# HILLCREST HIGH SCHOOL

## GRADE 12

## ENGINEERING GRAPHICS AND DESIGN
## JUNE EXAMINATIONS 2022
## PAPER 2

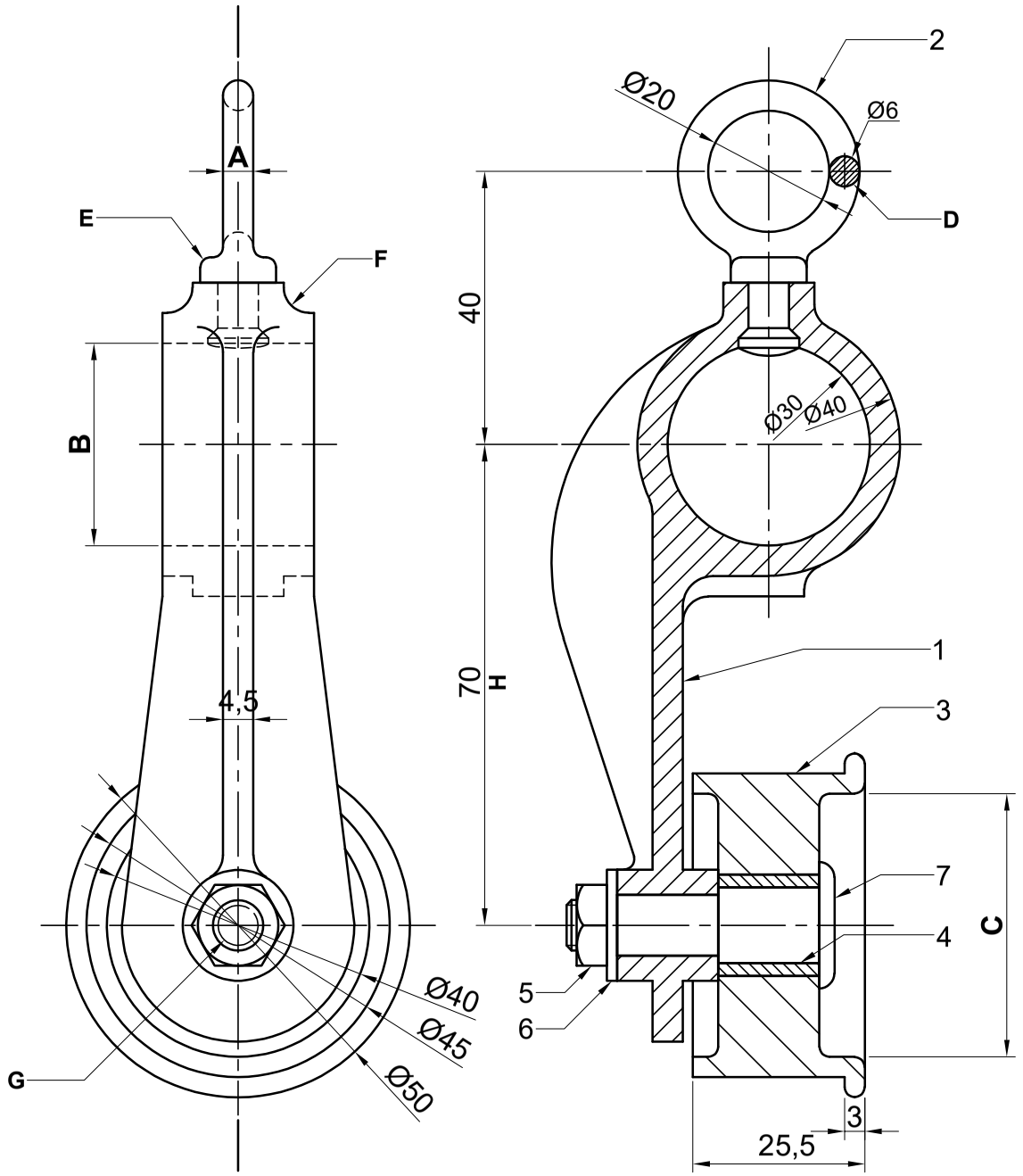
**MARKS : 150**
**TIME : $2\frac{1}{2}$ HOURS**

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of THREE questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER, asinstructed.
7. ALL the pages, irrespective of whether the questionwas attempted or not, must be re-stapled in numerial sequence in the TOP LEFT-HAND CORNER ONLY.
8. Time management is essential in order to complete all the questions.
9. Print your name in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

| FOR OFFICIAL USE ONLY | | | | | | | |
|---|---|---|---|---|---|---|---|
| QUESTION | LEARNERS MARK | | | | MODERATED MARK | | |
| ONE | | | | 30 | | | |
| TWO | | | | 30 | | | |
| THREE | | | | 90 | | | |
| TOTAL | | | | | | | |
| | 1 | 5 | 0 | | | | |

| FINAL CONVERTED MARK | CHECKED BY |
|---|---|
| $\frac{\quad}{100}$ | |




VIEW 1




VIEW 2

**QUESTION 1 : MECHANICAL ANALYTICAL**

**Instructions:**
Complete the table below by neatly answering the questions, which all refer to the accompanying detailed drawing and the title block. [30]

| QUESTIONS | | ANSWERS | | | |
|---|---|---|---|---|---|
| 1 | Who drew the drawing ? | | | | 1 |
| 2 | Who checked the drawing? | | | | 1 |
| 3 | Who approved the drawing ? | | | | 1 |
| 4 | What is the total height of the assembly ? | | | | 2 |
| 5 | What is the thickness of the WEB? | | | | 1 |
| 6 | What is the maximum width of belt/strap that would fit on the wheel? | | | | 1 |
| 7 | What are the correct dimensions for A, B and C? | A | B | C | 3 |
| 8 | Identify the feature at D. | | | | 1 |
| 9 | Identify the feature at E. | | | | 1 |
| 10 | Identify the feature at F. | | | | 1 |
| 11 | What does the incomplete circle at G represent ? | | | | 1 |
| 12 | Identify the part labeled 4? | | | | 1 |
| 13 | Identify the part labeled 6? | | | | 1 |
| 14 | If the assembly was drawn to scale 1:5, what would dimension **H** read? | | | | 1 |
| 15 | At what angle is the end of the STUD chamfered? | | | | 1 |
| 16 | At what angle are the hatch lines drawn? | | | | 1 |
| 17 | Complete the drawing of the section plane AA in VIEW 1. | | | | 4 |
| 18 | What is the correct name for VIEW 2? | | | | 1 |
| 19 | What system of projection was used to draw the assembly? | | | | 1 |
| 20 | Draw ,freehand,the projection symbol in the space provided. | | | | 5 |
| **TOTAL : 30** | | | | | |

| RAIL-TRANSPORT HANGER | | |
|---|---|---|
| SCALE | 1 : 2 | |
| DRAWN BY | R. MOHUNLAL | 08/04/2015 |
| CHECKED BY | S.V. MOODLEY | 27/04/2015 |
| APPROVED BY | N. WARD | 14/05/2015 |
| **SCOTT ENGINEERING** | | |
| 2175 MARITIME DRIVE, WHARFDALE | | |

| PARTS LIST | | | |
|---|---|---|---|
| | PART | QUANTITY | MATERIAL |
| 1 | HANGER | 1 | STEEL |
| 2 | EYEBOLT | 1 | STEEL |
| 3 | WHEEL | 1 | STEEL |
| 4 | refer to Q12 | 1 | STEEL |
| 5 | M10 HEXAGONAL NUT | 1 | STEEL |
| 6 | refer to Q13 | 1 | STEEL |
| 7 | STUD | 1 | STEEL |

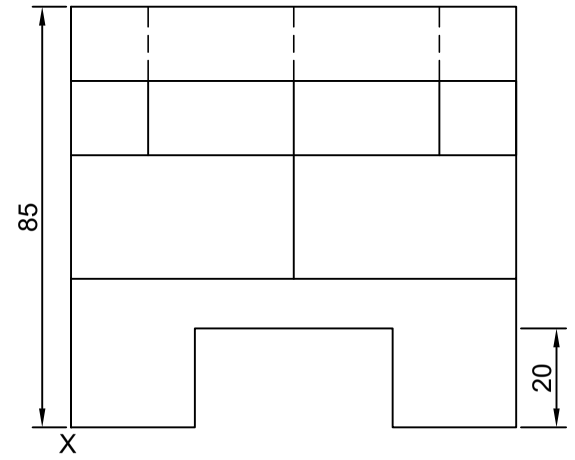
QUESTION 20

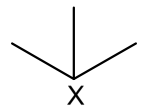
**QUESTION TWO: ISOMETRIC DRAWING**

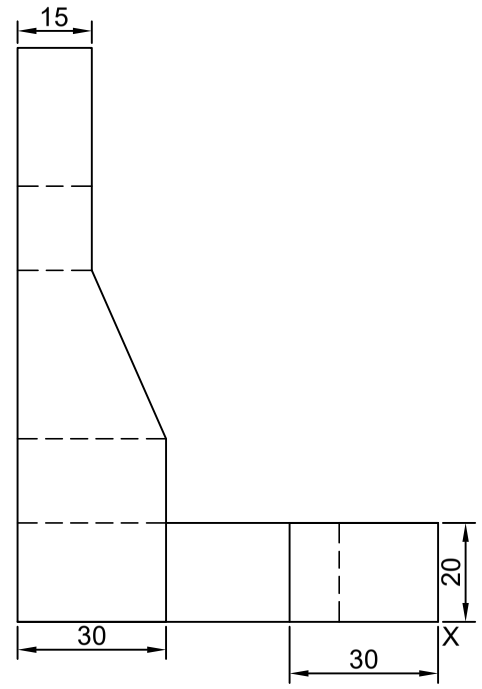
**Given:**
The front, top and left view of a jig with a regular hexagonal hole.
The position of point X on the drawing sheet.

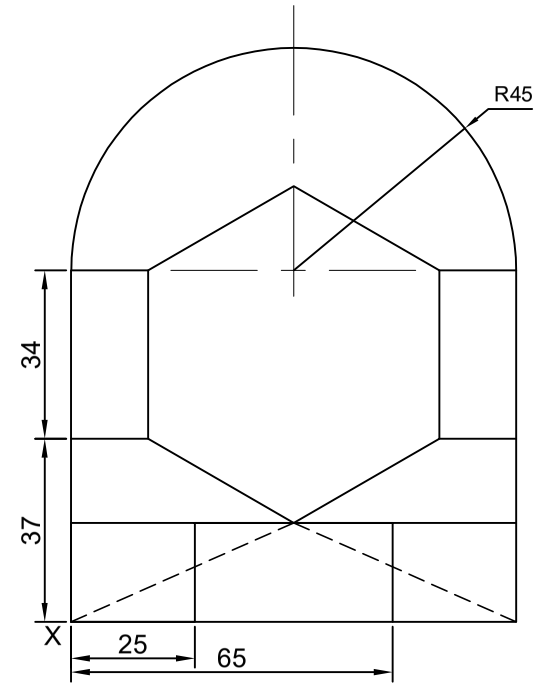
**Instruction:**
Use scale 1 : 1 and convert the orthographic views of the jig into an isometric drawing.

- Make point X the lowest point of your drawing.
- Show ALL necessary construction.
- NO stencils may be used.
- NO hidden detail in required. [30]

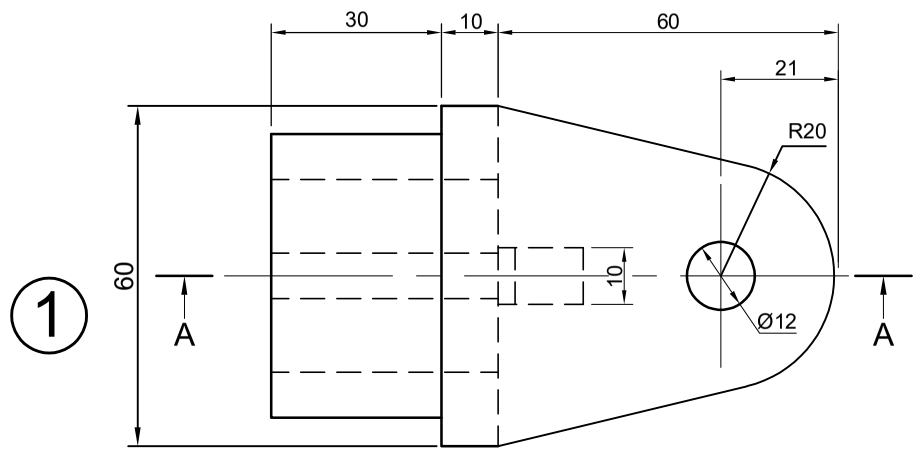


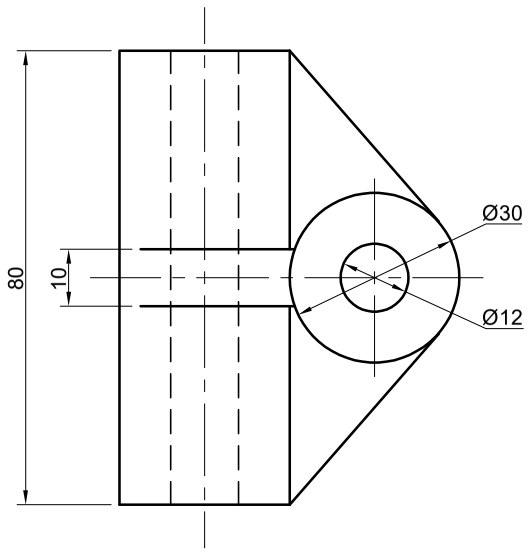



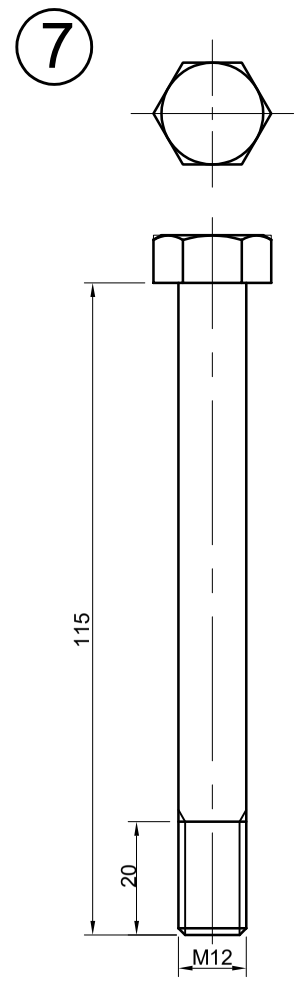



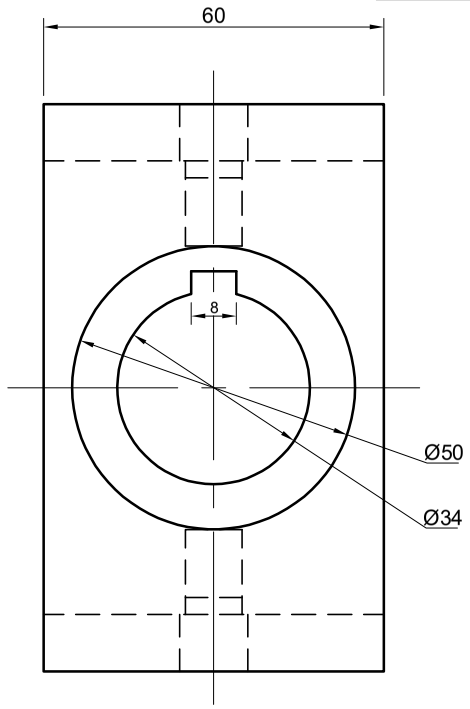



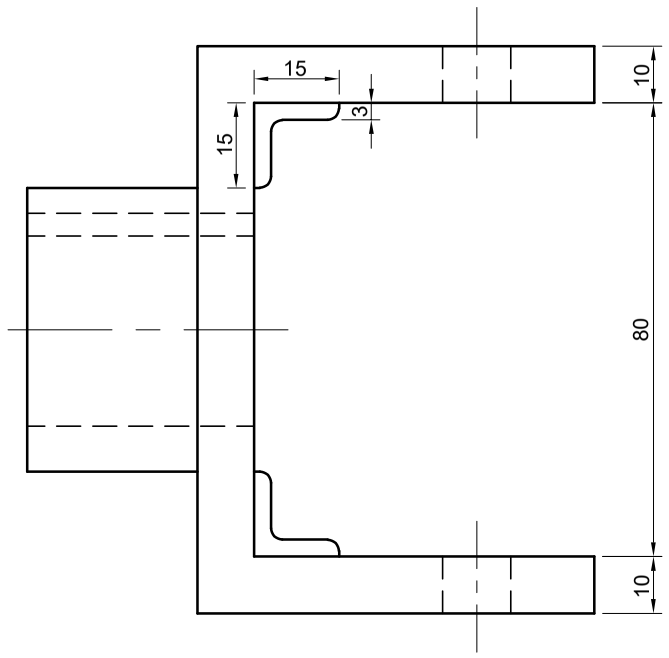

| ASSESSMENT CRITERIA | | | | | |
|---|---|---|---|---|---|
| | | POSSIBLE | OBTAINED | SIGN | MODEARTE |
| 1 | AUXILIARY VIEW | 2 | | | |
| 2 | ISOMETRIC LINES | 13 | | | |
| 3 | NON-ISOMETRIC LINES + HEXAGON | $9\frac{1}{2}$ | | | |
| 4 | CIRCLE + CENTRE LINES + CONSTR. | $5\frac{1}{2}$ | | | |
| | TOTAL | 30 | | | |

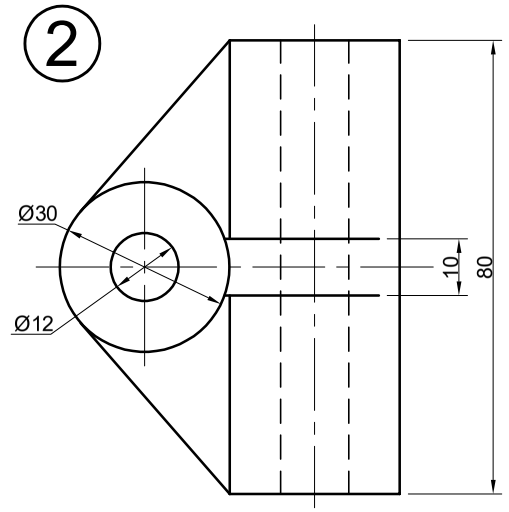


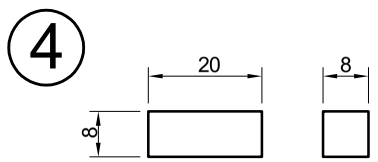



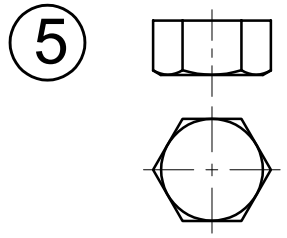



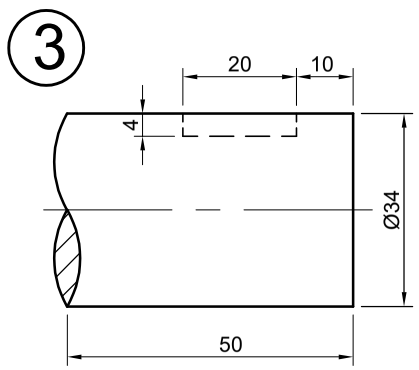



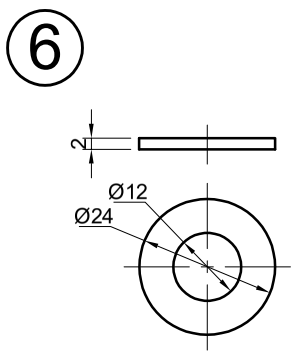



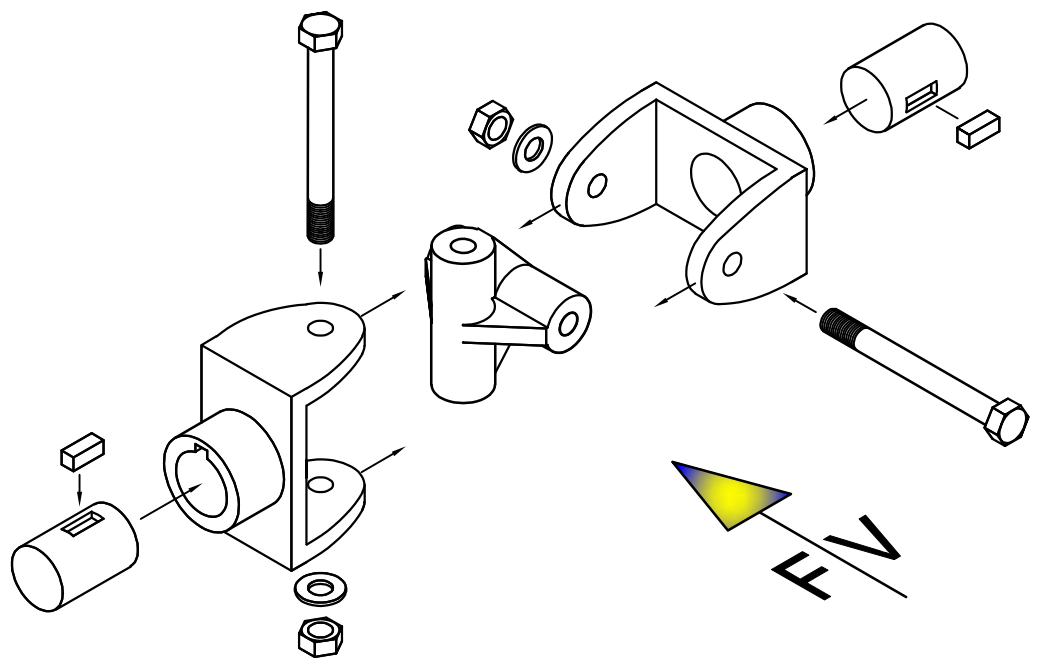




EXPLODED ISOMETRIC DRAWING



**QUESTION 3 : MECHANICAL ASSEMBLY**

**Given:**

- The exploded isometric drawing of the parts of a UNIVERSAL COUPLING assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the UNIVERSAL COUPLING assembly

**Instructions:**

- Answer this question on page 5.
- Draw, to scale 1:1 and in third-angle orthographic projection, the following views of the assembled parts of the stop valve assembly:

**3.1** **A sectional front view** on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the centre of the assembly, is shown on the top view of the forked end (part 1).

**3.2 The left view**

- ALL drawing must comply with the guidelines contained in the *SABS 0111.*

**NOTE:**

- Show THREE faces of the nut and bolt in the front view and ALL necessary construction.
- NO hidden details are required.
- Show all centre lines and the section plane.
- Label the views. **[90]**

## PARTS LIST

| PART | ITEM | QTY |
|---|---|---|
| 1 | FORKED END | 2 |
| 2 | CENTRAL BLOCK | 1 |
| 3 | SHAFT | 2 |
| 4 | KEY | 2 |
| 5 | M12 NUT | 2 |
| 6 | WASHER | 2 |
| 7 | LONG BOLT | 2 |

RM ENGINEERING
273 RISMO PLACE
BHOWANI HILLS
2000

ANY DIMENSIONS NOT GIVEN MAY BE ASSUMED TO REASONABLE PROPORTION

ALL DIMENSIONS ARE IN MILLIMETERS

SCALE 1:1

| ASSESSMENT CRITERIA | | | |
|---|---|---|---|
| **SECTIONAL FRONT VIEW** | | | |
| 1 | LEFT FORKED END | 10 | |
| 2 | LEFT SHAFT & KEY | 5 | |
| 3 | LONG BOLT | 9 | |
| 4 | WASHER | 2 | |
| 5 | M12 NUT | 4 | |
| 6 | CENTRAL BLOCK | 6 | |
| 7 | RIGHT FORKED END | 9 | |
| 8 | RIGHT SHAFT & KEY | 5 | |
| 9 | HATCHING($\frac{20}{2}$) | 10 | |
| **SUBTOTAL** | | **60** | |
| **LEFT VIEW** | | | |
| 1 | M12 NUT & BOLTS($\frac{18}{2}$) | 9 | |
| 2 | FORKED ENDS | 11 | |
| **SUBTOTAL** | | **20** | |
| **GENERAL** | | | |
| 1 | CENTRE LINES | 2 | |
| 2 | ASSEMBLY | 6 | |
| 3 | LABELS | 2 | |
| **SUBTOTAL** | | **10** | |
| **TOTAL** | | **90** | |