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C 14983 (Page 3) Name.....
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COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING)
DEGREE EXAMINATION, MAY 2011
EN 04 107 (A) – ENGINEERING MECHANICS (A)
(For CE, AI, CH, CE, CS, EE, EC, IT, IC, BM, DT, PT)

Time : Three Hours Maximum : 100 Marks

Answer all questions.

Part A
Each question carries 5 marks.

I. (a) State and prove Lamé's theorem.
(b) Explain the different types of forces with neat sketch.
(c) State the factors influencing friction.
(d) What are principal axes and principle moments of inertia ?
(e) Define the term 'support reactions'. Describe the analytical as well as graphical methods for finding out the support reactions of a beam carrying vertical loads only.
(f) What is a plane truss? What are the assumptions made in the analysis of plane trusses ?
(g) State and prove the working energy equation.
(h) State and prove the D'Alembert's Principle. (8 x 5 = 40 marks)

Part B

II. (a) An automobile is pulled by means of trucks as shown in Figure 1. If the resultant of the two forces acting on the automobile is 25 kN being directed along the positive direction of X-axis, determine the angle θ of the cable attached to the truck at B such that the force F_B in this cable is minimum. What is the magnitude of force in each cable when this occurs?

Fig.1.

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