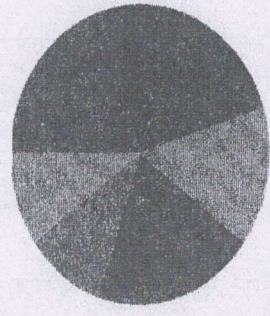


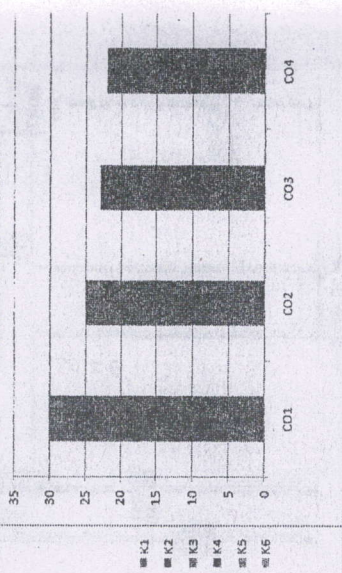
CO- Course Outcomes,	KL- Knowledge Level,	PO – Program Outcome
CO1	Understanding the concept and principles of Hook's law of elasticity and other mechanical properties.	
CO2	Define and calculate stress and strain induced due to simple and combined loading.	
CO3	Analysing various situations in practical applications such as bending, shear and torsion.	
CO4	Calculate deflection and slope for different loading condition of beams.	

GRAPHICAL REPRESENTATION

Blooms Level wise marks Distribution



Course Outcome Wise Marks Distribution



Branch Mechanical Engineering
Subject Name Solid mechanics

Program B. tech
Semester 5th
Year 2022/Odd

• Start writing from 2nd page onwards; don't Write on the 1st Page Backside
 • Answer all Questions of Section A (Compulsory)
 • Answer Any Four out of Six of Section B
 • Answer Any Three out of Five of Section C
 • Graph Paper / Drawing Sheet/ Log Book/ Ledger (please Mention if any)
 • Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers.

Time: 3 Hour
Max. Marks: 70

Knowledge Level (KL)
 K1 : Remembering
 K2 : Understanding
 K3 : Applying
 K4 : Analysing
 K5 : Evaluating
 K6 : Creating

END TERM EXAMINATION
School of Engineering & IT

Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) – 20 Marks

Q.N	QUESTIONS	Marks	COs	KL	PO
1					
i	Is stress a vector or scalar quantity? Justify your answer with suitable example.	2	CO 1	K1	PO2
ii	What is thermal Stress?	2	Co1	K1	PO2
iii	Show and explain two dimensional stress system acting on a component.	2	Co2	K4	PO3
iv	Write equation for Normal and tangential stress on an inclined plane due to two dimensional stress system accompanied by a shear stress.	2	Co3	K2	PO3
v	Write sign convention for Bending Moment and Shear Force Diagram.	2	Co2	K4	PO4
vi	At which point, zero bending moment occurs in simply supported beam?	2	Co3	K5	PO4
vii	What is neutral axis?	2	Co2	K2	PO3
viii	Define the term 'Section Modulus'.	2	Co3	K3	PO4
ix	What type of stress induced in a rotation shaft?	2	Co4	K4	PO3
x	What is the formula for polar moment of inertia for	2	Co4	K4	PO

Section B (Answer any FOUR out of SIX) - 20 Marks

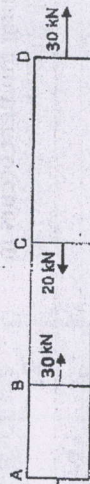
(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Draw stress-strain curve for MS and show and explain salient points on it.	5	Co1	K2	PO3
3	Derive equation for thermal stress for a rod which is fixed at both ends.	5	Co1	K3	PO2
4	A component is subjected to two mutual perpendicular stresses of 120 N/mm^2 and 70 N/mm^2 . Determine the normal, tangential and resultant stresses on a plane inclined at 30° to the axis of minor stress.	5	Co2	K4	PO3
5	Draw shear force and bending moment diagram for a cantilever beam of length 5m subjected to UDL of 3kN over entire span.	5	Co2	K4	PO4
6	Explain nature of stress induced on top and bottom layers of beam in case of positive and negative bending.	5	Co3	K4	PO3
7	A simply supported square beam (cross section $50 \text{ mm} \times 50 \text{ mm}$) of length 4m carries point load of 50kN at centre. Find maximum deflection. Take $E = 200 \text{ GPa}$.	5	Co4	K5	PO4

Section C (Answer any THREE out of FIVE) - 30 Marks-

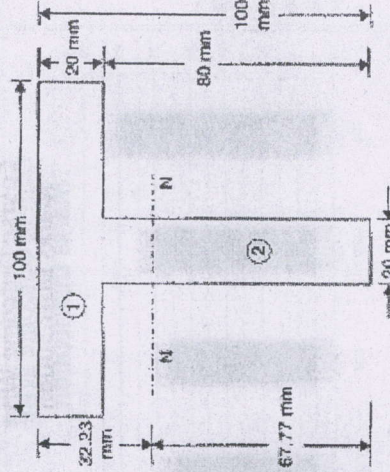
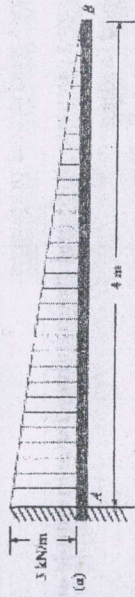
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Determine the net change in the length of the member shown in figure. Cross section of bar is 900 mm^2 , Length $AB = 0.6 \text{ m}$, $BC = 0.8 \text{ m}$ and $CD = 1 \text{ m}$. Take $E = 100 \text{ GPa}$.	10	Co2	K5	PO3
9	Direct stresses of 160 N/mm^2 tensile and 120 N/mm^2 Compressive exist on two perpendicular planes accompanied by shear stress of 80 N/mm^2 . Determine the normal, shear and resultant stresses on an oblique plane inclined at an angle of 30° with the axis of minor stress. Also find Major and minor principle stress along with maximum shear stress	10	Co1	K2	PO4



for this loading condition.

10	Draw shear force and bending moment diagram for beam shown in figure.	10	Co3	K3	PO3
11	A cast iron beam is of T-section as shown in figure. The beam is simply supported on a span of 8m. The beam carries a uniformly distributed load of 1.5 kN/m on the entire length. Determine the maximum tensile and maximum compressive stresses.	10	Co4	K5	PO4
12	What is the need of finding Slope and deflection of Beams? Derive equation for maximum deflection and slope of cantilever beam loaded with UDL load $w \text{ N/m}$ over entire length 'L'. (Assume suitable value for the unknown quantity if needed).	10	Co4	K1	PO5



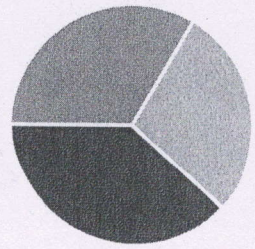
Branch	Mechanical Engineering	Program	B.Tech
Subject Name	Manufacturing Process	Semester	5th
		Year	2022/Odd
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Papers.</u> 		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

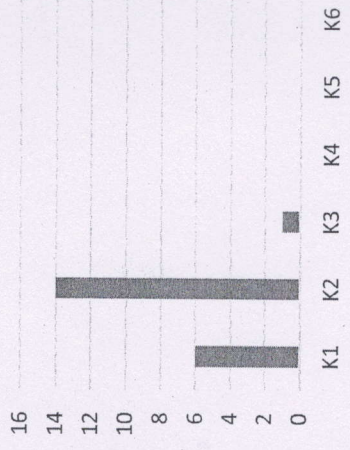
CO1	Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products.
CO2	Upon completion of this course, the students will have an overview of the mechanical behavior and application of tools used in machining purpose.
CO3	Upon completion of this course, the students will be able to examine the different Techniques involved in traditional machining process.
CO4	Students will be able to understand the manufacturing process of complex shape products.
CO5	Upon completion of this course, students will analyze the basic components of Lathe machine, Milling Machine, Drilling machine, Grinding Machine and different tools handled.

GRAFICAL REPRESENTATION

Bloom level wise distribution



Course outcome wise distribution



Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. N1	QUESTIONS	Mar ks	COs	KL	PO
i	Define casting and pattern	2	CO4	K2	PO4
ii	Define orthogonal and oblique cutting	2	Co5	K2	PO2
iii	What are the function of core in moulding sand	2	CO3	K1	PO3
iv	Define the shear plane	2	CO5	K2	PO5
v	How tool life is defined?	2	Co5	K1	PO2
vi	state four type of pattern	2	CO4	K1	PO4
vii	What are the four important characteristics of materials used for cutting tools?	2	Co4	K2	PO3
viii	What are the cause for the formation of blow hole in sand casting	2	CO3	K2	PO3
ix	What is the difference between milling and turning	2	CO4	K2	PO4
x	what are the significance of share angle	2	CO5	K2	PO5

Section B (Answer any FOUR out of SIX) - 20 Marks

(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain orthogonal cutting and oblique cutting with its neat sketches and compare?	5	CO5	K2	PO5
3	Write short notes on surface finish?	5	CO3	K2	PO3
4	Define shrinkage and porosity. How can you tell weather cavities in a casting are due to porosity or to shrinkage?	5	Co4	K2	PO5
5	The diameter of the cylinder is 500 mm and its thickness or height is 20 mm. calculate the solidification time.	5	CO5	K1	PO5
6	Define rake angle, shear angle and leap angle.	5	Co3	K1	PO3
7	How fluidity define? Why is it important	5	CO3	K2	PO3

Section C (Answer any THREE out of FIVE) - 30 Marks-

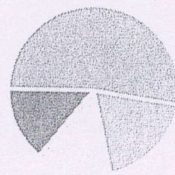
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Explain the various tool materials	10	CO 3	K3	PO3
9	Explain all process of powder metallurgy in sequence. Derive the formula for cutting ratio	10	Co5	K2	PO5
10	three metal pipe being cast having the same volume but different shape one is sphere, cube and cylinder with its height equal to diameter assume that $n=2$. find out which piece will solidify the fastest and which one slowest.	10	CO 5	K1	PO5
11	The end of the pipe was orthogonally cut with a tool of 20 degree rake angle. The chip length was measured as 85 mm whereas uncut chip length was 202 mm. Determine shear plane angle. if the depth of cut is 0.5	10	Co4	K2	PO5
12					

CO- Course Outcomes,	KL- Knowledge Level,	PO – Program Outcome
CO1	Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products.	
CO2	Upon completion of this course, the students will have an overview of the mechanical behavior and application of tools used in machining purpose.	
CO3	Upon completion of this course, the students will be able to examine the different Techniques involved in traditional machining process.	
CO4	Students will be able to understand the manufacturing process of complex shape products.	
CO5	Upon completion of this course, students will analyze the basic components of Lathe machine, Milling Machine, Drilling machine, Grinding Machine and different tools handled.	

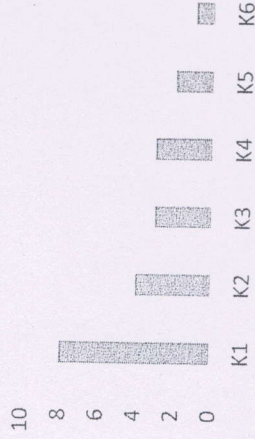
GRAFICAL REPRESENTATION

Bloom level wise distribution



CO1 CO2 CO3 CO4 CO5 CO6

Course outcome wise distribution



Branch	Mechanical Engineering	Program	B.Tech
Subject Name	Design of Machine Element	Semester	5th
		Year	2022/ Odd
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Standard Data Book for Design is required Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers. 		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. N1	QUESTIONS	Mar ks	COs	KL	PO
i	Define Machine design.	2	CO1	K1	PO1
ii	What is the function of shaft?	2	CO5	K2	PO3
iii	Define Development design.	2	CO1	K1	PO4
iv	Define Key and coupling?	2	CO4	K1	PO1
v	List the types of rivet heads.	2	CO1	K4	PO2
vi	What do you mean by Factor of safety?	2	CO1	K1	PO1
vii	Write the SI unit of Stress.	2	CO1	K3	PO1
viii	Define stiffness.	2	CO1	K1	PO1
ix	State Hook's Law.	2	CO1	K1	PO1
x	Write the SI unit of Force.	2	CO1	K2	PO2

Section B (Answer any FOUR out of SIX) - 20 Marks

(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain the desired properties of material used in shaft.	5	CO4	K3	PO1
3	Elaborate the types of Cotter Joints	5	CO2	K1	PO2
4	List the advantages & disadvantages of Rolling Contact Bearings over Sliding Contact Bearing.	5	CO5	K1	PO1
5	Describe the Classification of Machine Design with suitable examples.	5	CO1	K6	PO3
6	Write short note on Spur Gear with suitable diagram	5	CO5	K4	PO4
7	Elaborate the types of Belts and belt drives	5	CO4	K2	PO4

Section C (Answer any THREE out of FIVE) - 30 Marks-

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	What is the socket and spigot cotter joints? Write down design steps (procedure) of socket and spigot cotter joint in detail.	10	CO1	K4	PO1
9	Design a knuckle joint to transmit 150KN. The design stresses may be taken as 75MPa in tension, 60MPa in shear and 150MPa in compression	10	CO2	K5	PO3
10	Design a cotter joint to support a load varying from 30 KN in compression to 30 KN in tensions. The material used is carbon steel for which the following allowable stresses may be used. the load is applied statically. Tensile stress = compressive stress = 50MPa; shear stress = 35 Ma and crushing stress = 90MPa.	10	CO2	K5	PO5
11	Describe different types of theories of failure to design.	10	CO2	K2	PO1
12	What is machine design and write down the general procedure of machine design?	10	CO1	K3	PO1



END TERM EXAMINATION
School of Engineering & IT

Branch	Mechanical Engineering	Program	B. TECH
Subject Name	Heat & Mass Transfer	Semester	5th
		Year	2022/Odd
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Graf Paper / Drawing Sheet/ Log Book/ Ledger (please Mention if any) Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers. 		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

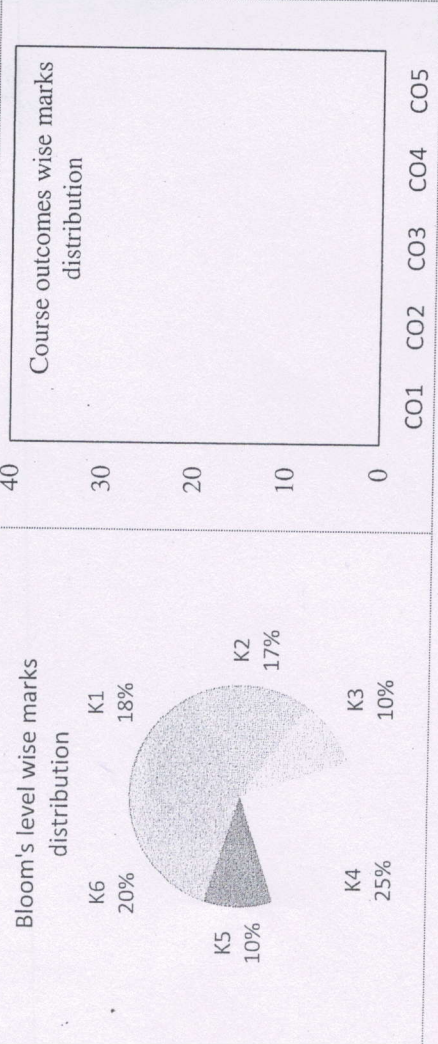
Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) - 20 Marks

Q.N	QUESTIONS	Marks	COs	KL	PO
1	Define Thermal Conductivity with its unit	2	CO1	K1	PO1
i	Name the general mechanism of heat transfer in: a) Solids b) Liquids and gases	2	CO1	K2	PO2
iii	How is natural convection different from forced convection?	2	CO3	K2	PO3
iv	What is the Fourier number?	2	CO2	K2	PO1
v	Define Radiation. Give an example	2	CO5	K1	PO1
vi	Why metals are good thermal conductors, while non-metals are poor conductors of heat? Explain with examples.	2	CO1	K1	PO1
vii	Explain Fouling Factor or scaling of heat exchanger.	2	CO4	K2	PO2
viii	Define a black surface	2			

CO- Course Outcomes, KL- Knowledge Level, PO - Program Outcome.

CO1	Understand the basic heat transfer fundamentals and their practical relevance in Planes, Cylinders and Spherical components.
CO2	Analyse the Fin heat transfer concepts.
CO3	Understand the basic of free and forced convection.
CO4	Analyze the performance of heat exchanger.
CO5	Formulate radiation mode of heat transfer for the surfaces.

GRAFICAL REPRESENTATION



10	Drive the three-dimensional heat conduction equations in cylindrical coordinates.	10	CO1	K2	PO1
11	A long 35mm diameter copper rod ($k = 380 \text{ W/m}^\circ\text{C}$) extends horizontally from a plane heated wall at 120°C . The temperature of the surrounding is 25°C and the convective heat transfer coefficient is $9.0 \text{ W/m}^2\text{C}$. Determine the heat loss. [Consider: The fin tip is insulated]	10	CO3	K2	PO3
12	Prove that the temperature distribution in a body at a time t during Newtonian heating or cooling is given by: $\frac{T - T_\infty}{T_i - T_\infty} = \exp\left(-\frac{Bi}{Fo}\right)$	10	CO2	K4	PO4

ix	Define and state the physical interpretation of the Biot number.	2	CO3	K2	PO1
x	Define Nusselt number with its physical significance.	2	CO3	K1	PO1
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question 5 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Describe the classification of heat exchanger	5	CO4	K4	PO2
3	Define emissive power and monochromatic emissive power	5	CO5	K4	PO2
4	Derive the expression for heat conduction equation for plane wall.	5	CO1	K4	PO2
5	Define fins or extended surfaces.	5	CO1	K1	PO1
6	A furnace walls made up of three layers, one of fire brick, one of insulating brick and one of red brick. The inner and outer surfaces are at 870°C and 40°C respectively. The respective co- efficient of thermal conductivity of the layer are 1.0, 0.12 and 0.75 W/mK and thicknesses are 22 cm, 7.5, and 11 cm. assuming close bonding of the layer at their interfaces, find the rate of heat loss per sq. meter.	5	CO1	K2	PO1
7	Define Reynolds number, Prandtl number & Nusselt number	5	CO3	K1	PO1
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Derive the expression for heat transfer in fins in case of insulated end.	10	CO2	K1	PO1
9	In a certain double pipe heat exchanger hot water at a rate of 4000 kg/h and gets cooled from 95°C to 65°C . At same time 5000 kg/h of cooling water at 30°C enters the heat exchanger in parallel direction. Calculate exit temperature of cold fluid and LMTD.	10	CO4	K3	PO2