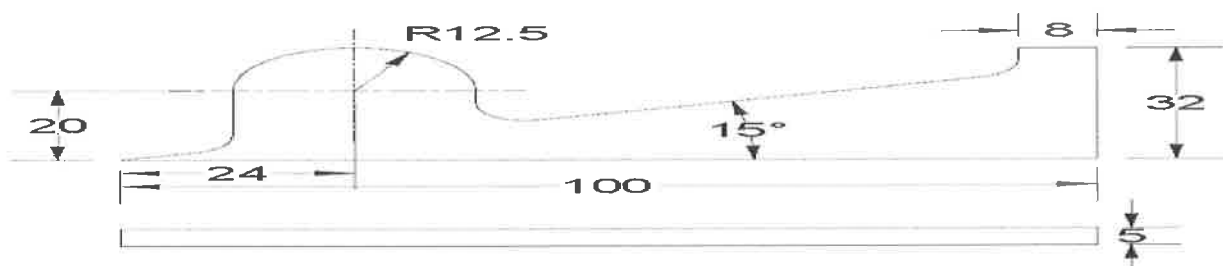
5. Write manual part programming for machining at spindle speed of 1650 rpm and feed 20 mm/mm for figure given below
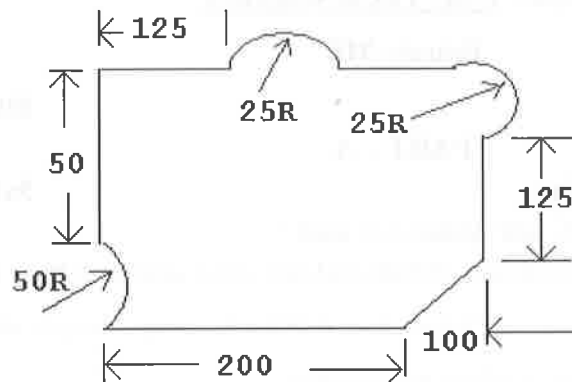
6. a) Sketch and explain Behind Tape Reader and Special Machine Control unit in DNC system.

   b) Distinguish between the features of NC, CNC and DNC System.

7. Explain adaptive control constraint system for a lathe machine with a block diagram.

8. a) Write the Special function registers (SFR) associated with interrupt function in a microcontroller?

   b) What are different types of timers and counters?

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: MAINTENANCE & SAFETY ENGINEERING

Branch: ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Define Active repair time and mean time to repair.
2. List out subcomponents of active repair time.
3. List out the assumptions associated with economic order quantity model.
4. Define quality and safety in maintenance.
5. What is the expression for maintainability function: weibull distribution?

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. Define modern maintenance and write in detail about the principles of modern Maintenance.
2. Define lifecycle equipment. How maintenance plays a key role in equipment lifecycle?
3. Compare the various maintenance management control indices.
4. Draw the network for the events in table below. Calculate ES, EF, LS, LF, and slack time for each event.

Activity Description	Symbol	Duration	Immediately Preceding Event(s)
Design Prototype	A	6	-
Obtain Materials	B	2	A
Order Parts	B	2	A
Manufacture Parts	D	3	B
Assembly 1	F	2	C
Assembly 2	E	4	D,F
Final Assembly	G	1	E

5. A maintenance department uses ten types of items. The below table present their annual usage and cost per unit. Determine the following.
   (i)The annual dollar usage for each item
   (ii) The ordered list of items with respect to their annual dollar usage
   (iii) The cumulative yearly dollar usage and cumulative percent of items
   (iv)The A,B,C classification of items.

Item No.	Annual Usage(units)	Cost per unit($)
1	400	10
2	200	40
3	1000	5
4	100	15
5	50	80
6	1700	5
7	500	10
8	600	50
9	700	200
10	900	4

6. a) Write a short note on PMT activities.

   b) What is the safety officer's role in maintenance work?

7. Build and expression for MTTF in series and parallel network in reliability network.

8. Explain the maintainability in system life cycle.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **POWER PLANT ENGINEERING**

Branch: ME

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

PART – A

Answer ALL questions of the following　　　　　　　　　　　　**5x2M=10 M**

1. What is pulverization?
2. Write the advantages of closed cycle gas turbine power plant.
3. Define Spill way? Classify different types of spill ways.
4. How the nuclear reactors are classified?
5. What is load curve?

PART-B

Answer ANY FIVE questions of the following　　　　　　　　　　**5x10 M= 50M**

1. Name the various methods of ash handling. Describe the pneumatic system of ash handling.

2. Explain the working of closed cycle gas turbine power plant.

3. a) Write short notes on why the cooling system is necessary in the engine?

   b) What are the merits and demerits of Diesel Engine Power Plant?

4. a) Explain the working principle of MHD power generation system with a neat sketch.

   b) What are various types of Direct Energy Conversion systems? Explain.

5. Explain the working of boiling water nuclear reactor.

6. With a neat sketch explain the working principle of fast breeder reactor.

7. Write about various effluents from power plants and their impact on environment.

8. What are the general arrangements for power distribution in a power plant?