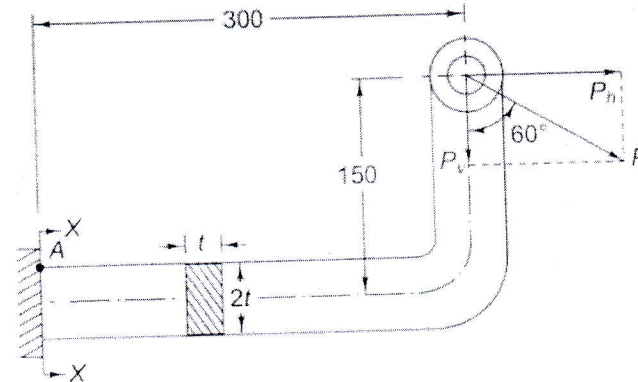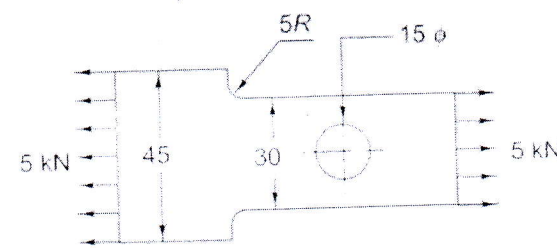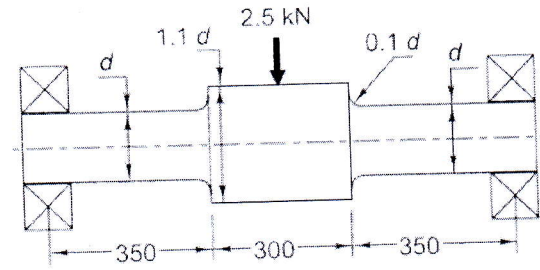## SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan to July, 2023	Month- April
Sem- 6th	Subject- DESIGN OF MACHINE ELEMENT	
Code - C037611(037)	Time Allowed: 2 hrs	Max Marks: 40

Note: - Attempt all question. Parts (a) are compulsory of each question. Solve any two parts from (b), (c) and (d) of each question.

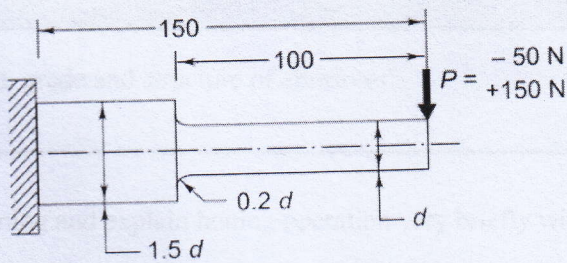| Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – I			
1.A	What is factor of safety? Why is it necessary to use factor of safety in analysis and design? What is allowable stress?	4	Analyzing	CO1
1.B	A cantilever beam of rectangular cross-section is used to support a pulley as shown in Figure. 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.	8	Creating	CO2
1.C	A wall bracket with a rectangular cross-section is shown in Figure. The depth of the cross-section is twice of the width. The force P acting on the bracket at 600 to the vertical is 5 kN. The material of the bracket is grey cast iron FG 200 and the factor of safety is 3.5. Determine the dimensions of the cross-section of the bracket. Assume maximum normal stress theory of failure.	8	Creating	CO1

1.D	A flat plate subjected to a tensile force of 5 kN is shown in Figure. The plate material is grey cast iron FG 200 and the factor of safety is 2.5. Determine the thickness of the plate. 	8	Creating	CO1

Unit – II				
2.A	What is stress concentration? What are the causes of stress concentration? Analyse the methods of reducing stress concentration?	4	Analyzing	CO2
2.B	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. 	8	Creating	CO1
2.C	A component machined from a plate made of steel 45C8 (Sut = 630 N/mm2) is shown in Fig. 5.29. 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.	8	Creating	CO3
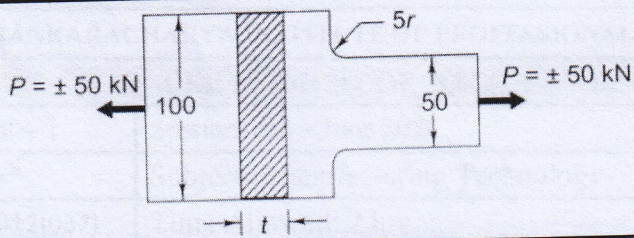
	$P = \pm 50$ kN ← 100 — 5r — 50 — $P = \pm 50$ kN, t			
2.D	A cantilever beam made of cold drawn steel 4OC8 (Sut = 600 N/mm2 and Syt = 380 N/mm2) is shown in Figure. The force P acting at the free end varies from −50 N to +150 N. The expected reliability is 90% and the factor of safety is 2. The notch sensitivity factor at the fillet is 0.9. Determine the diameter 'd' of the beam at the fillet cross-section.	8	Creating	CO2

Kinsok Sin

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan – June 2023	Month- April	
Sem-6th	Subject- Manufacturing Technology		
Code - C037612(037)	Time Allowed: 2 hrs	Max Marks: 40	

Note: - 1. Students are Required to focus on question and marks columns only.
2. Support your answers with neat sketches.
3. 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	What is grit, grade and structure of abrasives?	4	Understanding	CO1
1.B	Explain honing and explain honing operation very briefly with their types?	8	Understanding	CO1
1.C	Explain external cylindrical grinding and surface grinding with neat sketch?	8	Understanding	CO1
1.D	Explain with diagram lapping and super finishing process?	8	Applying	CO1

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Unit – I				
2.A	What is MRR? In which process MRR is high?	4	Understanding	CO2
2.B	Explain EBM?	8	Applying	CO2
2.C	Explain the mechanics of electro chemical grinding?	8	Applying	CO2
2.D	How the working of abrasive jet machining helps to rectify the surface finishing of workpiece?	8	Applying	CO2

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan – June 2023	Month- April
Sem- 6th	Subject- Power Plant Engineering	Max Marks: 40
Code - C037632(037)	Time Allowed: 2 hrs	

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	Describe main components of electrical distribution system.	4	Remembering	1
1.B	Describe Primary and secondary power distribution system.	8	Understanding	1
1.C	Explain the various types of coal Transferring system with neat sketches.	8	Understanding	2
1.D	Sketch the Layout of Gas power plant and explain Advantages, disadvantages, applications.	8	Understanding	1

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – II			
2.A	Define Steam rate, Heat rate, work ratio and super heater.	4	Understanding	2
2.B	Sketch The layout of modern Steam Power Plant and explain all circuit involved in it.	8	Understanding	2
2.C	Explain the following with a neat sketch. (i) Low Pressure Ash Handling System. (ii) High Pressure Ash Handling System	8	Remembering	2
2.D	A turbine is supplied with steam at a pressure of 32 bar and temperature of $410^0 c$. the steam then expands isentropically to a pressure of 0.008 bar. Find the dryness fraction at the end of expansion and thermal efficiency of the cycle. If the steam reheat at 5.5 bar to a temperature of $400^0 c$ and then expand isentropically to a pressure of 0.08 bar what will be the dryness fraction and thermal efficiency of the cycle?	8	Applying	2

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan-June, 2023	Month- April, 2023
Semester - 6th	Subject- Principles of Management	
Code – C000635(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	Write the objectives of production planning and control.	4	U	1
1.B	What is Aggregate planning? Explain the characteristics of Aggregate planning.	8	U	1
1.C	Analyse the functions of Management with suitable examples.	8	A	1
1.D	Explain the various roles of a manager in any organization.	8	A	1

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Question – 2				
2.A	Explain the significance of Sequencing in production.	4	U	1
2.B	Explain the four major skills are expected to have in a Manager.	8	U	1
2.C	2 machines and Six jobs follow shop scheduling problem. Using John son's algorithm obtain the optimal sequence which will minimize the make span. Find the value of make span and idle time.	8	A	1
2.D	Explain the functions of Production planning and control (PPC).	8	A	1

For Question 2.C:

Job	Time taken by m/cs, hr	
	1	2
1.	5	4
2.	2	3
3.	13	14
4.	10	1
5.	8	9
6.	12	11

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jan-June, 2023	Month- April, 2023
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 Spherical Co-ordinates for the homogeneous material.	**8**	U	1
1.C	Two slabs, each 120 mm thick, have thermal conductivities of 14.5 W/m°C and 210 W/m°C. These are placed in contact, but due to roughness, only 30 percent of the area is in contact and the gap in the remaining area is 0.025 mm thick and is filled with air. If the temperature of the face of the hot surface is at 220°C and the outside side surface of another slab is at 30°C, determine: (i) Heat flows through the composite system. (ii) The contact resistance and temperature drop in contact. Assume that the conductivity of air is 0.032 W/m°C and that half of the contact (of the contact area) is due to either metal.	**8**	Ap	1
1.D	A furnace wall is made of composite wall of total thickness 550 mm. The inside layer is made of refractory material (K = 2.3 W/mK) and outside layer is made of an insulating material (K = 0.2 W/mK). The mean temperature of the glass inside the furnace is 900°C and inter- face temperature is 520°C. The heat transfer coefficient between the gases and inner surface can be taken as 230 W/m2°C and between the outside. surface and atmosphere as 46 W/m2°C. Taking air temperature = 30°C, calculate: (i) Required thickness of each layer, (ii) The rate of heat loss per m² area, and (iii) The temperatures of surface exposed to gases and of surface exposed to atmosphere.	**8**	Ap	1

Part– II				
2.A	Explain Thermal Resistance for Conduction and Convection.	4	R	1
2.B	Derive an equation of Temperature distribution and thermal resistance for hollow Cylinder.	8	U	1
2.C	A steel pipe with 50 mm OD is covered with 6.4 mm asbestos. insulation [k = 0.166 W/mK] followed by a 25 mm layer of fiber-glass insulation [k = 0.0485 W/mK]. The pipe wall temperature is 393 K and the outside insulation temperature is 311 K. Calculate the interface temperature between the asbestos and fiber-glass:	8	Ap	1
2.D	An insulated steam pipe having an outside diameter of 30 mm is to be covered with two layers of insulation, each having a thickness of 20 mm. The thermal conductivity of one material is 5 times that of the other. Assuming that the inner and outer surface temperatures of composite insulation are fixed, how much will heat transfer be increased when better insulation material is next to the pipe than it is outer layer?	8	Ap	1