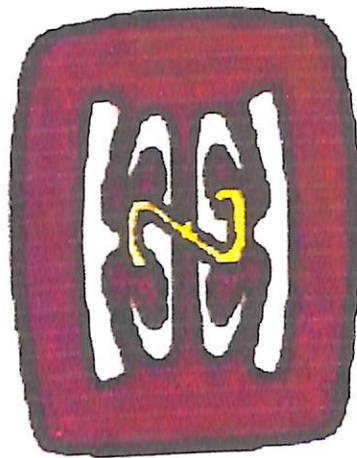


**PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING**

EXAMINATION QUESTION PAPERS



**EN 122
ENGINEERING MECHANICS
SEMESTER TWO - 2022**

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

ALL 1st YEAR ENGINEERING DEGREE STUDENTS

SECOND SEMESTER EXAMINATIONS – 2022

EN122 ENGINEERING MECHANICS

MONDAY, 24TH OCTOBER 2022 – 08.20 AM-11:20AM

TIME ALLOWED: 3 HOURS

INSTRUCTIONS FOR CANDIDATES:

1. You have 10 minutes to read the paper. You **MUST NOT** begin writing during this time.
2. Answer **ALL questions** and you can do them in any order.
3. Use only ink. Do not use pencil for writing except for drawings and sketches.
4. Start each question on a new page and show all your calculations in the answer book provided. No other written material will be accepted.
5. Write your NAME and STUDENT ID NUMBER clearly on the front page of the answer book. **Do it now.**
6. Calculators are permitted in the examination room. **Notes, textbooks or smart phones are NOT allowed.**
7. Each question carries equal marks
8. Any student caught cheating will be penalized

Question 1	_____ /20 Points
Question 2	_____ /20 Points
Question 3	_____ /20 Points
Question 4	_____ /20 Points
Question 5	_____ /20 Points

Question 1

- a) Explain the principle of transmissibility with an aid of a diagram (5 Mrks)
- b) Briefly discuss concurrent and non-concurrent forces and give an example of each (5 Mrks)
- c) Two bars AC and CB are hinged together at C as shown in the Fig.1. Find the forces induced in the bar. Assume weight of bars as negligible. (10 Mrks)

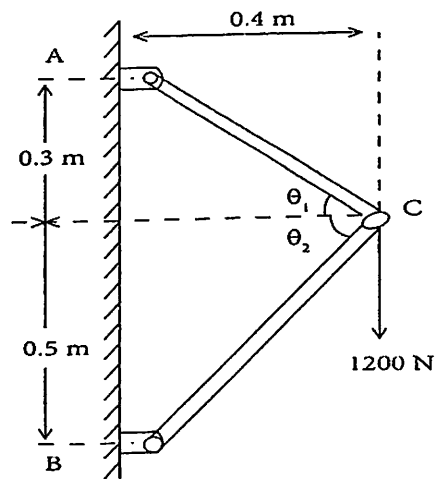


Fig.1

Question 2

- a) Explain why it is important to know the centre of gravity (5 Mrks)
- b) Describe centroid of a beam (5 Mrks)
- Determine the centroid of I-section as shown in Fig.2. (10 Mrks)

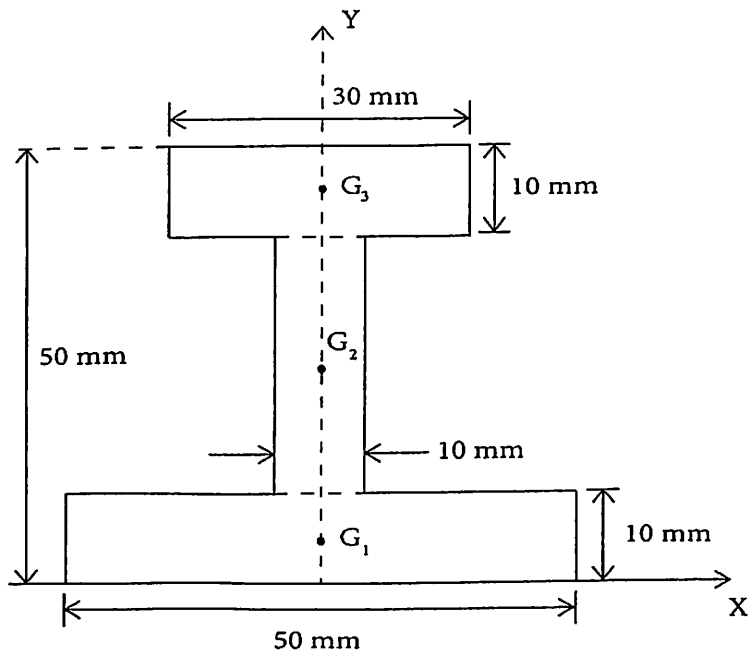


Fig.2

Question 3

- a) Name at least two types of beams and show with diagram (5 Mrks)
- b) Name at least two types of loads and beams, showing in a diagram (5 Mrks)
- c) Draw S.F.D. and B.M.D. for simple supported beam as shown in Fig. 3 (10 Mrks)

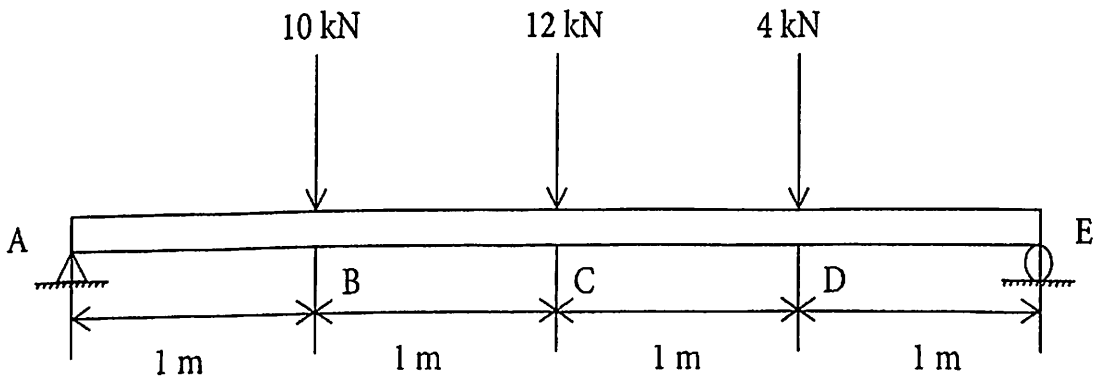


Fig.3

Question 4

- a) State D'Alembert's Principle (5 Mrks)
- b) State Newton's third Law (5 Mrks)
- c) A block of 50 kg mass rests on a rough horizontal surface, whose coefficient of kinetic friction is 0.3. It is being pulled by a constant force of 100 N as shown in Fig.4. Determine the velocity and distance travelled by the block after 2 seconds. (10 Mrks)

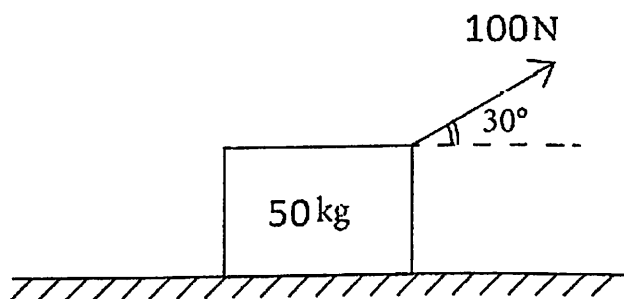


Fig.4

Question 5

- a) Define work, power and energy (10 Mrks)
- b) A 40 kg block is lying on an inclined rough plane as shown in Fig.5. It is pulled by 600 N force by means of a rope parallel to inclined plane. If the initial velocity of the 40 kg block is 2.4 m/sec then determine the final velocity of the block after traversing 5 m on inclined plane by using: (10 Mrks)

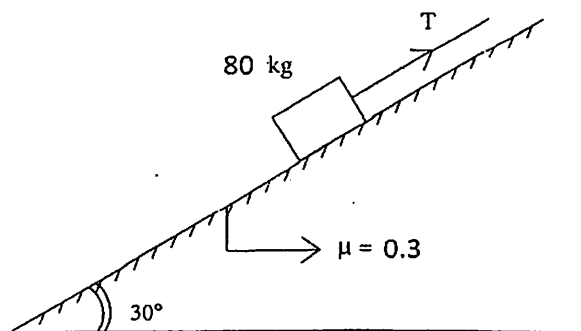


Fig.5.