COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE IV SEMESTER EXAMINATION IN MARINE ENGINEERING
JUNE 2020

MRE 1401 MECHANICS OF MACHINERY
(2013 Scheme)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet] /module

Max. Marks: 14 per module

INSTRUCTIONS
1. You have to be available in Google Meet on demand by the faculty.
2. You have to share your '**live location**' to the faculty before uploading the answer sheet.
3. You have to answer only one question per module.
4. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
5. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
6. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
7. You have to put the Question Number correctly.
8. After answering the question, you have to scan and upload the answer page.

MODULE - I
(Answer *ANY ONE* question)

I(1). Briefly explain the third inversion of four bar chain with a neat sketch. (14)

OR

I(2). In a four –link mechanism, the dimensions of the links are as under: (14)
AB = 50mm, BC = 66mm, CD = 56 mm and AD = 100 mm. At the instant when <DAB = 60^0, the link AB has an angular velocity of 10.15 rad/s in the counter – clockwise direction Determine the
    (i) Velocity of the point C.
    (ii) Velocity of the point E on the link BC when BE = 40mm
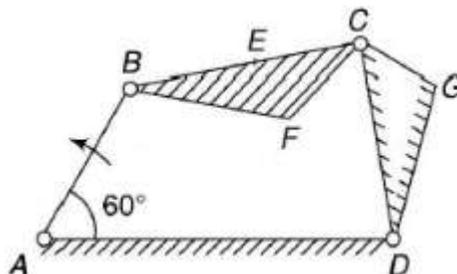
MODULE - II
(Answer *ANY ONE* question)

II(1).   What is a cam? Describe any two types of cam with neat sketch.   (14)

OR

II(2).   A cam with a minimum radius is to be designed for a knife-edge follower with the following data:
  - To raise the follower through 35mm during 60° rotation of the cam
  - Dwell for next 40° of the cam rotation
  - Descending of the follower during the next 90° of the cam rotation
  - Dwell during the rest of the cam rotation

Draw the profile of the cam if the ascending and descending of the cam is with simple harmonic motion and the line of stroke of the follower is offset 10 mm from the axis of the cam shaft.

MODULE - III
(Answer *ANY ONE* question)

III(1).   What are centrifugal governors? How do they differ from inertia governor?   (14)

OR

III(2).   In a Porter governor, each of the four arms is 400 mm long. The upper arms are pivoted on the axis of the sleeve where as the lower arms are attached to the sleeve at a distance of 45mm from the axis of rotation. Each ball has a mass of 8kg and the load on the sleeve is 60kg. What will be the equilibrium speeds for the extreme radii of 250 mm of rotation of the governor balls?   (14)

MODULE - IV
(Answer *ANY ONE* question)

IV(1).   What type of gears is used for parallel, intersecting and skew shafts? Brief it with a neat sketch.

OR

IV(2).   A spur gear has 30 teeth and a module of 1.4 mm. It rotates at 360 rpm. Determine its circular pitch and pitch line velocity.   (14)

MODULE - V
(Answer *ANY ONE* question)

V(1).   Briefly explain the working of a multiplate clutch with the help of a neat sketch.   (14)

OR

V(2).   Determine the maximum power that can be transmitted through a flat belt having the following data: (14)
Cross section of the belt = 300 mm × 12 mm
Ratio of friction tensions = 2.2
Maximum permissible tension in belt = 2 N/mm^2
Mass density of the belt material = 0.0011 g/mm^3