



**PART – B**

- 5 The reciprocating masses of first three cylinders of a four cylinder engine are 4.1, 6.2 and 7.4 tonnes. The centre lines of three cylinders are 5.2 m, 3.2 m and 1.2 m from the fourth cylinder. If the cranks of all cylinders are equal. Determine the reciprocating mass of 4<sup>th</sup> cylinder and angular position of crank such that system is completely balanced for the primary and secondary force and couple. If the crank radius 80 cm, connecting rod 3.8 m and speed of the engine 75 rpm. Find the maximum unbalanced secondary force and crank angle at which it occurs. (20 Marks)
- 6 a. Define the following terms:  
 (i) Stability (ii) Sensitiveness (iii) Isochronism  
 (iv) Effort (v) Power (05 Marks)
- b. The arms of a porter governor are each 300 mm long and are pivoted on the governor axis. Mass of each ball is 2 kg. At mean speed 150 rpm. The arm makes 30° with the vertical. Determine the central load and sensitivity of the governor if the sleeve movement is ±25 mm. (15 Marks)
- 7 a. Derive an expression for angle of heel for a motor cycle taking left from with usual notations and neat sketch. (12 Marks)
- b. Explain with sketches the effect of gyroscopic couple while aeroplane steering to right, if engine runs in clockwise when viewed from the tail end. (08 Marks)
- 8 a. Explain with neat sketches different types of cams. (08 Marks)
- b. Draw the profile of a cam operating with knife edge follower for the following data:  
 i) If lifts the follower through 3.75 cm during 60° of rotation with SHM.  
 ii) The follower remains at rest for next 40°.  
 iii) The follower returns to original position for next 90° rotation of cam.  
 iv) The follower remains at rest for the rest of rotation.  
 The least radius of cam is 50 mm, if the cam rotates at 300 rpm. (12 Marks)

\* \* \* \* \*