

Unit-IV

15 each

8. Explain in what way the gyroscopic couple affects the motion of an aircraft while taking a turn.
9. Explain the gyroscopic couple and centrifugal couple for stability of a two-wheel vehicle while taking a turn.

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Roll No. :

Total No. of Questions : 9]

[Total No. of Pages : 4

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B.Tech. (ME) 6th Semester (Supplementary)

Examination, July-2021

(G Scheme)

DYNAMICS OF MACHINES

Paper-PCC-ME-308-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following :
 - (i) What are free-body diagrams of a mechanism ?

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(ii) What is meant by static and dynamic unbalance in machinery ?

(iii) What is the function of a governor ?

(iv) Distinguish between brakes and dynamometers.

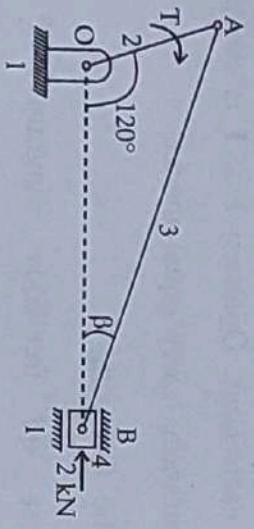
(v) Briefly explain the different types of centrifugal governor.

(vi) What do you mean by spin, precession and gyroscopic planes ?

Unit-I

15 each

2. A slider-crank mechanism with the following dimensions is acted upon by a force $F = 2 \text{ kN}$ at B as shown in Fig. $OA = 100 \text{ mm}$, $AB = 450 \text{ mm}$. Determine the input torque on the link OA for the static equilibrium of the mechanism for the given configuration :



3. State and explain D' Alembert's principle.

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Unit-II

15 each

4. Three masses of 8 kg, 12 kg and 15 kg attached at radial distances of 80 mm, 100 mm and 60 mm respectively to a disc on a shaft are in complete balance. Determine the angular position of the masses of 12 kg and 15 kg relative to the 8 kg mass.

5. Determine the unbalanced forces and couples in case of in-line two-cylinder engine.

Unit-III

15 each

6. In a Hartnell governor, the extreme radii of rotation of the ball are 40 mm and 60 mm, and the corresponding speeds are 210 rpm and 230 rpm. The mass of each ball is 3 kg. The lengths of the ball and the sleeve arms are equal. Determine the initial compression and the constant of the central spring.

7. Describe with sketches of belt transmission dynamometer and explain with detail the calculation involved in finding the power transmitted.

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