



- l) The moment of inertia of a sphere of mass  $m$  and radius  $r$ , about an axis tangential to it, is 01  
 (A)  $2mr^2 / 3$  (B)  $2mr^2 / 5$  (C)  $7mr^2 / 3$  (D)  $7mr^2 / 5$
- m) The unit of moment of inertia of an area is 01  
 (A)  $\text{kg.m}^2$  (B)  $\text{kg.m.s}^2$  (C)  $\text{kg/m}^2$  (D)  $\text{m}^4$
- n) The center of gravity of a semi circle lies at a distance of ..... from its base measured along the vertical radius. 01  
 (A)  $3r/8$  (B)  $4r/3\pi$  (C)  $8r/3$  (D)  $3r/4\pi$

**Attempt any four questions from Q-2 to Q-8**

**Q-2 Attempt all questions (14)**

- (a) Explain briefly the instruments used in chain surveying. 05  
 (b) Explain primary divisions of surveying. 05  
 (c) What are the objects and uses of surveying? 04

**Q-3 Attempt all questions (14)**

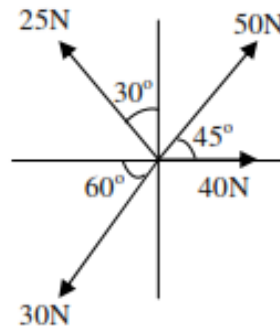
- (a) Explain with sketch functional segments of Global Positioning System (GPS). 05  
 (b) Discuss various characteristics of contour with the help of neat sketches? 05  
 (c) Explain the application of remote sensing. 04

**Q-4 Attempt all questions (14)**

- (a) Enlist types of scale. Describe plane scale and draw a plane scale of 1 cm = 2m. 07  
 (b) What is local attraction in compass? How you can predict the same? 07

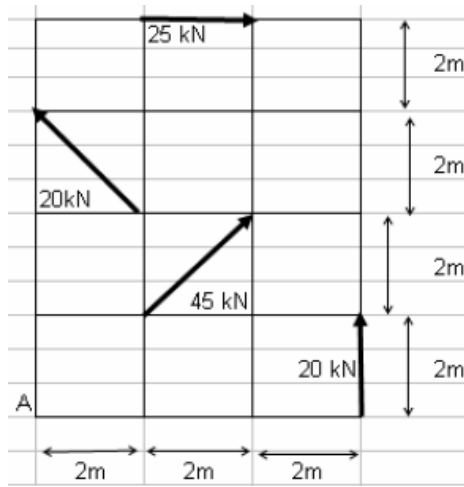
**Q-5 Attempt all questions (14)**

- (a) Determine magnitude and direction of resultant force of the force system shown in figure. 07



- (b) Determine the magnitude direction and position of resultant force of the force system given in figure with reference to point A. 07



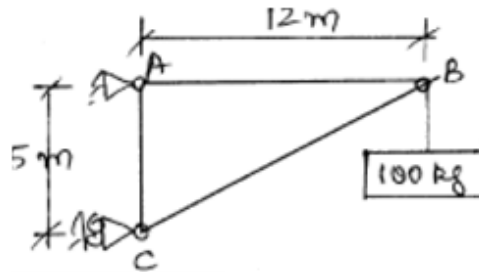


**Q-6** **Attempt all questions** (14)

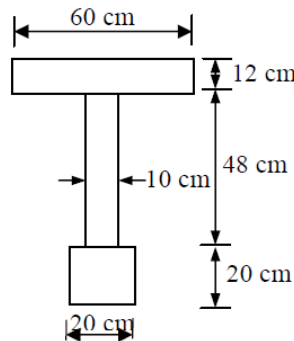
- (a) Explain different type of force system with suitable example and sketch. 07
- (b) Write assumptions made in the analysis of plane truss. Distinguish between perfect, unstable and redundant trusses. Illustrate with sketches. 07

**Q-7** **Attempt all questions** (14)

- (a) Determine forces in member AB, BC and AC of a truss shown in figure using Method of Joints. 07



- (b) Determine moment of inertia of a section shown in figure about horizontal centroidal axis. 07



**Q-8** **Attempt all questions** (14)

- (a) Define the following terms used in compass survey: 05
  - (i) Magnetic bearing, (ii) Whole circle bearing, (iii) Quadrantal bearing, (iv) Magnetic declination, (v) True meridian.
- (b) What is seasoning of timber? Why is it required? State various methods of seasoning. 05
- (c) What is cement? What are its ingredients? 04

