

- e) The 150 kg car A is coasting at freely at 1.5 m/s on the horizontal track when it encounters a car B having a mass of 120 kg and coasting at 0.75 m/s towards it as shown in fig.1.e. If the cars meet and couple together, determine the speed of both the cars just after the coupling. [5x4=20]

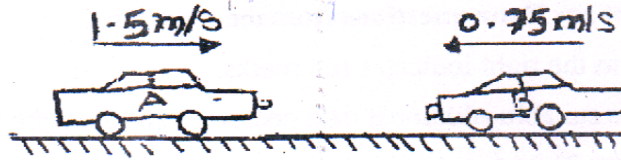


Fig 1.e

- Q2 a) The four tangent forces are acting on the circle of radius 2.4 m. Find the resultant in magnitude and direction and also find the point of application of the resultant. Refer fig.2.a [8]

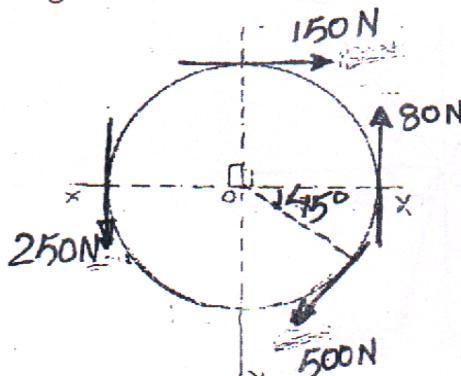


Fig 2.a

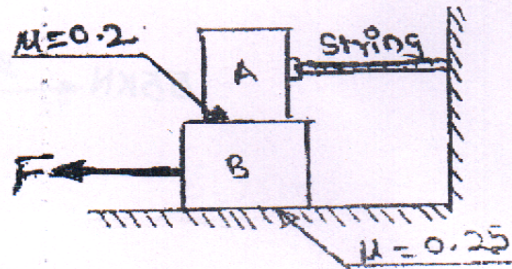


Fig 2.b

- b) In fig.2.b weight of two blocks A and B are 100 N and 150 N respectively. Find the smallest value of the horizontal force F to just move the lower block B if
- The block is restrained by a string. [6]
 - When string is removed. [6]
- c) Track repairs are being carried out over 2 km length of a railway line. The maximum speed of the train is 90 kmph and the repair track should not exceed 36 kmph. The train approaching the repair track decelerates uniformly from 90 kmph to 36 kmph in 200 m. after traveling on the repair track it accelerates to its full speed in 1600 m. Determine the time lost due to track repair. [6]
- Q3 a) Two spheres A and B are resting in a smooth trough as shown in fig.3.a. Find reactions at point 1, 2, 3 and 4. [8]
- b) The motion of the particle is described by x-t and y-t relations as $x = 2(t+2)^2$ and $y = 2/(t+2)^2$. Show that path travelled by the particle is a rectangular hyperbola. Determine velocity and acceleration of the particle at $t = 2$ sec. [6]

[TURN OVER