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of a ship has a mass of 3500 kg. It  
ation of 0.45 m and a speed of 3000  
hen looking from stern. Determine  
ple and its effect upon the ship :  
p is steering to the left on a curve  
us at a speed of 36 km/h.  
p is pitching in a simple harmonic  
ow falling with its maximum velocity.  
pitching is 40 seconds and the total  
acement between the two extreme  
pitching is 12 degrees. 20

**B. Tech. 5th Semester (ME) Examination,**

**December-2015**

**DYNAMICS OF MACHINES**

**Paper-ME-301-F**

*Time allowed : 3 hours]*

*[Maximum marks : 100*

*Note : Attempt any five questions in all. Question No. 1 is compulsory and select at least one question from each section.*

1. (a) What is Static Balancing ? 2×10
- (b) What do you mean by Dynamic Balancing ?
- (c) Write the formula of Primary Unbalanced Force.
- (d) What is Tractive Force ?
- (e) What do you mean by Hammer Blow ?
- (f) What is firing order ?

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**Section–A**

kg, 250 kg, 150 kg and 100 kg are  
ii of rotation are 100 mm, 120 mm,  
m respectively. The angles between  
asses are 45, 70, and 140 degree  
d the position and magnitude of  
s required, if its radius of rotation  
20

he analytical and graphical method  
orque exerted on crank shaft when  
ng rod is considered. 20

**Section–B**

plain the term Balancing of Rotating  
will be harm if the rotating parts of  
ngine are not properly balanced ? 10

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5. Explain the Partial Balancing of Primary Unbalanced Force in Reciprocating Engine with the help of mathematical derivation ? 20

**Section–C**

6. In an engine governor of the Porter type, the upper and lower arms are 200 mm and 250 mm respectively and pivoted on the axis of rotation. The mass of the central load is 15 kg, the mass of each ball is 2 kg and friction of the sleeve together with the resistance of the operating gear is equal to a load of 24 N at the sleeve. If the limiting inclinations of the upper arms to the vertical are  $30^\circ$  and  $40^\circ$ , find, taking friction into account, range of speed of the governor. 20
7. (a) With a neat sketch describe the principle and working of torsion dynamometer. 10