CINEC CAMPUS
Beyond A Graduate

Faculty of Engineering & Technology

Bachelor of Science Honours in Engineering

ME1312 – Engineering Drawing

FINAL EXAMINATION PAPER

Date : **July 2026**

Examiner : **Virantha E.A.I**

Time Allowed: 3 Hours

INSTRUCTIONS TO CANDIDATES

- The question paper consists of **one** question in two pages.

MATERIALS REQUIRED

- A2 size drawing sheet
- Drawing tools including compass set and triangles

A pictorial view of A PRESS-BRACKET is shown in Figure below. Draw by first angle of projection.

(a) Sectional front view, looking in the direction-X, take section along A-A.

(b) End elevation viewing in the direction of arrow Y

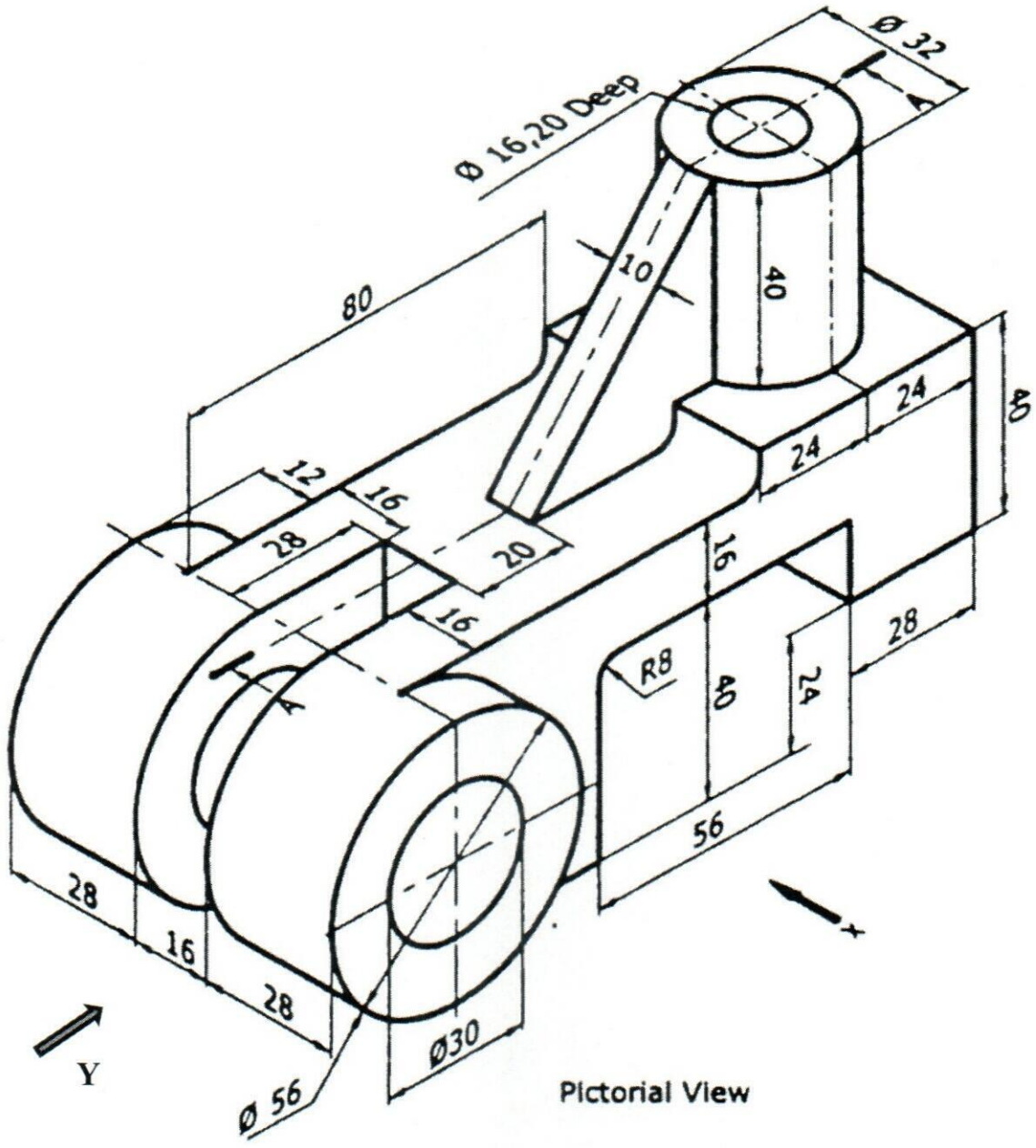
(c) Plan

Complete the drawing by inserting the projection symbol, title, subtitles, and scale. Any unspecified dimension is for the discretion of the candidate.

Select the suitable scale and any data which is not given you can assume.

Marking Scheme

1.	Accuracy of view (a)	25 Marks
2.	Accuracy of view (b)	20 Marks
3.	Accuracy of view (c)	25 Marks
4.	Alignment of views	10 Marks
5.	Spacing	10 Marks
6.	Title block, Projection symbol, Lettering	05 Marks
7.	Final Appearance	05 Marks



Pictorial View

Faculty of Engineering & Technology

Bachelor of Science Honours in Engineering

CINEC CAMPUS
Beyond A Graduate

CE1314 MECHANICS

REPEAT FINAL EXAMINATION PAPER (Batch-8)

Date	:	**21st July 2026**
Examiner	:	**Janaka Liyanagama / Kapila Khemarathna**
Time Allowed	:	**Three Hours**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **five** questions.
- Answer **all Five** questions.
- Show all stages of your work
- You should write legibly in black or blue ink.

MATERIALS REQURIED

- Eight page answer booklets.
- You may use a scientific calculator. This must not be programmable, and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the exam.
- Additional Information and Figures are presented on ***page 4*** of the examination paper.
- Give your answers to two decimal places.

Attempt All Questions

1 (a) For the beam arrangement shown as **Figure 1**, determine all the reaction forces. Take the self-weight of the beam as **305.81 kg/m**. 03%

(b) Produce a fully labelled **Shear Force Diagram** 05%

(c) Produce the bending moment diagram showing clearly the values of bending moment at **B, C and D**. 08%

(d) Determine the position of **maximum bending** and calculate the bending moment at this position. Clearly show this position on your shear force and bending moment diagrams 04%

2 (a) A **6mm** diameter high tensile steel cable is used to winch people to safety from a rescue helicopter. Assuming the steel has a Modulus of Elasticity, **E= 200kN/mm²**. Determine :

(i) the stress in the steel cable when two people (one **90kg** the other **70kg**) are being lifted (answer in N/mm²). 02%

(ii) final length of the cable, in mm, if it's original length before the load of the people is applied was **12 m**. (ignore the self weight of the cable). 04%

(iii) the maximum number of people that the cable can safely carry (assuming an average person has a mass of **80kg**), if the stress in the cable should not exceed **460N/mm²**. 04%

(b) In a tensile test on a steel rod the following data was recorded: applied load = **20kN**,
bar diameter = **12mm**,
reduction in diameter = **0.003mm**,
test length = **240mm**,
extension in test length = **0.150mm**
Determine **Poisson's ratio** ν and the **Modulus of Elasticity, E** for the material (**answer in kN/mm²**). 10%

3 (a) The principal stresses at a point in a piece of material are **80N/mm²** tension and **20N/mm²** compression. With the use of a Mohr's circle of stress determine the normal and shear stresses on a plane inclined by **40 degrees** to the direction of the major principal stress. 10%

(b) Using the **Method of Joints**, determine the force in each member of the frame, shown in **Figure 3**. Indicate, whether the member is subjected to Tension or Compression. 10%

4 An I shaped beam section is presented as **Figure 4** on page 4. The beam carries a bending moment of 80kNm about the **X-X axis**, which induces **tension above** the neutral axis.

(a) Calculate the stresses due to bending at **A, B, C** and **D**. State clearly whether the stresses are compressive or tensile. Present your answers in **N/mm²**, to two decimal places. 12%

(b) The beam is then further loaded by a direct axial compressive force of **200kN**. Determine the total stresses at **A, B, C** and **D** 04%

(c) Briefly describe the procedure to determine the bending stresses if bending is induced about the **y-y axis.** 04%

5 (a) Find the degree of freedom in the link mechanism given in Figure-5(a). 10%

(b) A solid shaft of 120mm diameter is required to transmit 200 kW at 100rpm. If the angle of twist is not to exceed 2^0, find the length of the shaft. Take modulus of rigidity for the shaft material is 90 GPa. 10%

End of Questions

Additional Information

Acceleration due to gravity, g = 9.81m/s^2.

Parallel Axis Theorem, $I_x = I_1 + a_1c_1^2 + I_2 + a_2c_2^2 + \cdots + I_n + a_nc_n^2$

I_{xx} for a rectangle = $\frac{bd^3}{12}$ Bending Theory Equation $\frac{\sigma}{y} = \frac{M}{I} = \frac{E}{R}$

General torsion expression $\frac{T}{J} = \frac{\tau}{r} = G\frac{\theta}{L}$

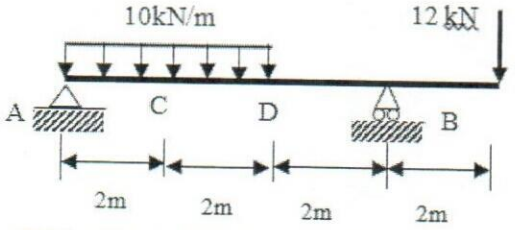
Polar second moment of area for a solid shaft $J = \frac{\pi}{32}(D^4)$

Power = 2πNT/60

Gruebler's equation $F = 3(n-1) - 2l - h$

$V = r\omega$

Figures



Self-weight of the beam is 305.81kg/m

Figure-1

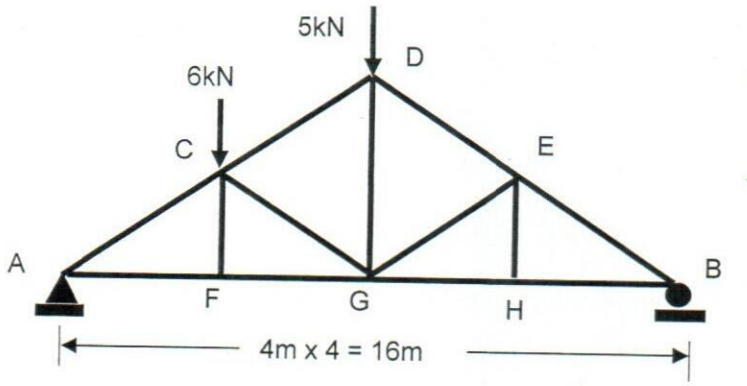


Figure 3

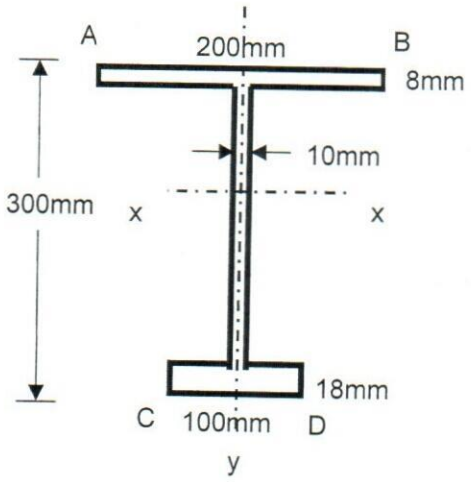


Figure-4

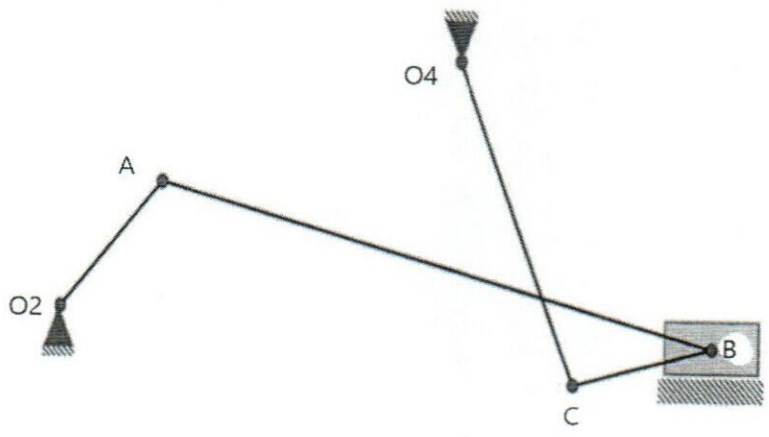


Figure-5(a)