**PILLAI INSTITUTE OF INFORMATION TECHNOLOGY, ENGINEERING, MEDIA STUDIES & RESEARCH NEW PANVEL – 410 206**

**INTERNAL ASSESSMENT 1**

**SUBJECT: ENGINEERING MECHANICS**

**DIVISIONS: B,C,F,G** **TOTAL MARKS : 20** **TIME: 08:30AM-09:30**

Instruction: Question No.1 is compulsory.

**Q. 1.** Solve any five.(Each question carries 2 marks) **(10m)**

**(a)** Explain the conditions of equilibrium

**(b)** State varignon's theorem

**(c)** Find the resultant force acting on the particle P as shown in fig.1.c

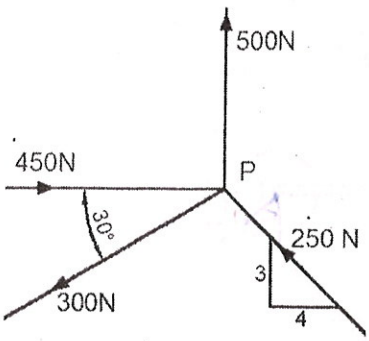


Fig.1.c

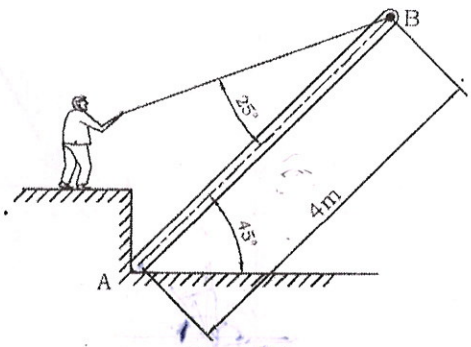


Fig.1.d

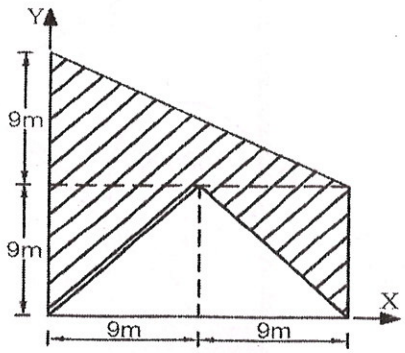


Fig.1.e

**(d)** A man raises a 10 Kg joist of length 4 m by pulling on a rope. Find the tension T in the rope and the reaction at A. Fig.1.d

**(e)** Find the centroid of the given area. Refer Fig.1.e

**(f)** A roller of weight W=1000N rest on a smooth incline plane. It is kept from rolling down the plane by a string AC. Find the tension in the string and reaction at the point of contact D. Fig.1.f

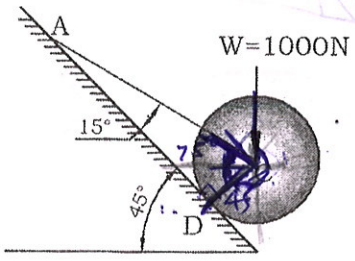


Fig.1.f

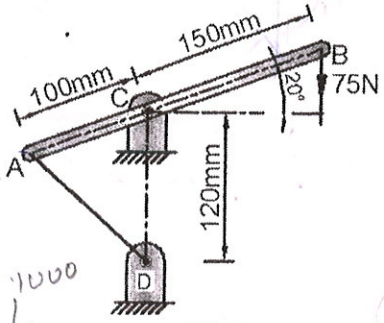


Fig.2.a

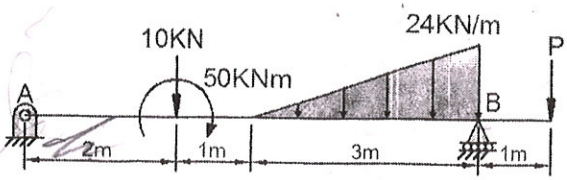


Fig.2.b

**2.(a)** A crane pivoted at the end B is supported by a guide at A. Determine the reaction produced at A and B by a vertical load W = 75KN applied at C. Fig.2.a **(5m)**

**OR**

**(b)** Find analytically the support reaction at B and load P for the beam shown in fig.2.b, if the reaction at support A is Zero. **(5m)**

**3.(a)** A cylinder 1.5 m in diameter and weight 1000 N is a supported by a beam of length 6m and weight 400 N as shown in Fig.3.a Neglecting friction determine (1) Wall reaction at D (2) Tension in the cable BC (3) Reaction at hinged support A. **(5m)**

**OR**

**(b)** A rigid link DEF is supported by cylinders at D and F. It is loaded by a force of 20 KN as shown in Fig.3.b Neglecting friction and self-weights of cylinders and link, calculate support reactions at contact points A, B and C. Diameter of each cylinder is 200 mm. DE = EF = 300 mm. **(5m)**

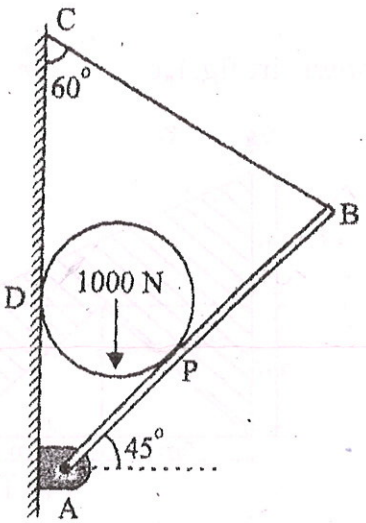


Fig.3.a

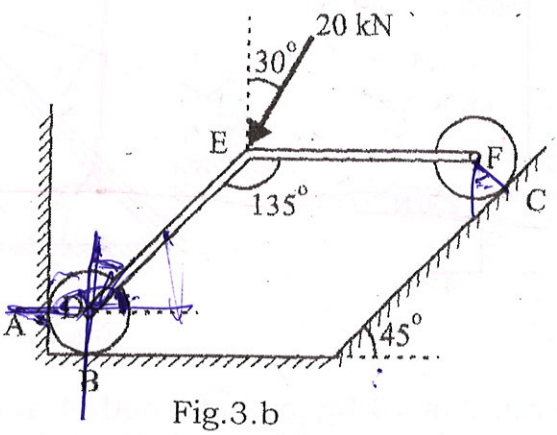


Fig.3.b