

School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - G3UB420T - Mechanisms and Machines

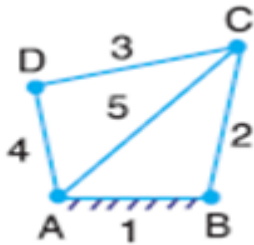
General Instructions

Answer to the specific question asked

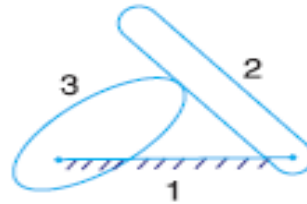
Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

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|----|---|-------|
| 1) | A differential gear in automobiles is used to | K1(2) |
| 2) | State the different types of governors. What is the difference between centrifugal and inertia type governors ? | K2(4) |
| 3) | Describe an application double rocker mechanism is commonly used and explain its function in that application. | K2(6) |
| 4) | Determine the mobility (degrees of freedom) of the mechanism shown below using Kutzbach mobility criterion and classify them. | K3(9) |



and



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|----|---|--------|
| 5) | Derive the general kinematic equations for a six-bar linkage and discuss its applications in complex mechanical systems. | K3(9) |
| 6) | Explain the concept of adaptive control in CNC machines and its significance in modern manufacturing. | K5(10) |
| 7) | A four bar mechanism has the following dimensions : DA = 300 mm ; CB = AB = 360 mm ; DC = 600 mm. The link DC is fixed and the angle ADC is 60°. The driving link DA rotates uniformly at a speed of 100 r.p.m. clockwise and the | K4(12) |
| 8) | Find the power transmitted by a belt running over a pulley of 600 mm diameter at 200 r.p.m. The coefficient of friction between the belt and the pulley is 0.25, angle of lap 160° and maximum tension in the belt is 2500 N. | K5(15) |
| 9) | The driving crank AB of the quick-return mechanism, revolves at a uniform speed of 200 r.p.m. Find the velocity and acceleration of the tool-box R, in the position shown, when the crank makes an | K5(15) |

angle of 60° with the vertical line of centres PA. What is the acceleration of sliding of the block at B along the slotted lever PQ?

10)

A single reduction gear of 120 kW with a pinion 250 mm pitch circle diameter and speed 650 r.p.m. is supported in bearings on either side. Calculate the total load due to the power transmitted, the pressure angle being 20° .

K6(18)