

--	--	--	--	--	--	--	--

***B.Tech. Degree IV Semester Examination in
Marine Engineering June 2015***

MRE 1401 MECHANICS OF MACHINERY

Time: 3 Hours

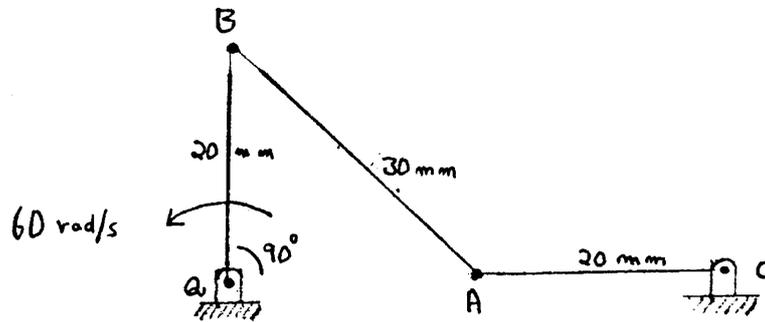
Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Describe the inversions of a slider crank chain.
(b) Derive the expression for the coriolis acceleration when a slider is moving in a rotating link.

OR

- II. For the mechanism shown in figure, determine the angular velocity of link AB.



- III. Draw the profile of a cam operating on a roller reciprocating follower and with the following data:

Minimum radius of cam	=	30 mm
Lift	=	35 mm
Roller diameter	=	15 mm

The cam lifts the follower for 120° with SHM followed by a dwell period of 30° . Then the follower lowers down during 150° of the cam rotation with uniform acceleration and deceleration followed by a dwell period. If the cam rotates at a uniform speed of 150 rpm, calculate the maximum velocity and acceleration of the follower during the descent period.

OR

- IV. The following data relate to a cam profile in which the follower moves with uniform acceleration and deceleration during the ascent and descent:

Minimum radius of cam	=	25 mm
Roller radius	=	7 mm
Lift	=	28 mm
Offset of the roller axis	=	12 mm turns right
Angle of ascent	=	60°
Angle of descent	=	90°
Angle of dwell between ascent and descent	=	45°
Speed of the cam	=	200 rpm

Draw the profile and determine the maximum velocity and the uniform acceleration of the follower during the outstroke.

(P.T.O.)

- V. (a) What is ISOCHRONISM?
 (b) Write notes on:
 (i) Sensitiveness of a governor
 (ii) Effort of a governor
 (iii) Power of a governor

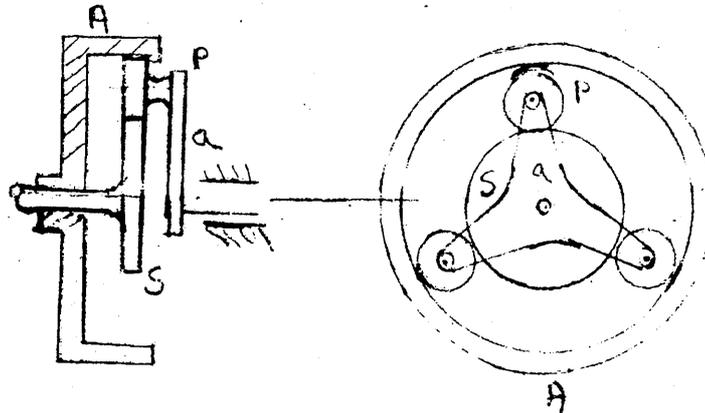
OR

- VI. In a porter governor, each of the four arms is 400 mm long. The upper arms are pivoted on the axis of the sleeve whereas the lower arms are attached to the sleeve at a distance of 45 mm from the axis. Each ball has a mass of 8 kg and the load on the sleeve is 60 kg. What will be the equilibrium speeds for the two extreme radii of 250 mm and 300 mm of rotation of the governor balls?

- VII. Explain the following:
 (i) Interference
 (ii) Pressure angle
 (iii) Worm gears
 (iv) Interchangeable gears

OR

VIII.



The annulus A in the gear shown in figure rotates at 300 rpm about the axis of the fixed wheel S which has 80 teeth. The three armed spider (only one arm is shown in the side view) is driven at 180 rpm. Determine the number of teeth required on the wheel P.

- IX. Explain with neat sketch, any two types of dynamometers and derive the equation to find power of the machine under test.

OR

- X. A flat belt 8 mm thick and 100 mm wide transmits power between two pulleys, running at 1600 m/minutes. The mass of the belt is 0.9 kg/m length. The angle of lap in the smaller pulley is 165° and the coefficient of friction between the belt and the pulley is 0.3. If the maximum permissible stress in the belt is 2 MN/m^2 , find :
 (i) maximum power transmitted
 (ii) initial tension in the belt
