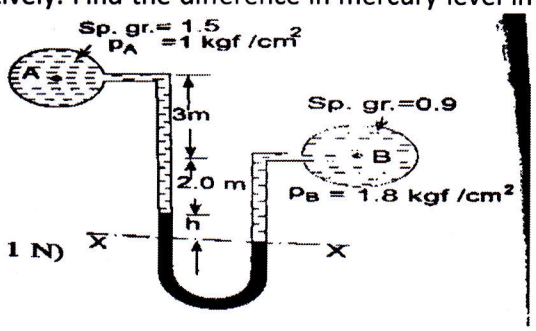
SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY		
DEPARTMENT OF MECHANICAL ENGINEERING		
Class Test – I	Session- Jan-June 2022	Month- June
Sem- 4th	Subject- Fluid Mechanics	
Code - B037412(037)	Time Allowed: 2 hrs	Max Marks: 40

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 the Newton's law of viscosity and Buoyancy force.	**4**	Understanding	1
1.B	Explain the stability condition of completely submerged and partially submerged body.	**8**	Understanding	1
1.C	A cubical tank has sides of 1.5m. It contains water for the lower 0.6m depth. The upper remaining part is filled with oil of specific gravity 0.9 . Calculate: (i) Total pressure on one side of the tank, (ii) The position of center of pressure for one side of the tank.	**8**	Applying	1
1.D	A differential manometer connected at the two points A and B of two pipes as shown in fib. The pipe A contains a liquid of sp.gr. =1.5 while pipe B contains a liquid of sp.gr. =0.9. The pressure at A and B are 1 kgf/cm^2 and 1.80 kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer. 	**8**	Applying	1

Unit – II				
2.A	. Explain Compressibility and effect of temperature on viscosity.	4	Remember	1
2.B	Derive an expression for Hydrostatic force and position of Centre of Pressure for vertical plane surface.	8	Understanding	1
2.C	A cubical block weighing 4.5 N and having a 40 cm edge is allowed to slide down an inclined plane surface making an angle of 300 with the horizontal on which there is a uniform layer of oil 0.005 cm thick. If the expected steady state velocity of the block is 12.5 cm/s, determine the viscosity of the oil. Also express the kinematics viscosity in stokes if the oil has a mass density 800 kg/m3.	8	Applying	1
2.D	A solid cylinder of diameter of 4.0m has a height of 4.0m. Find the meta centric height of the cylinder if the specific gravity of the material of cylinder =0.6 and it is floating in water with its vertical axis. State whether the equilibrium is stable or unstable.	8	Applying	1

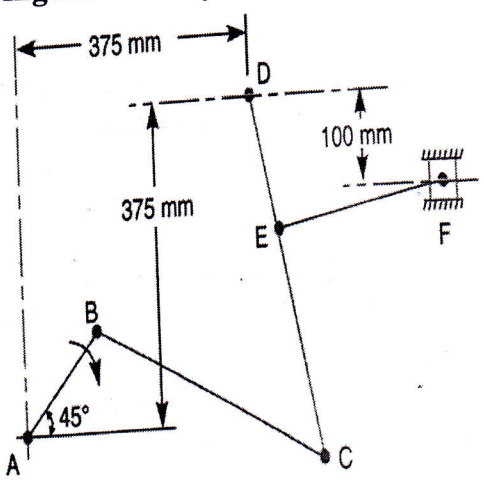
MECH- 4th
FM -
① date - 15/06/23

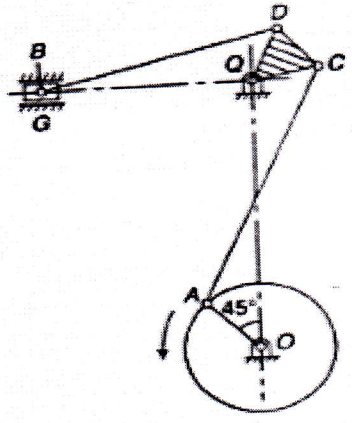
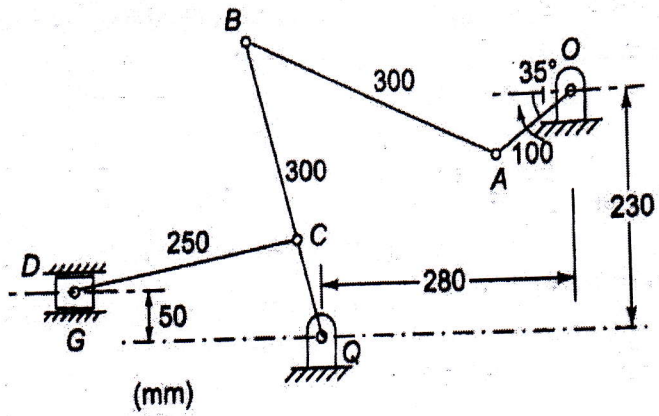
SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

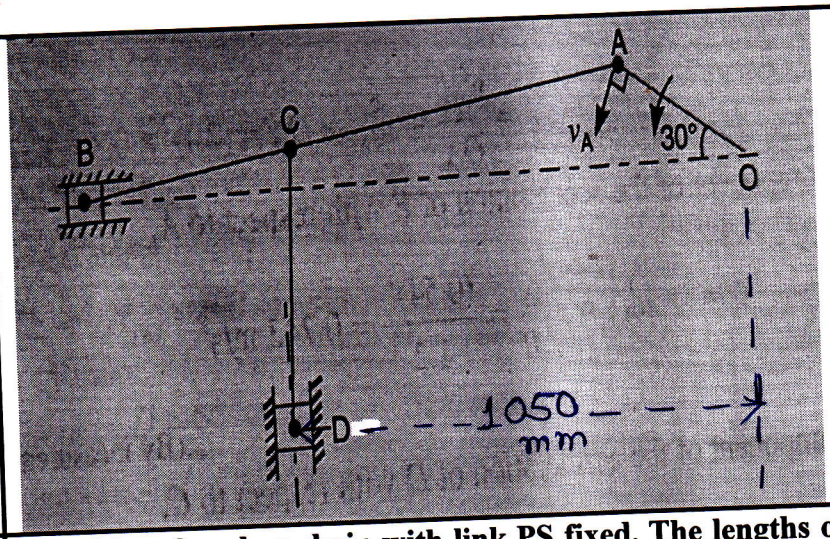
Class Test – I	**Session- January- June, 2022**	**Month-June, 2022**
Semester- IV	**Subject- Kinematics of Machines**	
Code - B037415(037)	**Time Allowed: 2 Hours**	**Max Marks: 40**

Note: - Part A of Question 1 and Question 2 is compulsory. Attempt any Two Parts out of B, C and D in Question 1, Attempt any one part out of B and C in Question 2.

Q. No	Questions	Marks	Levels of Bloom's Taxonomy	CO
	Question – 1			
1.A	**Explain the meaning of Radial and Tangential components of acceleration.**	**4**	**Understanding**	**CO2**
1.B	**The mechanism shown has dimensions of links as follows: AB=DE=150mm, BC=CD=450mm, EF=375mm.Crank AB makes an angle of 45^0 with the horizontal and rotates about A in clockwise direction at a uniform speed of 120rpm. Lever DC oscillates about fixed point D which is connected to AB by a coupler BC. The block F moves in horizontal guides, being driven by link EF. Draw velocity diagram and Find: (i) Velocity of block F. (ii)Angular velocity of DC.** 	**8**	**Applying**	**CO1**

1.C	The length of various link of mechanism as shown in fig. 1 (c) are as follow OA = 150 mm; AC = 600 mm; CQ = QD= 145 mm; CD = 125 mm; BD=500 mm and OQ= 625 mm. Draw the space and velocity diagrams.  Fig. 1 (C)	8	Applying	CO1
1.D	Figure shows a mechanism in which OA=QC=100mm, AB=QB=300mm and CD=250mm. The crank OA rotates at 150rpm in the clockwise direction. Determine the (i) velocity of slider at D (ii) angular velocity of link QB.  	8	Applying	CO1

Question –2				
2.A	Explain velocity of rubbing taking a suitable example.	6	Remembering	CO1
2.B	In the mechanism shown, crank OA rotates at 20rpm anticlockwise and gives motion to sliding blocks B and D. OA=300mm, AB=1200mm, BC=450mm and CD=450mm. Draw space diagram, velocity diagram and acceleration diagram and find: (i) Linear acceleration of D, (ii) Angular acceleration of CD.	14	Analyzing	CO2

				
2.C	**PQRS is a four bar chain with link PS fixed. The lengths of the links are PQ=62.5mm, QR=175mm, RS =112.5mm and PS=200mm. Crank PQ rotates at 10rad/s clockwise. Draw velocity and acceleration diagrams when angle QPS=60^0 and Q and R lie on same side of PS. Find angular velocity and angular acceleration of link QR and RS.**	**14**	**Analyzing**	**CO2**

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY		
DEPARTMENT OF MECHANICAL ENGINEERING		
Class Test – I	Session- Jan – June 2022	Month- June
Sem- 4th	Subject- Manufacturing Process	
Code - B037414(037)	Time Allowed: 2 hrs	Max Marks: 40

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 core and chaplet.	4	Understanding	CO2
1.B	With the help of neat diagram ,discuss shell moulding casting	8	Understanding	CO2
1.C	State the different type of moulding send. Explain each type their properties, composition and application.	8	Understanding	CO2
1.D	Explain With the help of neat diagram different type element in gating system,	8	Understanding	CO2
	Unit – II			
2.A	Define welding process. Why flux used in welding.	4	Understanding	CO3
2.B	What Do You Mean By Pattern? Explain Different Types Of Pattern.	8	Understanding	CO1
2.C	Explain the types of flames used in gas welding?	8	Understanding	CO3
2.D	Write The Difference Between TIG And MIG welding with a neat sketch?	8	Understanding	CO3

SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY		
DEPARTMENT OF MECHANICAL ENGINEERING		
Class Test – I	**Session- Jan-June, 2022**	**Month- June, 2022**
Semester 4th	**Subject- Applied Thermodynamics**	
Code – B037411(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	*Define Air standard cycle. Explain the assumptions for the analysis of air standard cycles.*	**4**	**U**	**1**
1.B	*Derive the expression of Air Standard Efficiency and Mean Effective pressure for Diesel Cycle.*	**8**	**U**	**1**
1.C	*In an engine working on Dual cycle, the temperature and pressure at the beginning of the cycle are 90°C and 1 bar respectively. The compression ratio is 9. The maximum pressure is limited to 68 bar and total heat supplied per kg of air is 1750 kJ.* *Determine :* *(i) Pressure and temperatures at all salient points* *(ii) Air standard efficiency* *(iii) Mean effective pressure.*	**8**	**A**	**1**
1.D	*The minimum pressure and temperature in an Otto cycle are 100 kPa and 27°C. The amount of heat added to the air per cycle is 1500 kJ/kg.* *(i) Determine the pressures and temperatures at all points of the air standard Otto cycle.* *(ii) Also calculate the specific work and thermal efficiency of the cycle for a compression ratio of 8 : 1.* *Take for air : c_v= 0.72 kJ/kg K, and γ = 1.4.*	**8**	**A**	**1**

	Question – 2			
2.A	*The efficiency of an Otto cycle is 50% and γ is 1.5. What is the compression ratio?*	**4**	**U**	**1**
2.B	*Derive the expression of Air Standard Efficiency and Mean Effective pressure for Dual Cycle.*	**8**	**U**	**1**

2.C	*An engine of 250 mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.00263 m^3. The initial pressure and temperature are 1 bar and 50°C. If the maximum pressure is limited to 25 bar, find the following :* *(i) The air standard efficiency of the cycle.* *(ii) The mean effective pressure for the cycle.* *Assume the ideal conditions*	**8**	**A**	**1**
2.D	*The compression ratio and expansion ratio of an oil engine working on the dual cycle are 9 and 5 respectively. The initial pressure and temperature of the air are 1 bar and 30°C. The heat liberated at constant pressure is twice the heat liberated at constant volume. The expansion and compression follow the law $pV^{1.25}$ = constant. Determine:* *(i) Pressures and temperatures at all salient points.* *(ii) Mean effective pressure of the cycle.* *(iii) Efficiency of the cycle.* *(iv) Power of the engine if working cycles per second are 8.*	**8**	**A**	**1**

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Date - 14/04/22

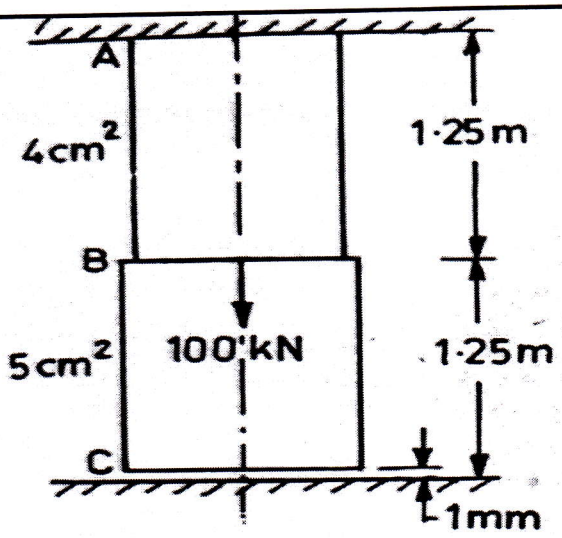
SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY

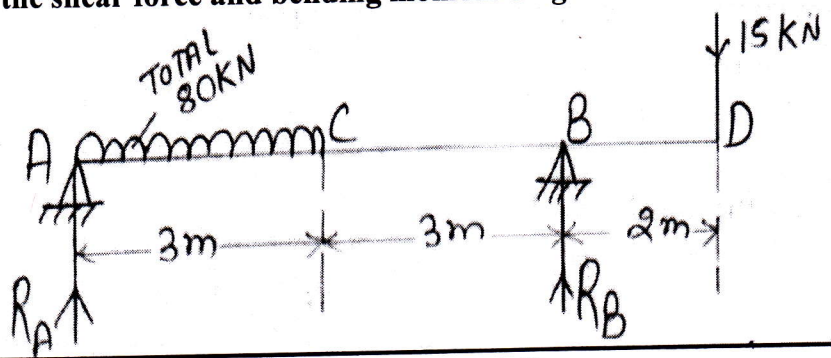
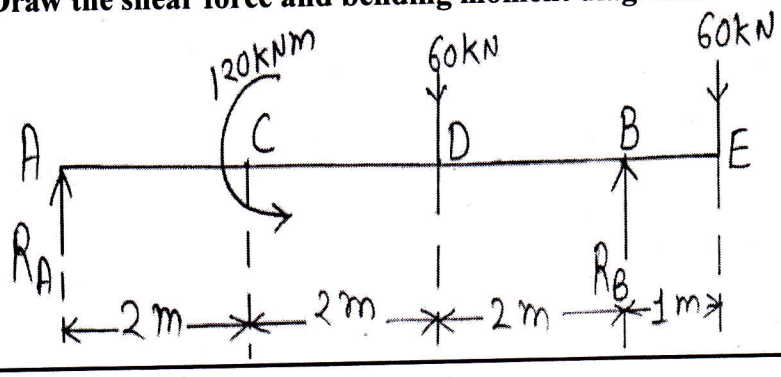
DEPARTMENT OF MECHANICAL ENGINEERING

Class Test – I	**Session- January- June, 2022**	**Month- June, 2022**
Semester- IV	**Subject- Strength of Materials**	
Code – B037413(37)	**Time Allowed: 2 Hours**	**Max Marks: 40**

Note: - For question 1, Part A is compulsory, attempt any Two Parts out of B, C and D. For Question 2, Parts A and B are compulsory, attempt any one part out of Parts C and D.

Q. No	Questions	Marks	Levels of Bloom's Taxonomy	CO
	Question: 1			
1.A	(i) Define Young's modulus of elasticity. (ii) What is Bulk Modulus? (iii) Define normal stress. (iv) What is factor of safety?	4	Remembering	CO1
1.B	Derive the relationship between Bulk Modulus (k) and Young's modulus of elasticity (E).	8	Applying	CO1
1.C	A bar of steel is of square section 60mmx60mm and 180mm long. It is subjected to an axial compressive load of 300kN. Lateral strain is prevented by application of uniform pressure. If Poisson's ratio is 0.3 and young's modulus is $2x10^5$ N/mm^2, find alteration in length of the bar.	8	Applying	CO1
1.D	A steel bar as shown in figure consists of two parts AB and BC having areas of cross section of 4cm^2 and 5cm^2 respectively. It is rigidly fixed at end A and end C is at a distance of 1mm from the other rigid horizontal support. A load of 100kN is applied vertically downward at B. Determine the reactions produced by the rigid horizontal support and the stress in the parts AB and BC of the bar. E=200 GPa.	8	Analyzing	CO1



	Question: 2			
2.A	**Explain the different types of beams with suitable diagrams.**	5	Understanding	CO2
2.B	**Derive an expression for elongation of a conical bar due to its self weight.**	5	Analyzing	CO1
2.C	**Draw the shear force and bending moment diagram.** 	10	Applying	CO2
2.D	**Draw the shear force and bending moment diagram.** 	10	Applying	CO2

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