SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- July –December, 2021	Month- October
Sem- 7th	Subject- PDD	
Code – 337744(37)	Time Allowed: 2hr.	Max Marks: 40

Note: - Question 1 A and 2 A are Compulsory and solve any two from B,C,D from each section.

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
Unit – I				
1.A	Write some of the human factors which are important to consider for new product designing?	**4**	R	4
1.B	Elaborate six phases of product development process?	**8**	R	5
1.C	Explain the steps for identifying customer needs?	**8**	U	1
1.D	Explain the steps involved in establishing Target specifications?	**8**	U	2
Unit – II				
2.A	Define following: (I) Function analysis. (II) Modular architecture.	**4**	R	4
2.B	Explain seven-step method for Testing product concept?	**8**	U	1
2.C	Define 'HOQ'. Explain the templates of 'HOQ'?	**8**	R	7
2.D	Explain the steps of Concept screening with example?	**8**	U	2

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DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- July to December 2021	Month- October
Sem- 7th	Subject- Automobile Engineering	
Code – 337731(37)	Time Allowed: 2 hrs	Max Marks: 40

Note: - Part A 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
	Unit – I			
1.A	What is the function of shock absorber? Explain the purpose of shock absorber? Draw a simple sketch and explain the common type of independent suspension system used in passenger cars?	4	Remembering	CO2
1.B	Write Short notes on Tapered Spring and telescopic damper?	8	Remembering	CO1
1.C	What are the differences between the following: Conventional leaf spring and helper spring, torsion bar?	8	Remembering	CO1
1.D	A typical coil suspension spring has 10 effective coils of a mean diameter 125mm and made out of wires of diameter 15 mm. the spring is designed to carry a maximum static load of 3531.6N. calculate the shear stress and the deflection under the above loading. If a maximum shear stress of 637650KPa is allowable in the material then what is the possible clearance in the spring G= 73575X103 KPa.	8	Applying	CO2

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – II			
2.A	Explain the constructional feature and working of multiplate dry clutch?	4	Remembering	CO3
2.B	With the help of neat sketches explain the construction, working of fluid flywheel.	8	Remembering	CO3
2.C	Explain the construction and working of centrifugal clutch?	8	Remembering	CO4
2.D	A centrifugal clutch is to transmit 35 KW at 750 rpm when engaged at 75 percent of the running speed. The inside diameter is 36 cm and the radial distance of the center of gravity of each shoe from the shaft axis is 15cm Determine the necessary weight of each shoe of the above clutch?	8	Applying	CO3

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DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- Jun Dec 2021	Month- OCTOBER 2021
Sem- 7	Subject- Computer Aided Design and Manufacturing	
Code – 337733(37)	Time Allowed: 2 hrs.	Max Marks: 40

Note: - i) Part A is compulsory in both units ii) attempt and two questions from B,C,D

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – I			
1.A	List 4 difference between concurrent and sequential engineering?	4	R	C01
1.B	Explain with the help of block diagram, the use of CAD/CAM environment in an automobile industry.	8	R,U	C01
1.C	Explain 1) world coordinates, ii) Window coordinates, iii) normalized device coordinates and iv) device coordinates	8	R	C01
1.D	What are the different kinds of CAD/CAM modules which can be used in a typical Industrial environment?	8	R	C01

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – II			
2.A	Establish the difference between perspective and parallel projection.	4	A	C02
2.B	Enumerate differences between parametric & non parametric form of curves	8	R,U	C03
2.C	Generate five points on Bezier curve with control points (20,30), (40,50), (60,70) and (80,90) with values of parametric variable as 0,0.25,0.5,0.75,1	8	A	C03
2.D	The triangle a(-5,-2) , B(-1,4) and C(1,-3) has undergone a transformation of up 4 and over to right 4 and then reflection about X axis . show the composite transformation? Change the order of transformation and tell whether the order matter?	8	A	C03

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DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	Session- July-December, 2021	Month- October, 2021
Sem- 7th	Subject- RAC	
Code –337732(37)	Time Allowed: 2hr.	Max Marks: 40

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

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – I			
1.A	Define terms Refrigerator and Heat Pump	4	R	1
1.B	With respect to VCR cycle explain (a) Flash chamber (b) Liquid-Vapor Heat Exchanger.	8	U	1
1.C	A vapour compression refrigeration machine, with Freon-12 as a refrigerant, has a capacity of 12 tonne of refrigeration operating between a -28⁰Cand 26⁰C.The refrigerant is subcooled by 4⁰C before entering the expansion valve and the vapour is superheated by 5⁰C before leaving the evaporator. The machine has a six-cylinder single-acting compressor with stroke equal to 1.25 times the bore. It has a clearance of 3% of the stroke volume, determine:1. Theoretical power required; 2. C.O.P.; 3. Volumetric efficiency; 4. Bore and stroke of cylinder. The speed of compressor is 1000 r.p.m. The following properties of Freon-12may be used. <table><tr><td>Sat.temp ⁰C</td><td>Pressure, bar</td><td>Sp.Volume of vapor m³/kg</td><td colspan="2">Enthalpy, KJ/Kg</td><td colspan="2">Entropy, KJ/Kg K</td></tr><tr><td></td><td></td><td></td><td>Liquid</td><td>Vapor</td><td>Liquid</td><td>Vapor</td></tr><tr><td>-28</td><td>1.093</td><td>0.1475</td><td>10.64</td><td>175.11</td><td>0.0444</td><td>0.7153</td></tr><tr><td>26</td><td>6.697</td><td>0.0262</td><td>60.67</td><td>198.11</td><td>0.2271</td><td>0.6865</td></tr></table> Specific heat of liquid refrigerant =0.963KJ/Kg K and specific heat of superheated vapour =0.615KJ/Kg K.	8	Ap	1
1.D	A cold storage plant is required to store 20 tonnes of fish. The fish is supplied at a temperature of 30⁰C. the specific heat of fish above freezing point is 2.93 KJ/Kg K. The specific heat of fish below freezing point is 1.26 KJ/Kg K. the fish is stored in cold storage which is maintained at - 8⁰C. The freezing point of fish is - 4⁰C. The latent heat of fish is 235 KJ/Kg K. if the plant requires 75 KW to drive it, find: 1. The capacity of plant, and 2. Time taken to achieve cooling. Assume actual C.O.P. of the plant as 0.3 of the Carnot C.O.P.	8	Ap	1

P.T.O.

	Unit – II			
2.A	Draw P-V and T-S diagram for reversed Carnot cycle and actual gas refrigeration cycle.	4	R	2
2.B	With the help of neat diagram explain how actual VCR cycle differs with ideal one.	8	U	1
2.C	A simple NH3 VCR system has compressor with piston displacement of 2m3/min. A condenser pressure of 12 bar and evaporator pressure of 2.5 bar. The liquid is sub cooled by 20^0C. The temperature of vapor leaving the compressor is 100^0C. Heat rejected to compressor cooling water is 5000kJ/h, volumetric efficiency is 0.8, find capacity, cop, indicated power.	8	Ap	1
2.D	An air refrigeration works between the pressure limits of 1 bar and 5 bar. The temperature of air entering the compressor and expansion cylinder are 10^0C and 25^0C respectively. The expansion and compression follow the law $PV^{1.3} = C$. Find the following: 1.The theoretical COP of the refrigeration cycle. 2. if the load on the refrigerating machine is 10 TR, find the amount of air circulated per minute through the system assuming that the actual COP is 50% of the theoretical COP. 3.The stroke length and piston diameter of single acting compressor if the compressor runs at 300 r.p.m. and the volumetric efficiency is 85%. Take L/d=1.5;$C_P = 1.005KJ/KgK$;$C_V = 0.71\ KJ/KgK$	8	Ap	2

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DEPARTMENT OF MECHANICAL ENGINEERING			
Class Test – I	Session- July – Dec, 2021	Month - October	
Sem - 7th	Subject - Machine Tool Technology		
Code - 337734(37)	Time Allowed: 2 hrs	Max Marks: 40	

Note: the first Question is compulsory from section A, B of 4 marks and solve any two question from Section A, B each of 8 marks.

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Section – I			
1	Explain orthogonal cutting and Oblique cutting.	4	U	CO1
2	Explain the complete geometry of single point cutting tool with the help of neat sketches?	8	U	CO1
3	What is chip breakers and derive an expression relating shear plane angle with chip thickness ratio and rake angle?	8	A	CO2
4	In an orthogonal cutting operation, the following observation were made: cutting speed = 80m/min, cutting force = 20kg, feed force = 8kg ,back rake angle =15^0 ,feed = 0.2mm/rev ,chip thickness = 0.4 determine the a) Shear force b) Work done in shear c) Shear strain	8	C	CO2

		Section – II			

1		Write short notes on the following (any two)
		   I. Chip formation
		   II. Chip reduction coefficient
		   III. Multi point cutting tool
			4	U	CO2

2		What are the requirement of cutting tool and derive the velocity relationship involved in metal cutting?	8	A	CO2
3		Write and explain the mechanism of chip formation and type of chip formation?	8	U	CO2

4		In orthogonal cutting if the feed is 1.25mm/ rev. and chip thickness after cutting is 2mm, determine the following
		The tool bit has a rack angle of 10°
		If shear strength is = 6000 kg/cm²
		Width of cut =10mm
		Cutting speed = 30 m/min
		Coefficient of friction is = 0.9
		        Determine the following
		   I. Chip thickness ratio
		   II. Shear angle
		   III. Shearing force
		   IV. Friction angle
		   V. cutting force
		   VI. Horse power at the cutting tool
			8	C	CO2