

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan – June 2021-22	Month- April
Sem- 6th	Subject- PM	
Code – C000636(037)	Time Allowed: 2hours	Max Marks: 40

**Note: - Note: - 1. Students are Required to focus on question and marks columns only.
2. In Unit I & II, Question A is compulsory and attempt any two from B, C & D.**

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO																											
Unit – I																															
1.A	Define Method Study .What are it's Importance.	4	Understanding	CO1																											
1.B	Explain the proceducer of Method Study.	8	Creating	CO1																											
1.C	Described Therbligs symbols in details.	8	Understanding	CO1																											
1.D	<p>The following table shows a time study data. The times shown are continuous watch reading in minutes. Initial setting of stop watch is at 0.00. Take allowance 15% and find the standard time.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">S.No.</th> <th rowspan="2">Element</th> <th colspan="3">Cycle Time</th> <th rowspan="2">Performance rating</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Get two cases</td> <td>0.5</td> <td>4.2</td> <td>8.6</td> <td>1.05</td> </tr> <tr> <td>2.</td> <td>Put parts into cases</td> <td>1.5</td> <td>5.7</td> <td>9.9</td> <td>1.15</td> </tr> <tr> <td>3.</td> <td>Clamp two parts in position</td> <td>3.8</td> <td>8.1</td> <td>12.6</td> <td>0.95</td> </tr> </tbody> </table>	S.No.	Element	Cycle Time			Performance rating	1	2	3	1.	Get two cases	0.5	4.2	8.6	1.05	2.	Put parts into cases	1.5	5.7	9.9	1.15	3.	Clamp two parts in position	3.8	8.1	12.6	0.95	8	Analyzing	CO1
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Unit – II

2.A	Write down the procedure for job Evaluation.	4	Remembering	CO2
2.B	What is merit rating and described various methods of merit rating.	8	Creating	CO1
2.C	Explain Taylor's differential piece rate system and Merrick's differential piece rate system.	8	Analyzing	CO3
2.D	What are two basic methods of payments of wage? Explain the merit and demerit of the two methods.	8	Remembering	CO2

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I

Session- Jan-June, 2022

Month- April, 2022

Sem- 6th

Subject- HMT

Subject Code –
C037613(037)

Time Allowed: 2hr.

Max Marks: 40

**Note: - 1. first Question (A) from both parts are compulsory.
2. Solve any two from B, C, D of each part.**

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Part – I				
1.A	Define Fourie's law of Conduction and Thermal Diffusivity	4	R	1
1.B	Derive a Three-Dimensional general conduction equation in Cylindrical Co-ordinates for the homogeneous material.	8	U	2
1.C	The thermal conductivity of a material is to be determined by fabricating the material into the shape of a hollow sphere, placing an electric heater at the center and measuring the surface Temperatures with thermocouples when steady state conditions have been attained. The sphere has internal radius 3 cm, external radius 8 cm and the corresponding temperatures are 95°C and 85°C when an electrical input to heater is 10 watts. Determine the experimental value of thermal conductivity and the temperature at a point halfway through the wall.	8	Ap	1
1.D	Two slabs, each 100 mm thick and made of materials with thermal conductivities of 16 W/m-deg and 200 W/m-deg, are placed in contact which is not perfect. Due to roughness of surfaces, only 40% of area is in contact and air fills 0.02 mm thick gap in the remaining area. If the extreme surfaces of the arrangement are at temperatures of 250°C and 30°C, determine the heat flow through the composite system, the contact resistance and temperature drop in contact. Take thermal conductivity of air as 0.032 W/m deg and assume that half of the contact (of the contact area) is due to either metal.	8	Ap	1

Part- II

2.A	Explain Critical thickness of insulation and its Importance.	4	R	2
2.B	Derive an equation of Temperature distribution and thermal resistance for hollow sphere.	8	U	2
2.C	An insulated steam pipe of 16cm diameter is covered with 4cm thick layer of insulation ($k=0.9 \text{ W/m-deg}$) and carries process steam. Determine the percentage change in the rate of heat loss if an extra 2cm thick layer of lagging ($k= 1.25 \text{ W/m-deg}$) is provided. Given that surrounding temperature remains constant and the heat transfer coefficient for both the configuration is $12 \text{ W/m}^2\text{-deg}$.	8	Ap	2
2.D	<p>The interior of a refrigerator has inside dimensions 60 cm x 45 cm base area and 120 cm high. The composite wall is made of two 3 mm mild steel sheets ($k = 145 \text{ kJ/m-hr-deg}$) with 6 cm of glass wool ($k = 0.188 \text{ kJ/m-hr-deg}$) insulation sandwiched between them. The average values of convective heat transfer coefficients at the interior and exterior wall are 40.8 and $52.3 \text{ kJ/m}^2\text{-hr-deg}$ respectively.</p> <p>(a) Calculate the individual resistance of this composite wall and the resistances at the surfaces, and the overall conductance.</p> <p>(b) Draw the thermal circuit.</p> <p>(c) For the air temperature inside the refrigerator at 6.5°C and outside of 25°C, determine the rate at which heat must be removed from the refrigerator. Also, calculate the temperature on the outer surface of the metal sheet.</p>	8	Ap	1

27/04/22

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SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I

Session- 2021-22

Month- Apr

Sem- 6

Subject- MT

Code – C037612

Time Allowed: 2 hrs

Max Marks: 40

Note: -

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Unit – I				
1.A	What is grit grade and structure of abrasives?	4	Remembering	CO1
1.B	What is honing and explain honing operation very briefly with their types?	8	Remembering	CO1
1.C	Enlist and explain surface finishing operation?	8	Remembering	CO1
1.D	What are the characteristics of grinding wheels?	8	Remembering	CO2

Unit – II

2.A	Why there is a requirement of unconventional methods of machining?	4	Remembering	CO3
2.B	Explain abrasive jet machining and its mechanism?	8	Remembering	CO3
2.C	Explain with neat diagram about the laser beam machining stating their principle and advantages?	8	Remembering	CO3
2.D	Explain the principle and working of electrical discharge machining with neat sketch?	8	Remembering	CO3

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I

Session- Jan – June 2021-22

Month- April

Sem- 6th

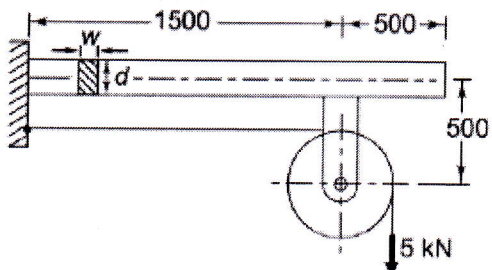
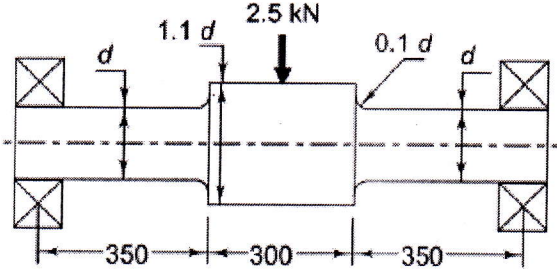
Subject- Design of Machine elements

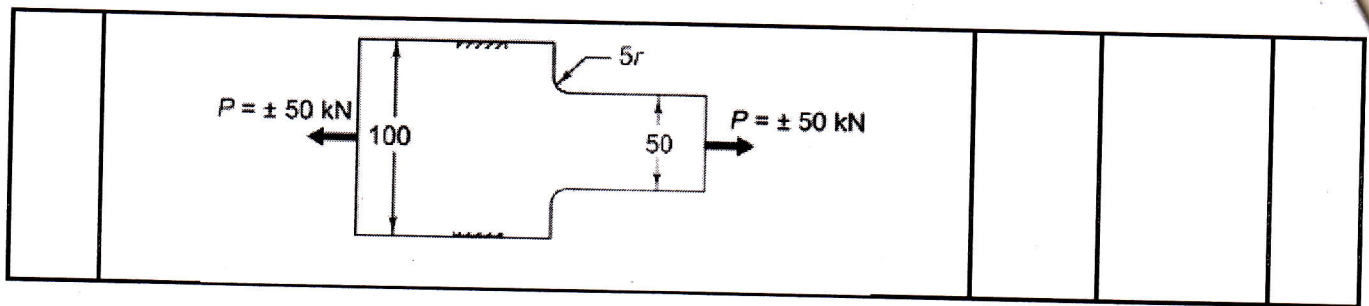
Code – C037611(037)

Time Allowed: 2hours

Max Marks: 40

**Note: - Note: - 1. Students are Required to focus on question and marks columns only.
2. In Unit I & II, Question A is compulsory and attempt any two from B, C & D.**

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Unit – I				
1.A	Define stress concentration and stress concentration factor.	4	Understanding	CO1
1.B	<p>A cantilever beam of rectangular cross-section is used to support a pulley as shown in Figure. The tension in the wire rope is 5 kN. The beam is made of cast iron FG 200 and the factor of safety is 2.5. The ratio of depth to width of the cross-section is 2. Determine the dimensions of the cross-section of the beam.</p> 	8	Creating	CO1
1.C	<p>A non-rotating shaft supporting a load of 2.5 kN is shown in Figure. The shaft is made of brittle material, with an ultimate tensile strength of 300 N/mm². The factor of safety is 3. Determine the dimensions of the shaft.</p> 	8	Understanding	CO1
1.D	<p>A component machined from a plate made of steel 45C8 ($S_{ut} = 630$ N/mm²) is shown in Figure. It is subjected to a completely reversed axial force of 50 kN. The expected reliability is 90% and the factor of safety is 2. The size factor is 0.85. Determine the plate thickness t for infinite life, if the notch sensitivity factor is 0.8.</p>	8	Analyzing	CO1



Unit – II				
2.A	What is Key? What are the different types of Keys?	4	Remembering	CO2
2.B	<p>Two rods, made of plain carbon steel 40C8 ($S_{yt} = 380 \text{ N/mm}^2$), are to be connected by means of a cotter joint. The diameter of each rod is 50 mm and the cotter is made from a steel plate of 15 mm thickness. Calculate the dimensions of the socket end making the following assumptions:</p> <p>(i) the yield strength in compression is twice of the tensile yield strength; and</p> <p>(ii) the yield strength in shear is 50% of the tensile yield strength.</p> <p>The factor of safety is 6.</p>	8	Creating	CO1
2.C	It is required to design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are co-axial and a small amount of angular movement between their axes is permissible. Design the joint and specify the dimensions of its components. Select suitable materials for the parts.	8	Analyzing	CO3
2.D	<p>Design a sleeve and cotter joint subjected to a load of 30 kN. For the steel used, take the permissible stresses as,</p> <p>In tension 55 N/mm^2</p> <p>In compression 70 N/mm^2</p> <p>In shear 35 N/mm^2</p>	8	Remembering	CO2

25/04/22

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SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan-June, 2022	Month- April, 2022
Semester 6th	Subject- Powerplant Engineering	
Code – C037632(037)	Time Allowed: 2 Hours	Max Marks: 40

*Note: - Part A(MCQ) of questions 1 and 2 is compulsory, from other parts B, C and D of questions 1 and 2, attempt any two parts.
 Ignore the columns of Level of Bloom's taxonomy and CO.*

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Question – 1				
1.A	<i>Explain Heat Rate and Work Ratio.</i>	4	R	2
1.B	<i>A steam turbine receives steam at 15 bar and 350⁰c and exhaust to the condenser at 0.06 bar determine the thermal efficiency of the ideal Rankine cycle operating between these two limits.</i>	8	A	2
1.C	<i>Write short notes on –</i> <i>(i) Air Preheater</i> <i>(ii) Economiser</i>	8	U	2
1.D	<i>Explain Ash handling system with neat sketch.</i>	8	U	2

Question – 2				
2.A	<i>Name any four sources of Conventional and Non-conventional energy.</i>	4	R	1
2.B	<i>Explain the elements of steam power plant with layout.</i>	8	U	1
2.C	<i>Explain primary and secondary distribution sub-station.</i>	8	U	1
2.D	<i>Write short notes on –</i> <i>(i) Feed water treatment</i> <i>(ii) Deaerator</i>	8	U	2