Department of Mechanical Engineering

III Year VI Semester

6ME3-01: Measurement and Metrology

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment 1

1	Draw the block diagram of generalized measurement system and explain different stages with examples.	CO-1	BLT-1
2	Distinguish between Repeatability and reproducibility	CO-1	BLT-2
3	Describe the different types of errors in measurements and the causes.	CO-1	BLT-1
4	Distinguish between Line and End Standard.	CO-1	BLT-2
5	Describe-Interchangeability and calibration	CO-1	BLT-3

Assignment 2

1	List the instrument used for angular measurement.	CO-2	BLT-1
2	What is optical flat and how can it use to check the flatness with three examples.	CO-2	BLT-3
3	What is sine bar? Explain the principal of sine bar and it uses.	CO-2	BLT-1
4	What are comparators and its type and explain one mechanical comparator	CO-2	BLT-3
5	Explain working of solex pneumatic comparator	CO-2	BLT-3

Assignment 3

1	Describe the two wire method of finding the effective diameter of screw threads. ?	CO-3	BLT-1
2	Describe the chordal thickness method using gear tooth vernier caliper.	CO-3	BLT-3
3	Write notes on the types of irregularities of a circular part and mention its causes.	CO-3	BLT-2
4	Derive the formula for measuring the effective diameter of thread by 3-wire method.	CO-3	BLT-2
5	How to check the errors of the gear by using Parkinson gear testing machine?	CO-3	BLT-3

Assignment 4

1	With neat sketch explain the various types of CMM based on its construction. Write the advantages of computer aided inspection.	CO-4	BLT-1
2	Explain the construction and working principle of laser interferometer with neat diagram? Explain the use of laser interferometer in angular measurement.	CO-4	BLT-3
3	Describe in detail the method of checking roundness by using Roundness Measuring Machine. State its advantages.	CO-4	BLT-2
4	Sketch and describe the laser interferometer?	CO-4	BLT-2
5	Explain Alignment test on milling machine?	CO-4	BLT-3

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Mechanical Engineering

III Year VI Semester

6ME3-01: Measurement and Metrology

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment 5

1	Briefly explain various methods of measuring temperature	CO-5	BLT-2
2	Briefly explain various methods of measuring power?	CO-5	BLT-2
3	Briefly explain various methods of measuring force ?	CO-5	BLT-3
4	Explain the construction and working of Bimetallic strip and Thermocouple?	CO-5	BLT-2
5	Explain the construction and working of Venturimeter and Rotameter ?	CO-5	BLT-3

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Mechanical Engineering

III Year VI Semester

6ME4-02: CIMS

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment -1

1	Explain various types of manufacturing systems.	CO-1	BLT2
2	Explain product life cycle. Briefly outline various achievements in CAD & CAM	CO-1	BLT2
3	Explain various basic components of NC Machine.	CO-1	BLT2
4	Mentions some of the important application of NC systems in manufacturing. Give example in support of your answer.	CO-1	BLT3
5	Discuss various controls used in CNC machines. Explain the principle of operation of closed loop CNC machine.	CO-1	BLT3

Assignment -II

1	Compare the NC, CNC and DNC Machine in detail.	CO-2	BLT2
2	Explain manual part programming with suitable example.	CO-2	BLT3
3	Write a note on interfacing NC with CIM.	CO-2	BLT2
4	What is APT language? Write the general form of an APT geometry statement.	CO-2	BLT2
5	Discuss the difficulties encountered with conventional NC System.	CO-2	BLT3

Assignment -III

1	Define part families. Explain the two categories of attributes, of parts.	CO-3	BLT-2
2	Explain the process planning. Discuss various steps involved in processing and its prerequisites.	CO-3	BLT2
3	What is CAPP? Explain with example. How does it differ from traditional process planning?	CO-3	BLT2
4	Write the comparison between retrieval and generative process planning with suitable example.	CO-3	BLT3
5	Describe the benefits of group technology.	CO-3	BLT3

Assignment -IV

1	Discuss optical and non-optical computer aided testing methods. Discuss how computers are used in quality control	CO-4	BLT-2
2	Discusses different activities in a process planning and control system.	CO-4	BLT-2
3	Explains the computer aided production management system (CAPMS) in detail.	CO-4	BLT-3
4	Explains MRP-I and MRP-1I in detail	CO-4	BLT-2
5	What is computer aided process planning and control? State its advantages in production management systems	CO-4	BLT-3

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Department of Mechanical Engineering

III Year VI Semester

6ME4-02: CIMS

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment -V

1	Writes short notes on the following: i) Computer aided quality control ii) Computer aided material handling ii) Warehouse control system	CO-5	BLT-2
2	Compares agile and lean manufacturing in detai	CO-5	BLT-2
3	What are different types of special manufacturing systems and explain any one from your answer	CO-5	BLT-3
4	Describe the principle of flexible manufacturing systems. Why is a FMS capable of producing a wide range of lot sizes? Explain.	CO-5	BLT-2
5	Write short note on the following: i) Concurrent engineering ii) Collaborative engineering	CO-5	BLT-3

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Department of Mechanical Engineering

III Year VI Semester

6ME4-03: Mechanical Vibration

Note: Each Assignment of Maximum marks10.All question carries equal marks.

ASSIGNMENT-I

Q1. What are the causes of Noise. Write a detailed note on Noise.	BLT-4	CO-1
Q2. What are the effects of noise on human body. Write details about auditory and non-auditory effects of noise.	BLT-2	CO-1
Q3. Define: a. Frequency b. Resonance c. Time Period d. Natural frequency e. Amplitude	BLT-1	CO-1
Q4.What is Simple Harmonic Motion (SHM) and discuss vector representation of SHM.	BLT-2	CO-1
Q5. Define degree of freedom in context of vibration also discuss its type.	BLT-3	CO-1

ASSIGNMENT-II

Q1. The mass of a vibrating system weighs 20N and is made to vibrate in a viscous medium. Determine the damping ratio and damping coefficient. When a harmonic exciting force of 30 N results in a resonant amplitude of 15mm with a period of 0.2 sec.	BLT-3	CO-2
Q2. Determine the differential equation of a classical spring- mass system and its natural frequency by using a. D' Alembert's principal, b. Energy methods	BLT-4	CO-2
Q3. Derive the natural frequency of torsional vibration system.	BLT-4	CO-2
Q4. Derive logarithmic decrement equation.	BLT-4	CO-2
Q5. A mass of 85 kg is supported on a spring which deflects 18mm under the weight of the mass. The vibrations of the mass are constrained to be linear and vertical. A dashpot is provided which reduces the amplitude to one quarter of its initial value in two complete oscillations. Calculate magnitude of the damping force at unit velocity and periodic time of damped vibrations.	BLT-3	CO-2

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Department of Mechanical Engineering

III Year VI Semester

6ME4-03: Mechanical Vibration

Note: Each Assignment of Maximum marks10.All question carries equal marks.

ASSIGNMENT-III

Q1 Derive the complete solution of forced vibration with harmonic excitation.	BLT-2	CO-3
Q2 What is Magnification factor and discuss frequency response curve in detail.	BLT-2	CO-3
Q3. A machine part weighing 5kg is subjected to a harmonic excitation of 36 N. Calculate the damping ratio if it vibrates in a viscous medium with 15mm resonant amplitude and a period of 0.32sec.	BLT-4	CO-3
Q4. What is vibration isolation and discuss about vibration isolation methods in detail.	BLT-1	CO-3
Q5. A vehicle has a mass of 490kg and the total spring constant of suspension system is 58,800 N/m. The profile of road may be approximately to a sine wave of amplitude of 40mm and wavelength 4m, determine: a. Critical speed of vehicle b. The amplitude of steady state vibration of mass when vehicle is at critical speed & damping factor =0.5 c. The amplitude of steady state motion of mass when vehicle speed at 57 km/hr and damping factor=0.5	BLT-4	CO-3

ASSIGNMENT-IV

Q1.	Derive the principal mode of spring mass system having two degree of freedom.	BLT-1	CO-4
Q2.	Write detailed note on Vibration absorbers.	BLT-1	CO-4
Q3.	Derive natural frequency of centrifugal pendulum absorber.	BLT-2	CO-4
Q4.	What is critical speed of shaft having multiple rotors and define secondary critical speed.	BLT-3	CO-4
Q5.	A shaft of 12.5 mm diameter rotates in long bearings and a disc weighing 196 N is attached to the midspan of shaft. The span of the shaft between the bearings is 600 mm. The mass centre of the disc is 0.5 mm from the axis of the shaft. Neglecting the mass of the shaft and taking the deflection as for a beam fixed at both ends. Determine the critical speed of the shaft. Also determine the range of the speed over which the stress in the shaft due to bending will not exceed 11.77 k-N/cm^2. Take E=1.96 x 10^7 N/cm^2.	BLT-3	CO-4

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Department of Mechanical Engineering

III Year VI Semester

6ME4-03: Mechanical Vibration

Note: Each Assignment of Maximum marks10.All question carries equal marks.

ASSIGNMENT-V

Q1. Compare and contrast the matrix method and the method of influence coefficients in analyzing many degrees of freedom systems, highlighting their respective advantages and limitations.	BLT-3	CO-5
Q2. Evaluate the effectiveness of Rayleigh's method compared to Dunkerley's method for approximating the natural frequencies of complex vibrating systems, providing examples where each method would be most appropriate.	BLT-3	CO-5
Q3. Derive the equations of motion for torsional vibrations in a multi-rotor system using eigenvalues and eigenvectors, and explain how these parameters influence the system's dynamic behavior.	BLT-3	CO-5
Q4. Apply generalized coordinates to analyze the vibrations of a geared system, illustrating how coordinate coupling affects the system's response to external forces or inputs.	BLT-3	CO-5
Q5. Explain the fundamental differences between transverse vibration of strings, longitudinal vibration of bars, and torsional vibration of shafts in continuous systems, and discuss their respective engineering applications and challenges.	BLT-3	CO-5

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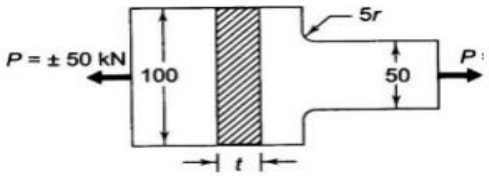
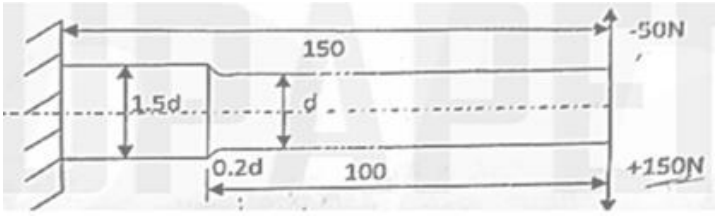
Department of Mechanical Engineering

III Year VI Semester

6ME4-04: Design of Machine Elements-II

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment: 1

Q.1	What is endurance limit. Write five factors that affects endurance limit/strength of the materials?	**CO-1**	**BT-1**
Q.2	What is Soderberg's, Goodman and Gerber line? Drive Soderbergs and Goodman equations.	**CO-1**	**BT-1**
Q.3	What is stress concentration effect and notch sensitivity?	**CO-1**	**BT-1**
Q.4	A plate made of steel 20C8 (σu = 440 N/mm2) in hot rolled and normalized condition is shown in below Figure. It is subjected to a completely reversed load of 30 kN. The notch sensitivity factor q can be taken as 0.8 and the expected reliability is 90%. The size factor is 0.85. The factor of safety is 2. Determine the plate thickness for infinite life. 	**CO-1**	**BT-4**
Q.5	A cantilever beam made of cold drawn carbon steel (σu = 600 MPa and σy = 380 MPa) is shown in Fig. The force acting at free end and varies from -50 N to + 150 N. The expected reliability is 90 and factor of safety is 2. The notch sensitivity at the fillet is 0.9. Find diameter of beam at fillet section. 	**CO-1**	**BT-4**

Assignment: 2

Q.1	State the function of the following for an internal combustion engine component. (a) Cylinder liner; (b) Piston ring; (c) connecting rod; and (d) crank pin	**CO-2**	**BT-1**
Q.2	Name the materials commonly used for making the following of an I. C. engine components. (a) Cylinder; (b) Piston; (c) piston rings; and (d) crank shaft	**CO-2**	**BT-2**
Q.3	Prove that $I_{xx} = 3.2I_{yy}$ for I section for connecting rod.	**CO-2**	**BT-4**
Q.4	The cylinder of a four-stroke diesel engine has the following specifications: Brake power = 7.5 kW Speed = 1400 rpm Indicated mean effective pressure = 0.35 MPa Mechanical efficiency = 80% Maximum gas pressure = 3.5 MPa The cylinder liner and head are made of grey cast iron FG 260 (Sut = 260 N/mm2 and m = 0.25). The studs are made of plain-carbon steel 40C8 (Syt = 380 N/mm2). The factor of safety for all parts is 6. Calculate	**CO-2**	**BT-4**
Q.5	The following data is given for the piston of a four-stroke diesel engine: Cylinder bore = 250 mm Material of piston rings = Grey cast iron Allowable tensile stress = 100 N/mm2 Allowable radial pressure on cylinder wall = 0.03 MPa Thickness of piston head = 42 mm Number of piston rings = 4 Calculate: (i) radial width of the piston rings; (ii) axial thickness of the piston rings; (iii) gap between the free ends of the piston ring before assembly; (iv) gap between the free ends of the piston ring after assembly; (v) width of the top land; (vi) width of the ring grooves; (vii) thickness of the piston barrel; and (viii) thickness of the barrel at open end.	**CO-2**	**BT-4**

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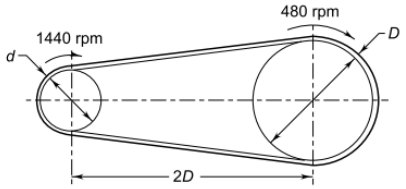
Department of Mechanical Engineering

III Year VI Semester

6ME4-04: Design of Machine Elements-II

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment: 3

Q.1	What is the spring index.? What is limiting value of spring index and why.?	**CO-3**	**BT-1**
Q.2	What type of stress is induced in helical compression spring? Draw stress diagram.	**CO-3**	**BT-1**
Q.3	Discuss the different types of belts and their material used for power transmission?	**CO-3**	**BT-2**
Q.4	It is required to design a helical compression spring for the valve mechanism. The axial force acting on the spring is 300 N when the valve is open and 150 N when the valve is closed. The length of the spring is 30 mm when the valve is open and 35 mm when the valve is closed. The spring is made of oil-hardened and tempered valve spring wire and the ultimate tensile strength is 1370 N/mm2. The permissible shear stress for the spring wire should be taken as 30% of the ultimate tensile strength. The modulus of rigidity is 81 370 N/mm2. The spring is to be fitted over a valve rod and the minimum inside diameter of the spring should be 20 mm. Design the spring and calculate (i) wire diameter; (ii) mean coil diameter; (iii) number of active coils (iv) total number of coils; (v) free length of the spring; and (vi) pitch of the coil. Assume that the clearance between adjacent coils or clash allowance is 15% of the deflection under the maximum load	**CO-3**	**BT-4**
Q.5	The layout of a leather belt drive transmitting 15 kW of power is shown in Fig. 13.13. The centre distance between the pulleys is twice the diameter of the bigger pulley. The belt should operate at a velocity of 20 m/s approximately and the stresses in the belt should not exceed Belt Drives 511 2.25 N/mm2. The density of leather is 0.95 g/cc and the coefficient of friction is 0.35. The thickness of the belt is 5 mm. Calculate: (i) the diameter of pulleys; (ii) the length and width of the belt; and (iii) the belt tensions. 	**CO-3**	**BT-4**

Assignment: 4

Q.1	State any four advantages of gear drive over other types of drives	**CO-4**	**BT-1**
Q.2	Draw force diagram of spur gear tooth and analysis them.	**CO-4**	**BT-5**
Q.3	All standard systems prescribe the involute profile for gear tooth. Why?	**CO-4**	**BT-2**
Q.4	What kind of contact occurs between worm and worm wheel? How does it differ from other types of gears?	**CO-4**	**BT-1**
Q.5	A pair of parallel helical gears consists of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20°, while the helix angle is 25°. The face width is 40 mm and the normal module is 4 mm. The pinion as well as the gear is made of steel 4OC8 (Sut = 600 N/mm2) and heat treated to a surface hardness of 300 BHN. The service factor and the factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of gears.	**CO-4**	**BT-4**

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Department of Mechanical Engineering

III Year VI Semester

6ME4-04: Design of Machine Elements-II

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment: 5

Q.1	Explain anti-friction bearing with examples.	**CO-5**	**BT-2**
Q.2	Explain various methods of lubrications in sliding contact bearing	**CO-5**	**BT-2**
Q.3	Design a full hydrodynamic journal bearing with the following specifi cation for machine tool application: journal diameter = 75 mm radial load = 10 kN journal speed = 1440 rpm minimum oil fi lm thickness = 22.5 microns inlet temperature = 40°C bearing material = Babbitt. Determine the length of the bearing and select a suitable oil for this application.	**CO-5**	**BT-5**
Q.4	A ball bearing, subjected to a radial load of 5 kN, is expected to have a life of 8000 h at 1450 rpm with a reliability of 99%. Calculate the dynamic load capacity of the bearing, so that it can be selected from the manufacturer's catalogue based on a reliability of 90%.	**CO-5**	**BT-4**
Q.5	The following data is given for a 360° hydrodynamic bearing: radial load = 3.2 kN journal speed = 1490 rpm journal diameter = 50 mm bearing length = 50 mm radial clearance = 0.05 mm viscosity of lubricant = 25 cP Assuming that the total heat generated in the bearing is carried by the total oil fl ow in the bearing, calculate (i) coefficient of friction; (iii) minimum oil film thickness; (iv) flow requirement in 1itres/min; and (v) temperature rise.	**CO-5**	**BT-4**

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Department of Mechanical Engineering

III Year VI Semester

6ME4-05: Quality Management

Note: Each Assignment of Maximum marks10.All question carries equal marks.

ASSIGNMENT-I

Q1. What are the objectives of quality policy? Explain different types probability distribution.	BLT-2	CO-1
Q2. Describe variation, pattern of variation its interfaces about process quality. How analysis of variance is done?	BLT-2	CO-1
Q3. What is frequency distribution? Explain its type.	BLT-1	CO-1
Q4. Describe in detail quality and economics of quality.	BLT-2	CO-1
Q5. Explain different dimension of quality.	BLT-3	CO-1

ASSIGNMENT-II

Q1. How sample size and sampling frequency is decided? How did we analyse the patterns on the control chart?	BLT-6	CO-2
Q2. What is difference between Quality assurance and Quality control?	BLT-2	CO-2
Q3. What is statistical quality control? Write down the causes of variance.	BLT-1	CO-2
Q4. Write down application of variable control chart.	BLT-2	CO-2
Q5. The thickness of a printed circuit board is an important quality parameter. Data on board thickness (in inches) are given in Table 6E.4 for 25 samples of three boards each. (a) Set up and R control charts. Is the process in statistical control? (b) Estimate the process standard deviation. (c) What are the limits that you would expect to contain nearly all the process measurements?	BLT-2	CO-2

(d) If the specifications are at 0.0630 in. ± 0.0015 in.

TABLE 6E.4

Printed Circuit Board Thickness for Exercise 6.4

Sample Number	x_1	x_2	x_3
1	0.0629	0.0636	0.0640
2	0.0630	0.0631	0.0622
3	0.0628	0.0631	0.0633
4	0.0634	0.0630	0.0631
5	0.0619	0.0628	0.0630
6	0.0613	0.0629	0.0634
7	0.0630	0.0639	0.0625
8	0.0628	0.0627	0.0622
9	0.0623	0.0626	0.0633
10	0.0631	0.0631	0.0633

ASSIGNMENT-III

Q1. what do you mean by SIX Sigma. Explain in detail?	BLT-2	CO-3
Q2. How control chart is selected between variable and attribute?	BLT-2	CO-3
Q3. Explain the processes capability analysis using a probability plot.	BLT-2	CO-3
Q4. How SPC work on short production run?	BLT-1	CO-3
Q5. Define the process capability analysis using a histograph or a probability plot	BLT-2	CO-3

ASSIGNMENT-IV

Q1. Explain the following: i) Field complaint ii) Quality survey iii) Quality audit iv) Quality ratting	BLT-2	CO-4
Q2. Explain the concept of quality assurance and list down the advantage of quality assurance?	BLT-2	CO-4
Q3. What are sampling plans explain in detail? Discuss the advantage and disadvantage of sampling.	BLT-2	CO-4
Q4. Explain in detail ISO 14000 principles.	BLT-1	CO-4
Q5. Explain in detail ISO 9000 principles.	BLT-2	CO-4

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Mechanical Engineering

III Year VI Semester

6ME4-05: Quality Management

Note: Each Assignment of Maximum marks10.All question carries equal marks.

ASSIGNMENT-V

Q1. Write short note on i) Failure data analysis iii) Quality loss function ii) Pareto analysis design for reliability iv) Reliability optimization	BLT-1	CO-5
Q2. What is Redundancy and improvement factors evaluations?	BLT-1	CO-5
Q3. Define failure, types of failure, failure rate of models also MTBF.	BLT-2	CO-5
Q4. Explain Taguchi method of design of experiments?	BLT-2	CO-5
Q5. Write short note on Reliability evaluation and types of it.	BLT-4	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Mechanical Engineering

III Year VI Semester

6ME5-11: Refrigeration and Air Conditioning

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment -I

1	Define COP. Derive the expression for the performance factor for Refrigerator, Heat engine and Heat pump.	**CO-1**	**BT-1**
2	Describe the mechanism of a simple vapour compression refrigeration system.	**CO-1**	**BT-2**
3	What is sub cooling and superheating? Explain with the help of diagram.	**CO-1**	**BT-2**
4	A machine working on a Carnot cycle operates between 305K and 260K.Detrmine the COP when it is operated as 1. A refrigerating machine 2. A heat pump 3 a heat engine.	**CO-1**	**BT-3**
5	The Capacity of a refrigerator is 200TR when working between -6^0Cand 25^0C. Determine the mass of ice produced per day from water at 25^0C.Also find the power required to drive the unit. Assume that the cycle operates on reversed Carnot Cycle and latent heat of ice is 335kJ/kg.	**CO-1**	**BT-3**

Assignment -II

1	Describe air refrigerator working cycle.	CO-2	BLT-1
2	Define boot strap process.	CO-2	BLT-2
3	Explain regenerative type air craft refrigeration cycle.	CO-2	BLT-1
4	A simple air cooled system is used for an aeroplane having a load of 10 tonnes. The atmospheric pressure and temperature are 0.9 bar and 10^0Crespectively. The pressure increases to 1.013 bar due to ramming. The temp. of the air is reduced by 50^0 Cin the heat exchanger. The pressure in the cabin is 1.012 bar and the temp. of air leaving the cabin is 25^0C. Determine: 1 Power required to take the load of cooling in the cabin; and 2 C.O.P of the system. Assume that all the expansions and compressions are isentropic. The pressure of the compressed air is 3.5 bar.	CO-2	BLT-3
5	A dense air machine operates on reversed Brayton cycle and is required for a capacity of 10 TR. The cooler pressure is 4.2 bar and the refrigerator pressure is 1.4 bar. The air is cooled in the cooler at a temperature of 50^0C and the temperature of air at inlet to compressor is -20^0C. Determine for the idle cycle; 1. C.O.P. ;2. Mass of air circulated per minute ;3 theoretical piston displacement of compressor; 4. Theoretical piston displacement of expander and 5. Net power per tonne of refrigeration. Show the cycle on p-v and T-s planes.	CO-2	BLT-3

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Mechanical Engineering

III Year VI Semester

6ME5-11: Refrigeration and Air Conditioning

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment 3

Q1	Describe Vapour absorption refrigeration system.	**CO-3**	**BT-1**
Q2	Write Short notes on (any two): 1) Electrolux refrigerator 2) Lithium Bromide -Water System 3) Water vapour refrigeration system 4) Vortex tube refrigeration system.	**CO-3**	**BT-1**
Q3	What are the desirable properties of ideal refrigerant. Give the classification of refrigerants.	**CO-3**	**BT-2**
Q4	Gives the types of compressor and evaporators. Explain anyone.	**CO-3**	**BT-1**
Q5	Explain the working of: 1) Condenser 2) Expansion devices	**CO-3**	**BT-3**

Assignment 4

Q1	What do you understand by the term psychrometry.	**CO-4**	**BT-1**
Q2	Define following: 1)Specific humidity 2) Absolute humidity 3)Relative humidity 4) Dew point temperature	**CO-4**	**BT-1**
Q3	Write a short note on bypass factor for cooling coils.	**CO-4**	**BT-2**
Q4	Atmospheric air with dry bulb temp. of 28^0C and a wet bulb temp. 17^0C is cooled to 15^0C without changing its moisture content. Find: 1. Original relative humidity 2. Final relative humidity; 3 Final WBT.	**CO-4**	**BT-3**
Q5	200 m^3 of air per min. is passed through the adiabatic humidifier. The condition of air at inlet is 40^0C DBT and 15% relative humidity and the outlet condition is 25^0C DBT and 20^0C WBT. Find the dew point temp. and amount of water vapour added to the air per minute.	**CO-4**	**BT-3**

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Department of Mechanical Engineering

III Year VI Semester

6ME5-11: Refrigeration and Air Conditioning

Note: Each Assignment of Maximum marks10.All question carries equal marks.

Assignment 5

Q1	What are the equipment's used in air conditioning system.	**CO-5**	**BT-1**
Q2	Define following terms: 1) RSHF 2) ERSHF 3) GSHF	**CO-5**	**BT-1**
Q3	Discuss briefly the different types of heat loads which have to be taken into account in order to estimate the total heat load of a large restaurant for summer air conditioning.	**CO-5**	**BT-2**
Q4	A conference room for seating 100 persons is to be maintained at 22^0C dry bulb temperature and 60% relative humidity. The outdoor conditions are 40^0C DBT and 27^0C WBT. The various loads in the auditorium are as follows: Sensible and latent heat loads per person,80W and 50W respectively; lights and fans 15000W; sensible heat gain through glass, walls, ceiling etc.15000W.The air infiltration is 20m^3/min. and fresh air supply is 100 m^3/min. Two-third of recirculated room air and one-third of fresh air are mixed before entering and cooling coils. The by-pass factor of the coils is 0.1. Determine apparatus dew point the grand total heat load and effective room sensible heat factor.	**CO-5**	**BT-3**
Q5	An airconditioned room is maintained at 25^0C DBT and 50%RH whose sensible heat load is 11.5 kW and latent heat load is 7.5 kW when the outside conditions are 35^0C and 28^0C WBT. Return air from the room is mixed with the outside air before entering the cooling coil in the ratio of 4:1 and return air from the room is also mixed after the cooling coil in the ratio 1:4. The cooling has the by-pass factor of 0.1. The air may be reheated, if necessary, before supplying to the conditioned room. Assuming apparatus dew point 8^0C. Determine: (a) Supply air condition to the room; (b) Refrigeration load; (c) Quantity of fresh air supplied.	**CO-5**	**BT-3**

*BLT: BLT shows the **Bloom's taxonomy** levels.