**UNIVERSITY OF ENGINEERING AND TECHNOLOGY TAXILA**

**DEPARTMENT OF INDUSTRIAL ENGINEERING**

**(Mid semester examination)**

Subject: **Engineering Mechanics** Semester: **3rd Semester 2013**

Time Allowed: **2.0 hours** Max Marks: **20**

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| **Q1** | **Fill in the blanks**  15 Slug = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Kg  20 ft = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m  33 lb = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_N  29 pound mass = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Kg | **2** |
| **Q2** | **A).** Determine the *x* and *y* components of each of the forces shown.  **B).** Knowing that α = 55o and that boom *AC* exerts on pin *C* a force directed along line *AC*, determine (*a*) the magnitude of that force, (*b*) the tension in cable *BC*.   |  |  | | --- | --- | |  |  | | Fig: Q2 (A) | Fig: Q2 (B) | | **6** |
| **Q3** | **A).** Cable *AC* is 70 ft long, and the tension in that cable is 5250 lb. Determine (*a*) the *x*, *y*, and *z* components of the force exerted by the cable on the anchor *C*, (*b*) the angles u*x,* u*y,* and u*z* defining the direction of that force.  **B).** A frame *ABC* is supported in part by cable *DBE* that passes through a frictionless ring at *B*. Knowing that the tension in the cable is 385 N, determine the components of the force exerted by the cable on the support at *D*.   |  |  | | --- | --- | |  |  | | Fig: Q3 (A) | Fig: Q3 (B) | | **6** |
| **Q4** | **A).** A transmission tower is held by three guy wires attached to a pin at *A* and anchored by bolts at *B*, *C*, and *D*. If the tension in wire *AB* is 630 lb, determine the vertical force **P** exerted by the tower on the pin at *A*.    **B).** A cube of side a= 15cm is acted upon by a force **P** as shown. Determine the moment of **P** (a) about A, (b) about the edge AB, (c) about the diagonal AG of the cube. | **6** |