CBCS SCHEME

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BME/BSA/BAG/BMT501

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Industrial Management and Entrepreneurship

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain in detail the nature and characteristics of management process.	10	L2	CO1
	b.	Discuss the functional areas of management.	10	L2	CO1
		OR			
Q.2	a.	Explain in detail the steps involved in planning.	10	L2	CO1
	b.	Explain in detail the decision making process.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the important principles of organization structure.	10	L2	CO2
	b.	Explain the process of selection and recruitment.	10	L2	CO2
		OR			
Q.4	a.	Explain the basic styles of leadership.	10	L2	CO2
	b.	Explain theories of motivation.	10	L2	CO2
		Module – 3			
Q.5	a.	Write a note on different types of entrepreneurs.	10	L1	CO2
	b.	Explain in detail the barriers to entrepreneurship.	10	L2	CO2
		OR			
Q.6	a.	Explain the stages in entrepreneurial process.	10	L2	CO2
	b.	Write a note on role of entrepreneurs in economic development.	10	L1	CO2
		Module – 4			
Q.7	a.	Explain the main objectives of developing small scale industries.	10	L2	CO3
	b.	Write a note on role of SSI in economic development.	10	L1	CO3
		OR			
Q.8	a.	Explain the steps to start a small scale industry.	10	L2	CO3
	b.	Write a note on government policy towards SSI.	10	L1	CO3

		Module – 5			
Q.9	a.	Write a note on: i) KIADB ii) KSSIDC	10	L1	CO3
	b.	Explain the guidelines issued by planning commission for preparation of project report.	10	L2	CO3
		OR			
Q.10	a.	Write a note on: i) NSIC ii) KSFC.	10	L1	CO3
	b.	Explain the different studies to be carried out for appraisal of a project.	10	L2	CO3

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BME502

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Turbo Machines

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of Steam table is permitted.

		Module – 1	M	L	C
Q.1	a.	Draw and explain the parts of general turbomachines.	6	L2	CO1
	b.	Distinguish between turbomachines and positive displacement machines.	6	L2	CO1
	c.	1/5 scale model of a pump was tested in a laboratory at 1000 rpm. The head developed and power input at the best efficiency point were found to be 8 m and 30 KW. If the prototype pump has to work against a head of 25 m, determine its working speed, power required to drive it and the ratio of flow rates handled by the two pumps.	8	L3	CO1
		OR			
Q.2	a.	Define the static and stagnation state of fluid.	4	L2	CO1
	b.	Define the following with the help of h-s diagram for power absorbing and power generating machine. i) Total to total efficiency ii) Total to static efficiency iii) Static to total efficiency iv) Static to static efficiency.	8	L2	CO1
	c.	Show that the polytrophic efficiency during expansion process is given by $\eta_p = \dfrac{\ln(T_2/T_1)}{\left(\frac{\gamma-1}{\gamma}\right)\ln(P_1/P_2)}$	8	L3	CO1
		Module – 2			
Q.3	a.	Define degree of reaction and utilization factor. Establish relation between them.	10	L2	CO2
	b.	Draw the velocity triangle at inlet and outlet of turbo machines and derive the Euler turbine equation with usual notations.	10	L2	CO2
		OR			
Q.4	a.	Derive head-capacity relationship for centrifugal pump and explain the effect of discharge angle on it.	10	L2	CO2

	b.	An inward flow radial vane turbine has the following data, power = 150 kW, speed = 32000 rpm, out diameter of the impeller = 20 cm, inner diameter of the impeller 8 cm, absolute velocity of gas at entry = 387 m/sec. Absolute velocity of gas at exit = 193 m/sec and radial in direction. Construct the velocity triangles at entry and exit of the impeller and determine: i) Mass flow rate ii) Percentage energy transfer due to change of radius.	10	L3	CO2
		Module – 3			
Q.5	a.	Prove that maximum blade efficiency of a single impulse turbine is given by $\eta_b = \cos^2\alpha_1$ with combined velocity diagram.	10	L2	CO3
	b.	The nozzle of a D-laval turbine delivers 2 kg /sec of steam at a speed of 2400 m/sec. The nozzle are inclined at an angle of 16 degree to the plane of the wheel. The blade velocity is 600 m/sec. Allowing a blade velocity coefficient of 0.72, calculate: i) Blade efficiency ii) Power developed by the blades iii) Energy lost in the blades. The blade angle at outlet may be taken as 25°.	10	L3	CO3
		OR			
Q.6	a.	Prove the condition for maximum efficiency of a reaction turbine using a combined velocity diagram.	10	L2	CO3
	b.	The following particulars refer to a stage of an impulse reaction turbine. Outlet angel of fixed blade = 20°, outlet angle of moving blades = 30°, radial height of fixed and moving blades = 10 cm, mean blade velocity = 138 m/sec, blade speed ratio = 0.625, specific volume of steam at fixed blade outlet = 1.235 m^3/kg, specific volume of steam at moving blade out = 1.305 m^3/kg, speed of the rotor = 3000 rpm, calculate the degree of reaction, the adiabatic heat drop in pair of blade rings and gross stage efficiency, Given the following coefficient which are same for both fixed and moving blades, $\eta = 0.9$, carry over coefficient = 0.86.	10	L3	CO3
		Module – 4			
Q.7	a.	Define and write mathematical equation. i) Hydraulic efficiency ii) Mechanical efficiency iii) Overall efficiency iv) Volumetric efficiency.	10	L2	CO4
	b.	In a power station, a pelton wheel produce 15000 KW under a head of 350 m, while running at 500 rpm. Assume a turbine efficiency of 0.84, coefficient of velocity for Nozzle as 0.98, speed ratio 0.46 and bucket velocity coefficient 0.86. Calculate: i) Number of jet ii) Diameter of each jet iii) Tangential force exerted on the buckets if the bucket deflect the jet through 165°.	10	L3	CO4

OR					
Q.8	a.	Explain with a next sketch working of hydro electric power plant.	6	L1	CO4
	b.	With a neat sketch. Explain the working of draft tube and list out the application.	4	L2	CO4
	c.	The following data is given for a Francis turbine. Net head = 70 m, speed = 600 rpm, power at the shaft = 367.5 kW, overall efficiency = 85%, hydraulic efficiency = 95%, flow ratio = 0.25, width ratio = 0.1, outer diameter to inner diameter ratio = 2.0. The thickness of vanes occupies 10% of the circumferential area of runner, velocity of flow is constant at inlet and discharge is radial at outlet. Determine: i) Guide blade angle ii) Runner vane angle at inlet and outlet iii) Width of the wheel at inlet iv) Diameter of runner at inlet and outlet.	10	L3	CO4
Module – 5					
Q.9	a.	Derive an expression for a minimum starting speed of a centrifugal pump.	5	L2	CO5
	b.	Derive an expression for the static pressure rise in the impeller of a centrifugal pump with inlet and outlet velocity diagram.	5	L2	CO5
	c.	A centrifugal pump running at 1000 rpm. The outlet angle of vane is 45° and the velocity of flow at outer let is 2.5 m/sec, the discharge through the pump is 200 lit/sec, when the pump is working against the total head of 20 m, if the nanometric efficiency of the pump is 80%, determine : i) Diameter of the impeller ii) Width of the impeller at outlet.	10	L3	CO5
OR					
Q.10	a.	Explain with a neat sketch working of centrifugal compressor.	5	L2	CO5
	b.	Explain the surging and choking in centrifugal compressor.	5	L2	CO5
	c.	An axial flow compressor stage draws air from with the stagnation conditions 1.013 bar and 308 K. Assuming 50% reaction stage with a flow coefficient of 0.52 and the ratio $\Delta V_{w/h} = 0.25$, find the rotor blade angle at the inlet and exit as well as the mean rotor speed. The total to total efficiency of the stage is 0.87 when the stage produces a total to total pressure ratio of 1.23. Find also pressure coefficient and the power input to the system, assuming the work input factor to be 0.86. The mass flow rate is 12 kg/sec.	10	L3	CO5

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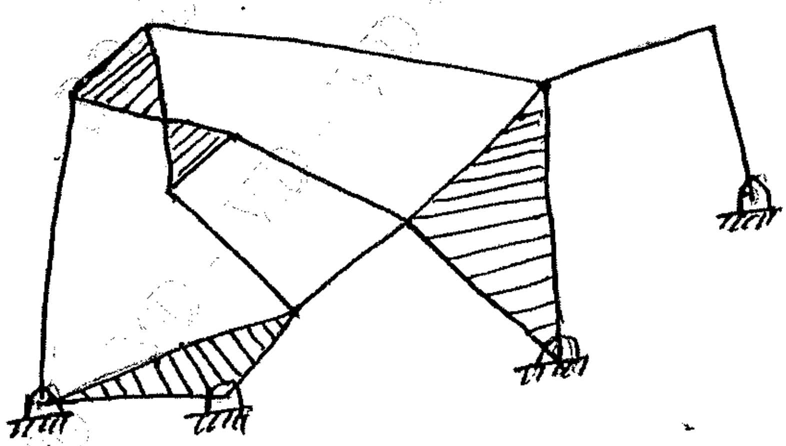
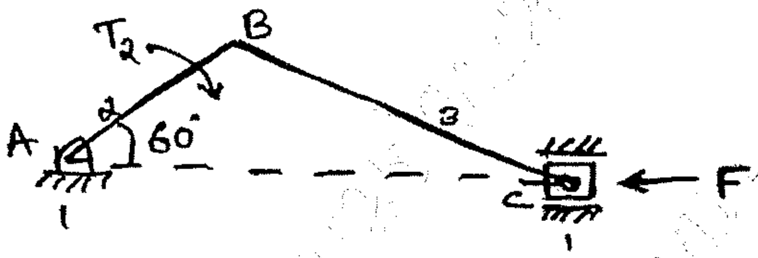
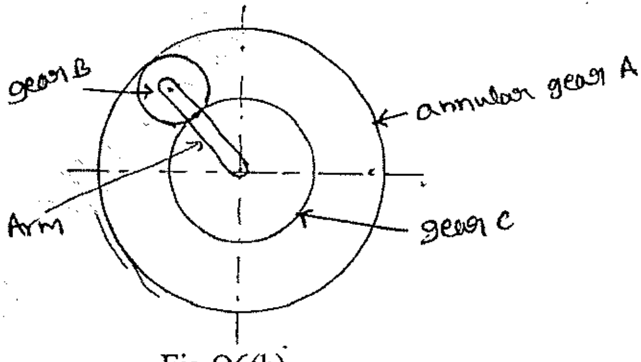
BME503/BMR503

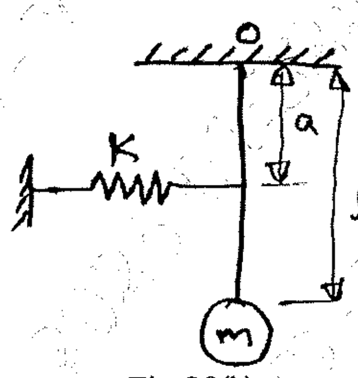
Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Theory of Machines

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define : i) Kinematic link ii) Kinematic pair iii) Kinematic joint iv) Kinematic mechanism v) Machine.	5	L1	CO1
	b.	Applying the knowledge of inversion of mechanisms, illustrate with a neat sketch a mechanism to, i) Draw an ellips ii) Draw a straight line.	7	L3	CO1
	c.	Apply the concept of complex algebra method to find the angular velocity of connecting rod and linear velocity of piston in a slider crank machinasnim. The crank radius in 100 mm and length of connecting rod is 500 mm. The crank is rotating in CCW at an angular velocity of 15 rad/s. When crank is at 60°.	8	L3	CO1
		OR			
Q.2	a.	Classify kinematic pair based on relative motion.	10	L2	CO1
	b.	Define degrees of freedom and mobility of mechanism.	4	L1	CO1
	c.	Calculate the mobility (Dof) of the following mechanism.  Fig.Q2(c)	6	L3	CO1

		Module – 2			
Q.3	**a.**	Analyze the static equilibrium of a member subjected to two force system, three force system and two force and a torque.	**8**	**L3**	**CO1**
	b.	Analysis the driving torque T_2 on the crank of a mechanism shown in Fig.Q3(b) for static equilibrium. Given, F = 2500N, AB = 100 mm, BC = 400 mm.  Fig.Q3(b)	**12**	**L3**	**CO1**
		OR			
Q.4	**a.**	Analyse D'Alembert's principle for dynamic force analysis.	**5**	**L3**	**CO2**
	b.	Apply the concepts of dynamic force analysis to determine the inertia forces of the 4-link mechanism. AB = 500 mm, BC = 660 mm, CD = 560 mm, and AD = 1000 mm, the link AB has an angular velocity of 10.5 rad/s CCW and an angular retardation of 26 rad/s^2 at the instant when it makes an angle of 60° with AD, the fixed link. The mass of the links BC and CD are 4.2 kg/m length. The link AB has a mass of 3.54 kg, the centre of which lies at 200 mm from A and a moment of inertia of 88500 kg.mm^2.	**15**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Explain with a neat sketch law of gearing.	**8**	**L2**	**CO3**
	b.	Two gear wheels of module pitch 4.5 mm have 24 and 33 teeth respectively. Pressure angle 20°, each wheels has a standard addendum of 1 module. Find the length of arc of contact and velocity of sliding if the speed of smaller wheel is 120 rpm.	**12**	**L3**	**CO3**
		OR			
Q.6	**a.**	What is a gear train? Explain with a neat sketch any 3 types of gear train.	**7**	**L2**	**CO3**
	b.	An epicyclic gear train consists of three gears A, B and C and shown in Fig.Q6(b). The number of teeth on annular gear A is 74 and on gear C is 34. The gear B meshes with both gears A and C and is carried on an arm F which rotates about the centre A at 25 rpm. If the gear A is fixed, find the speed of gear B and C.  Fig.Q6(b)	**8**	**L3**	**CO3**
	c.	With a neat sketch, explain spur gear terminology.	**5**	**L2**	**CO3**

		Module – 4			
Q.7	**a.**	What is static and dynamic balancing?	**5**	**L1**	**CO4**
	b.	Four masses, $m_1 = 100$ kg, $m_2 = 175$ kg, $m_3 = 200$ kg and $m_4 = m_4 = 125$ kg are fixed to the crank of 200 mm radius and revolve in planes 1, 2, 3 and 4 respectively. The angular position of the planes 2, 3 and 4 with respect to 1 are 75°, 135° and 240° taken in the same sense. Distances of the planes 2, 3, and 4 from 1 are 600 mm, 1800 mm and 2400 mm. Determine the magnitude and position of balancing masses at radius 600 mm in planes ℓ and m located in the middle of 1 and 2 and in the middle of 3 and 4 respectively.	**15**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is a governor? Derive an expression for the equilibrium speed of a porter governor.	**8**	**L2**	**CO5**
	b.	The arms of a porter governor are each 250 mm long and pivoted on governor axis. The mass of each ball is 5 kg and the mass of the central sleeve is 30 kg. The radii of rotation of balls at minimum and maximum speed are 150 mm and 200 mm respectively. Find the speed range of governor.	**12**	**L3**	**CO5**
		Module – 5			
Q.9	**a.**	With usual notations, determine the natural frequency of a simple pendulum by neglecting the mass of the rod.	**7**	**L2**	**CO6**
	b.	Find the natural frequency of the system shown in Fig.Q9(b) by neglecting the mass of the rod.  Fig.Q9(b)	**13**	**L3**	**CO6**
		OR			
Q.10	**a.**	Write a note on : i) Vibration isolation ii) Critical speed.	**8**	**L1**	**CO6**
	b.	An electric motor is supported on a spring and dash pot. The spring has the stiffness 6400 N/m and the dashpot offers resistance of 500 N at 4 m/s. The unbalanced mass 0.5 kg rotates at 5 cm radius and the total mass of vibratory system is 20 kg. The motor runs at 400 rpm. Determine : i) Damping factor ii) Amplitude of vibration and phase angle iii) Resonant speed and resonant amplitude iv) Forces exerted by the spring and dashpot on the motor.	**12**	**L3**	**CO6**

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ME. 601, 602, 614

CBCS SCHEME

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BME613A

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Total Quality Management

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define TQM. Explain the basic approach and benefits of TQM with examples.	10	L1 L2	CO1
	b.	Discuss the contribution of TQM gurus in the development of total quality management.	10	L2	CO1
		OR			
Q.2	a.	Explain the TQM Framework and obstacles faced during its implementation.	10	L3	CO1
	b.	Describe the ISO 9000series of standards. How do ISO 9001 requirements help organizations?	10	L5	CO1
		Module – 2			
Q.3	a.	What are characteristics of quality leaders? Explain leadership concepts and the importance of ethics.	10	L1	CO2
	b.	Illustrate the Deming philosophy and its significance in TQM leadership.	10	L4	CO2
		OR			
Q.4	a.	Discuss the role of TQM leaders in strategic planning and communication with examples.	10	L3	CO2
	b.	Explain how core values and decision-making affect leadership in a quality-oriented organization.	10	L5	CO2
		Module – 3			
Q.5	a.	Define customer satisfaction. How does service quality and customer perception impact it?	10	L1	CO3
	b.	Discuss customer complaints and retention strategies in maintaining quality.	10	L4	CO3
		OR			
Q.6	a.	Explain employee involvement through motivation, empowerment and performance appraisal.	10	L5	CO3
	b.	Describe the importance of recognition, rewards and union participation in TQM.	10	L2	CO3

		Module – 4			
Q.7	**a.**	Explain the Juran Trilogy and how it supports continuous improvement in quality.	**10**	**L2**	**CO4**
	b.	What is the PDSA cycle? Describe with a suitable example.	**10**	**L1** **L2**	**CO4**
		OR			
Q.8	**a.**	Write a detailed note on statistical process control tools used in quality management.	**10**	**L2**	**CO4**
	b.	Discuss the concept of six sigma and its role in improving process efficiency.	**10**	**L1** **L5**	**CO4**
		Module – 5			
Q.9	**a.**	Define TPM. Explain the different types of maintenance and the steps in implementing TPM.	**10**	**L1**	**CO5**
	b.	Describe the five pillar of TPM and the role of jishu Hozen in quality improvements.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the concept of Quality by Design (QbD) and its key components in the pharmaceutical industry.	**10**	**L3**	**CO5**
	b.	What is an Environmental Management System [EMS]? Discuss its benefits and challenges.	**10**	**L5**	**CO5**

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