TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
**Examination Control Division**

**2078 Bhadra**

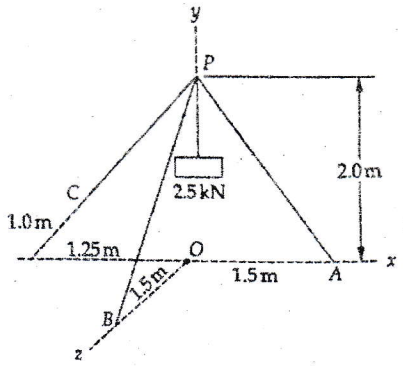
| Exam. | Regular | | |
|---|---|---|---|
| Level | BE | Full Marks | 80 |
| Programme | BEL, BEX, BCT, BAM, BIE, BAG, BAR, BAS | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

***Subject:*** - Applied Mechanics *(CE 401)*

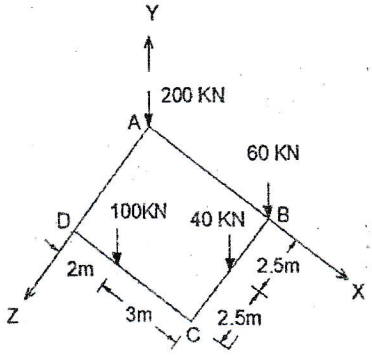
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain the basic concepts used to study the condition of rest or motion of particles and rigid body under the action of force. Define transmissibility of force. [2+2]

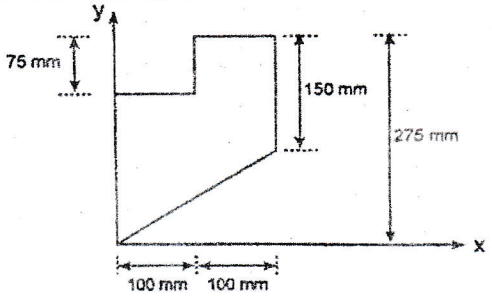
2. A tripod supports a load of 2.5 kN at point P as shown in figure. The end points A, B, C of the three legs in the x-z plane. Make calculations for the force developed in each leg. Explain free body diagram and its importance. [6+4]




3. How does "Varignon's theorem" differ from "Principle of Moments"? Explain. Determine the magnitude and point of application of resultant for a system of force consisting of a square foundation ABCD supporting the four column loads as shown. [3+6]

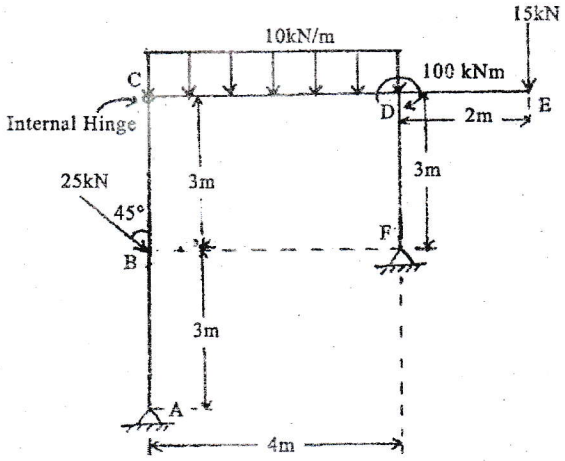



4. State & prove parallel axis theorem. Calculate polar moment of inertia of the given composite area about its centroidal axis. [4+8]

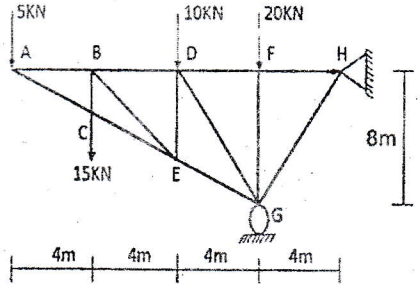


5. What is impending motion? Explain why coefficient of static friction is always greater than that of the kinetic friction coefficient? [2+2]

6. Draw axial force, shear force and bending moment diagram for the given frame. Also indicate salient features if any: [13]



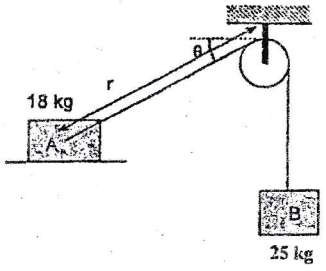

7. Determine the member force in member BE, BD, FG and EG of given loaded truss. [8]




8. Explain about dependent motion of particles with suitable example. The acceleration of a particle is defined by the relation $a = kt - 4$. Knowing that $v = 4m/s$ when $t = 2s$ and $v = -1m/s$ when $t = 1s$. Determine the value of constant k and write the equations of motion when $x = 0$ at $t = 3s$. [2+8]

9. Explain angular momentum and rate of change of angular momentum. The velocity of the block A is 2 m/sec to the right at the instant when $r = 0.73$ and $\theta = 30°$. Neglecting mass of the pulley and effect of friction, determine at this instant. [2+8]

(i) tension in the cable
(ii) acceleration of block A
(iii)acceleration of block B

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