

Seat No.	
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**F.Y. B.Tech. (All Branches) (Semester - I) Examination,  
December - 2018**

**APPLIED MECHANICS (CBCS)**

**Sub. Code : 71819**

Day and Date : Wednesday, 05 - 12 - 2018

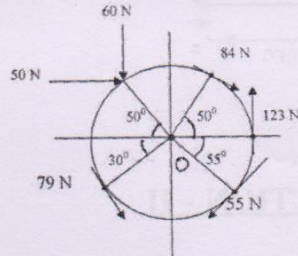
Total Marks : 70

Time : 02.30 p.m. to 05.00 p.m.

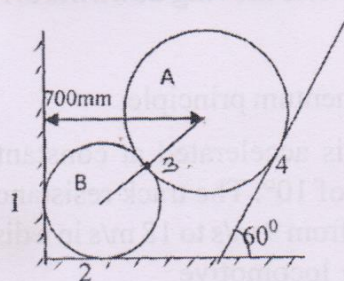
- Instructions :
- 1) Solve any three questions from each section.
  - 2) Assume any data necessary & highlight it in answer sheet.
  - 3) Figures to right indicates full mark.
  - 4) Use of non programmable calculator is allowed.
  - 5) Neat sketches should be drawn wherever necessary.

**SECTION - I**

- Q1) a) Define force system and classify it. [3]  
 b) Find magnitude of resultant for the force system shown in figure. Also find position of resultant w.r.t O. Given radius of circle is 2.5 m. [9]



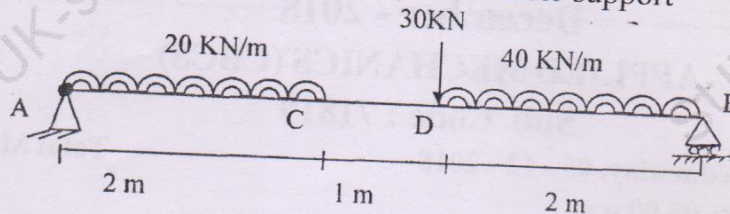
- Q2) a) State and explain Lamis theorem. [3]  
 b) Two spheres A and B of weight 1000 N and 750 N are kept as shown in figure. Determine reactions at all contact points. Radius of sphere A is 400 mm and radius of sphere B is 300mm. [9]



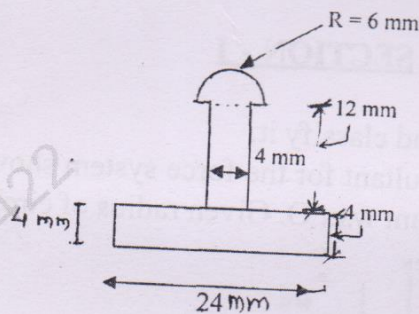
P.T.O.



- Q3) a) Explain different types of supports. [3]  
 b) Determine support reactions for the beam loaded as shown in figure. Support A is hinge support and B is roller support [8]



- Q4) a) State and prove perpendicular axis theorem. [3]  
 b) Determine Polar radius of gyration for given figure about its centroidal axis. [9]



### SECTION - II

- Q5) a) Define Kinetics and Kinematics. [3]  
 b) A lift carries a weight of 3600 N and is moving with a uniform acceleration of  $3.5 \text{ m/s}^2$ . Determine the tension in supporting cable when i) Lift is moving upward ii) Lift is moving downward. Assume  $g = 9.81 \text{ m/sec}^2$  [8]
- Q6) a) Define Impulse momentum principle. [3]  
 b) A 10000 KN train is accelerated at constant rate upward on a plane inclined at an angle of  $10^\circ$ . The track resistance is constant at 10 N/KN. If velocity increases from 9 m/s to 18 m/s in a distance of 500 m, determine power developed by locomotive. [9]



SE - 841

- Q7) a) Define centripetal force and centrifugal force? [3]
- b) A vehicle weighing 10 kN is to turn a circular corner of radius 100 m on a level ground with a speed of 10 m/s. The height of C.G above the road is 1 m and dist between its wheel is 1.5 m. At what maximum speed can it travel corner without fear of overturning? Also find reactions at wheels. [9]
- Q8) a) State difference between elastic and plastic impact. [3]
- b) A mass 12 kg travelling to the right with a speed of 7.5 m/sec collides with another mass 24 kg travelling to left with speed of 25 m/sec. If coefficient of restitution is 0.6, find the velocities of particle after impact. [8]

