Code No.: **50H03**

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 II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER -2018

Subject **Technical Communication and Presentation Skills**

Branch: **Common to CE, ME And Mining**

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

PART – A

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

1. How does technical vocabulary help in strengthening language skills?
2. Write a brief note on the use of 'impersonal language' in technical writing.
3. What are the elements of a Technical report?
4. Discuss the role of humour in giving presentations.
5. Mention any two ways to improve reading speed.

PART-B

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

1. a) List out the phonemic consonants with examples (5M)
   b) Write the phonemic vowels in the following words
   i) Culture ii) Later (2M)
   c) How do you differentiate between technical and general vocabulary. (3M)
2. a) What are anagrams? Explain with examples.
   b) Write short notes on Diphthongs.
3. a) Imagine that you are the director of your company. Write a circular to your share holders about change of address of your registered office.
   b) You are the manager of the marketing department in your company. A new assistant manager has recently been appointed and will start work soon. Write a memo to the administrative officer using the following hints: the need for the appointment – when the assistant manager will join the company – the qualifications and experience of the assistant manager
4. a) Explain quantitative and mixed method of writing.
   b) Write short notes on Qualitative Method of writing.
5. Imagine that you are an Assistant Executive Engineer working on the Hyderabad Metro Rail (MRTS) project. Write a Progress report to the Managing Director of L & T Metro Rail Hyderabad Limited giving the details of the project. You may use the following hints:
   Status of work done in the 3 Corridors i.e. Miyapur to L.B. Nagar, JBS to Falaknuma and Nagole to Raidurg respectively – estimated budget - time of completion of the project – recommendations
6. a) Write a report to the Director General of Police (DGP) of Telangana State Police Department informing the regular incidents of eve teasing in your locality and requesting the delegation of She teams. (5M)
   b) Write a report to the chairman of Telangana State Pollution Control Board about the necessity of controlling polythene waste in your locality.
7. a) Write the types of presentations.
   b) Suggest the various ways to overcome the barriers of effective oral presentation.
8. a) Write a note on reading skill. [4M]
   b) What do you understand from the phrase "Reading for specific purpose" explain. [6M]

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

Subject: **Thermal Engineering-II**

Branch: **ME**

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

PART – A

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

1. Define Heating value for a fuel
2. Define the terms Boiler Horse Power and Equivalent Evaporation
3. Define Vacuum Efficiency and Condenser Efficiency.
4. Define Blade or Diagram efficiency for a steam (impulse) turbine and give expression for it.
5. Classify the Jet Propulsive Engines.

PART-B

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

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) A steam power plant is supplied with dry saturated steam at a pressure of 12 bar and exhausts into a condenser at 0.1 bar. Calculate the Rankine efficiency.
   (b) Explain the working of ORSAT apparatus with neat sketch.

3. a) In a boiler trail the following data were recorded:

   Steam produced per hour: 2710 kg

   Feed water temperature: 40°C

   Boiler pressure: 11.5 bar

   Dryness fraction: 0.9

   Coal used per hour: 330kg

   Calorific value of coal : 29120 KJ/kg.

   Mass of Flue gases : 10kg/kg of coal

   Specific heat of flue gases: 1.05 kJ/kg K

   Temperature of Flue gases: 350°C

   Boiler room temperature: 30°C

   Determine i) equivalent evaporation from and at 100^0C

   ii) Draw the heat balance sheet per kg of coal.

   b) Explain the working of a high pressure Benson Boiler with a neat sketch.

4. (a) Explain Lancashire boiler with neat sketch.
   (b) What do you understand by feed check valve? Explain the working of a feed check valve with a neat sketch.

5. (a) Explain the working of ejector type condenser with neat sketch.
   (b) In a surface condenser, the vacuum maintained is 700 mm of Hg. The barometer reads 754 mm. if the temperature of condensate is 180°C, determine: (i) mass of air per kg of steam (ii) vacuum efficiency.

6. a) Explain the working of an Edwards Air Pump with a neat sketch.
   b) Distinguish between Jet and Surface Condensers.

7. (a) Differentiate between Impulse and Reaction turbine.
   (b) The velocity of steam at inlet to a simple impulse turbine is 1000 m/sec and the nozzle angle is 20°. The mean blade speed is 400 m/sec and the blades are symmetrical. The mass flow rate of steam is 0.75 kg/sec. The friction effects on the blades are negligible. Estimate (i) The blade angles. (ii) The tangential force on the blades. (iii) The axial thrust. (iv) The diagram power. (v) The diagram efficiency.

8. a) Define and explain the terms: i) Thrust ii) Thrust power, iii) Effective jet exit velocity, iv) Propulsive efficiency related to turbojet engines.
   b) Explain the advantages and disadvantages of bipropellants used in rocket engines over monopropellants.

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

Subject: **Design of Machine Members – II**

Branch: **ME**

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

PART – A

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

1. What are the desirable properties of a good bearing material?
2. Under what force, the big end bolts and caps are designed.
3. What are the factors upon which the coefficient of friction between the belt and the pulley depends?
4. What are the Terms used in Helical Gears.
5. Explain which type of Screw threads is used for Power Screws.

.PART-B

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

1. a) State advantages and disadvantages of deep groove ball bearing. [5M]

   b) A system involves 4 identical ball bearings each subjected to a radial load if 2500N. The reliability of the system i.e. one unit of four bearings failing during the lifetime of five million revolutions is 82 %. Determine the dynamic load carrying capacity of the bearing so as to select it from the manufacturer's catalogue based on 10% reliability. [5M]
2. The radial reaction on a bearing is 9000 N. It also carries a thrust load of 5000 N. The speed of the shaft is 1000 rpm. The outer ring stationary. Expected average life of bearing is about 25000 hours. The load on the bearing is smooth, the service is 8 hours/day.

   a) Select a suitable roller bearing

   b) What is the rated 90% life of selected bearing

   c) Compute the probability of the selected bearing surviving 25000 hours. Any other data required for design may be assumed. (10M)
3. Design a trunk type cast iron piston for an I.C. engine from the given data:

   Diameter of the cylinder is 100mm, stroke 120mm, maximum explosion pressure is 40kg/cm^2, maximum permissible tension for cast iron for the design of head thickness is 300 kg/cm^2, and the flexural stress for the pin may be taken from 900 to 1200 kg/cm^2.the gudgeon pin should be hardened and ground and should turn in phosphor bronze bushing. Bearing pressure should be limited to 200 kg/cm^2.sketch the piston inserting important dimensions of the piston with piston pin, piston rings and scraper ring in position. [10M]

4. A four stroke diesel engine has the following specifications.
   Brake power=5 KW; speed=1200 rpm; indicated mean effective pressure=0.35 N/mm^2 Mechanical efficiency= 80%. Determine 1. Bore and length of the cylinder;2. Thickness of the cylinder head; and3.Size of studs for the cylinder head. [10M]
5. A belt 100mm wide and 10mm thick is to be transmitting power at 1000m/min. The net driving tension is 1.8 times the tension slack side. If the permissible stress on the belt tension is 1.6MPa. Calculate the maximum power that can be transmitted at this speed. Assume density of leather as 1000kg/m^3. Calculate the absolute maximum power that can be transmitted by this belt and the speed at which this can be transmitted. [10M]
6. A pulley of 0.9 m diameter revolving at 200 rpm. Is to tranamit 7.5 KW. Find the width of a leather belt if the maximum tension is not to exceed 145 N in 10 mm width. The tension in the tight side is twice that in the slack side. Determine the diameter of the shaft and the dimensions of the various parts of the pulley, assuming is to have six arms. Maximum shear stress is not exceed 63 Mpa. [10M]
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. [10M]
8. A vertical screw with single start square threads of 50 mm mean diameter and 12.5 mm pitch is raised against a load of 10 KN by means of a hand wheel, the boss of which is threaded to act as a nut. The axial load is taken up by a thrust collar which supports the wheel boss and has a mean diameter of 60 mm. The coefficient of friction is 0.15 for the screw and 0.18 for the collar. If the tangential force applied by each hand to the wheel is 100 N, find suitable diameter of the hand wheel. [10M]

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

Subject: **Industrial Management**

Branch: **ME**

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

PART – A

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

1. What is directing and explain its importance.
2. Differentiate between organization and organizing.
3. What is meant by acceptance sampling?
4. What is an activity and event?
5. What is six sigma?

PART-B

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

1. a) Explain salient features of F.W.Taylor's scientific management. 5M
   b) Explain the Maslow's Theory of Human needs. 5M
2. a) Explain the concepts of management. [5M]
   b) What you understand by authority and responsibility? (5M)
3. Discuss the process of organizing. Explain the principles to be observed while creating an organization structure. [10M]
4. Write the differences between decentralization and departmentation. Explain line and staff organization with suitable example. 10M
5. Define productivity and production. Explain how productivity can be enhanced in the Indian industries. [10M]
6. Describe the basic types of layout and indicate when each is best used (10M)
7. A project has nine activities and the expected time of each activity is as follows:

Activity	1-2	1-3	2-4	2-5	3-5	3-6	4-7	5-7	6-7
Expected time (in days)	6	4	8	5	9	4	1	5	2

   (a) Draw the network diagram (b) Indicate the critical path (c) Calculate the total duration of the project. [10M]
8. What do you understand by Environmental Scanning? What are the internal factors that need to be examined for the firm to assess its strength and weakness? [10M]

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

Subject: **Refrigeration And Air Conditioning**

Branch: **ME**

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

PART – A

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

1. Draw T-s and P-v diagrams for Reverse Brayton cycle.
2. Explain working principle evaporator and sketch any one type.
3. What are the functions of absorber and rectifier?
4. Draw a schematic psychrometric chart and show the following processes on it: (i) sensible cooling (ii) cooling and dehumidification (iii) heating and humidification.
5. Explain in brief about load from occupants.

PART-B

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

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:
   (a) The theoretical COP of the refrigeration cycle
   (b) 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.
   (c) 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 dense closed cycle air refrigeration system working between 4 bar and 16 bar extracts $120x10^3$ kJ of heat per hour. The air enters the compressor at 5°C and in to the expander at 20°C . Assuming the unit runs at 300 rpm, find i) kW required to run the unit ii) Bore of compressor iii) Refrigerating capacity in TR.
   Take the following : i) Compressor and expander are double acting and stroke for compressor and expander = 30 cm. ii) mechanical efficiency of compressor = 80% iii) mechanical efficiency of expander = 85%. Assume compression and expansion are isentropic.
3. (a) Explain about thermodynamic properties of refrigerants.

   (b) The temperature limits of an ammonia refrigerating system are 25°C and -10°C if the gas is dry at the end of compression, calculate the COP of the cycle assuming no under cooling of the liquid ammonia. Use the following table for the properties of ammonia.

Temperature (°C)	Liquid heat (Kj/KG)	Latent heat (Kj/Kg)	Liquid entropy (Kj/Kg k)
25	298.9	1166.94	1.1242
-10	135.37	1297.68	0.5443

4. (a) Explain the working principle of thermostatic expansion valve with help of neat diagram

   (b) Explain about safe working properties of refrigerants.

5. a) In an absorption refrigeration system heating, cooling and refrigeration take place at temperatures of 150°C, 30°C and -20°C. i) Find theoretical COP of the system ii) If the heating temperature of the system is increased to 200°C and refrigeration temperature is decreased to -40°C, find the percentage change in theoretical COP.

   b) Explain the function of liquid-vapour heat exchanger between the generator and absorber and how it can improve the performance of the vapour absorption system.

6. a) With a neat sketch explain about practical Ammonia absorption system.

   b) Explain with neat sketch the working principle of Steam Jet Refrigeration System.

7. a) 20 m^3 of air at 30°C and 60% RH is cooled to 22°C DBT maintaining its specific humidity constant. Find the following:

   i) Heat removed from the air

   ii) RH of cooled air.

   iii) WBT of cooled air.

   b) The sensible heat load factor (SHF) of an air-conditioned room is 0.67. the condition of the air leaving the air conditioned room is 27°C. DBT and 52% R.H. the maximum permissible temperature difference between the inlet air and outlet air is 11°C. If the quantity of air flow at the inlet of the room is 180m^3/min, then find the sensible heat load and latent heat load of the air-conditioned room.

8. a) Discuss the conditions of comfort you would prescribe for office building in a city, which has hot and humid climate.

   b) An air-conditioned room is maintained at 27°C DBT and 52% R.H. The sensible heat load of the room is 27kW, and room SHF is 0.80. Determine

   a. Room latent heat gain

   b. The apparatus dew point temperature.

   The air supply to the room in m^3/min, if it is supplied to room at apparatus dew point temperature.

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

Subject: **CNC TECHNOLOGY**

Branch: **ME**

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

PART – A

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

1. With reference to precision in an NC positioning system, what is control resolution?
2. What is a Spindle Drive? What are the types of Spindle Drives?
3. Discuss about tool radius compensation?
4. State the applications of Adaptive Control System?
5. List out various hard ware components of PLC system.

PART-B

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

1. A two- axis NC system used to control a machine tool table uses a bit storage capacity of 16 bits in its control memory for each axis. The range of the x-axis is 600mm and the range of the y-axis is 500mm. The mechanical accuracy of the machine table can be represented by a Normal distribution with standard deviation = 0.002mm for both axes .For each axis of the NC system, determine (a) the control resolution, (b) accuracy, and (c) repeatability. [10M]
2. a) What is Numerical Control Coordinate System? What are the methods of NC Coordinate System?
   b) A DC Servomotor is coupled directly to a lead screw which drives the table of an NC Machine tool. A digital encoder which emits 500 pulses per revolution is mounted on Other end of lead screw. If lead screw pitch is 5mm and motor rotates at 600 RPM, Calculate:
   a) The Linear Velocity of table b) BLU of NC system
   c) Frequency of pulses emitted by encoder [
3. a)Explain the terms 'Pre-Set' and Qualified' tools in the context of CNC Tooling
   b) What are the advantages of CNC system over NC system?
4. a) Explain the structure of CNC machine tools.
   b) Define anti-friction guide way. Write its advantages and applications.
5. a) Explain any 10 vocabulary words used in APT language?
   b) Explain automatic tool path generation in computer aided programming?
6. a) Discuss to geometric statements for defining the following geometry entities.
   I) points II) Line III) Planes IV) Circles V) Pattern
   b) Define data structure. Explain various data structures of an object.
7. a) Discuss with neat block diagram, general configuration of a DNC system
   b) List advantages and disadvantages of DNC system.
8. a) What are the factors to be consider in selection of micro controllers.
   b) Define Bus in PLC system. List out different system buses.

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

Subject: **FINITE ELEMENT METHODS**

Branch: **ME**

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

PART – A

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

1. Why polynomial type of interpolation functions are mostly used in FEM.
2. What is the importance of shape functions?
3. What do you mean by Hermite shape functions?
4. How do you express the force vector of a CST?
5. What are Eigen values and Eigen vectors?

PART-B

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

1. a) Discuss how FEA solution is affected by size of the element and number of elements?
   b) State and explain the properties of stiffness matrix and characteristics of shape functions?
2. a)Briefly explain different types of elements used in FEM with neat sketches
   b) Compare the variational approach with weighted residual methods for solving problems of engineering and sciences
3. Each joint of the structural systems shown in Fig.1 is a pinned joint. The node numbers and element numbers are given on the sketch. C.S. area of each member is $1000mm^2$ and is made of steel with E = 2×10^5 N/mm^2. Determine (i) the displacement at node '3', (ii) The strain sand stresses in each element and (iii) the reaction forces by Finite Element Formulations.

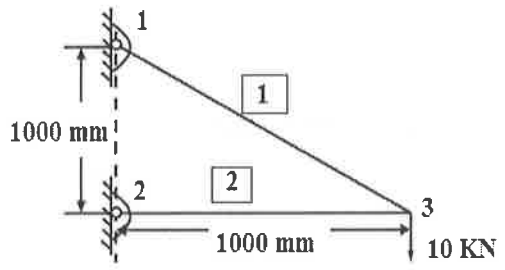
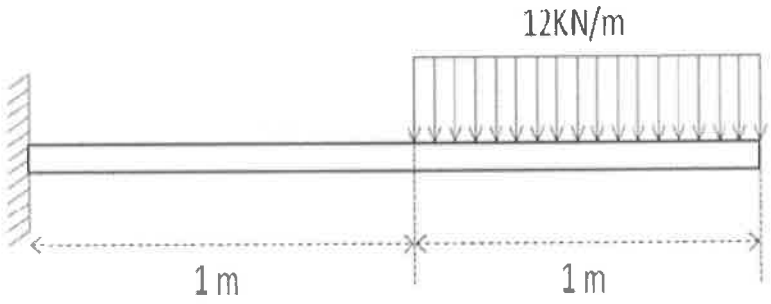


Fig.1.

4. a) What are shape functions? Indicate briefly the role of shape functions in FEM analysis.
   b) Write a short note on Space truss elements

5. The beam and loading shown in Fig.2 determine :

   Vertical deflection at midpoint of the load Take E=210GPa, I= 5 x 10^6 mm^4



6. A beam ABC is as shown in the Fig.2. It is loaded with a uniformly distributed load of 15 kN/m on AB and a point load 10 KN at B. Determine unknown d.o.f and reactions at supports for the beam Given EI=10,000 KNm^2.

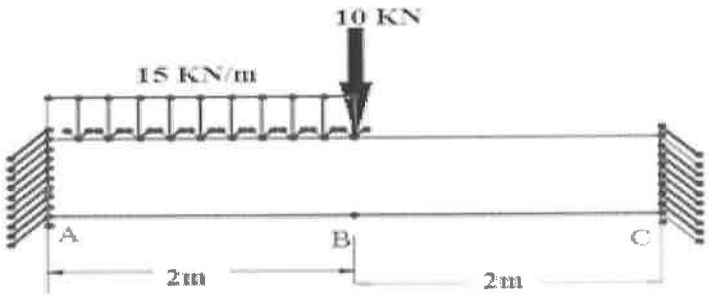
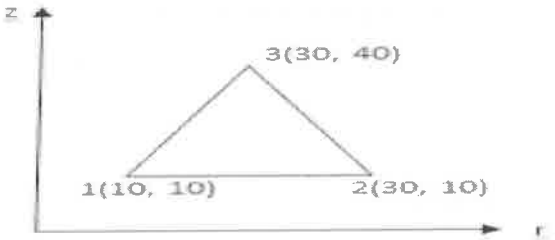


Fig.2.

7. Calculate the stiffness matrix for the element shown in Fig. Co-ordinates are given in mm. Assume plane stress conditions. Take E=2.1X10^5 N/mm^2, υ=0.25,t=10mm.



8. An aluminium alloy fin of 8 mm thick and 60mm long protrudes from a wall, which is maintained at 120°C. The ambient air temperature is 24°C. The heat transfer coefficient and thermal conductivity of the fin material are 160 W/m^2K and 50 W/mK respectively. Determine the temperature distribution of fin.

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MR15 - 2015-16 Batch

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

Subject: **Power Plant Engineering**

Branch: **ME**

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

PART – A

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

1. What is the function of cooling tower?
2. Why overcooling is harmful to the internal combustion engine?
3. What is hydrograph?
4. What are the different types of Nuclear Reactors?
5. What do you mean by diversity factor?

PART-B

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

1. Explain the principle of under feed and over feed fuel bed. [10M]
2. a) Explain the working principle of Mechanical Dust Collector with neat diagram [5M]
   b) Explain the various draught systems with a neat sketch [5M]
3. Explain the working of open cycle gas turbine power plant [10M]
4. Explain various types of cooling system of a diesel engine power plant. [10M]
5. Explain the different types of solar collectors with neat sketches [10M]
6. a) Differentiate horizontal and vertical axis wind turbines. [5M]
   b) Explain the various factors to be considered in the selection of site for a wind energy power plant. [5M]
7. a) Enumerate and explain the essential components of a nuclear reactor. [5M]
   b) List out the advantages and disadvantages of nuclear power plants over conventional thermal plants [5M]
8. How to control the emissions from power plants. What is the effect on the environment (ozone layer)? Explain in detail [10M]