

2501/301 2503/301 2509/301

2502/301 2508/301

COMPUTER AIDED DESIGN

June/July 2022

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN MECHANICAL ENGINEERING
(PRODUCTION OPTION)(PLANT OPTION)
DIPLOMA IN AUTOMOTIVE ENGINEERING
DIPLOMA IN WELDING AND FABRICATION
DIPLOMA IN CONSTRUCTION PLANT ENGINEERING**

MODULE III

COMPUTER AIDED DESIGN

3 hours

INSTRUCTIONS TO CANDIDATES

You have TEN minutes to read through the instructions and the questions paper before the examination.

You should have the following for this examination:

Computer installed with a CAD program;

An A4 printer;

Re-writable CD to save your work.

This paper consists of THREE sections: A, B and C. Answer FOUR questions as follows:

Answer ONE Question from Either section A or B according to area of specialization and THREE questions from section C.

Create a folder named CADJ22-XXXXXXX on your desktop, where XXXXXXX is your college code and index number. Save all your working in this folder.

Save your work on the CD provided and clearly indicate your full index number and name on the CD.

Print your work on A4 papers and clearly indicate your name and index number on each page.

Hand over the CD to the invigilator at the end of the examination.

Maximum marks for each part of the question are included.

The supervisor will print the commandline interface to be handed in together with your work.

All drawing questions should be answered using CAD program.

Candidates should answer the questions in English.

(Approximate the dimensions that are not indicated)

This paper consists 8 printed pages.

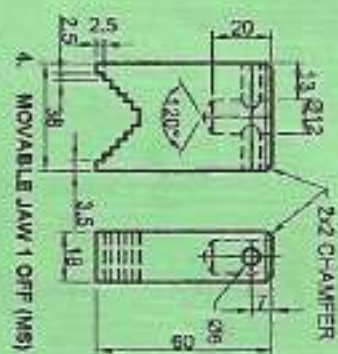
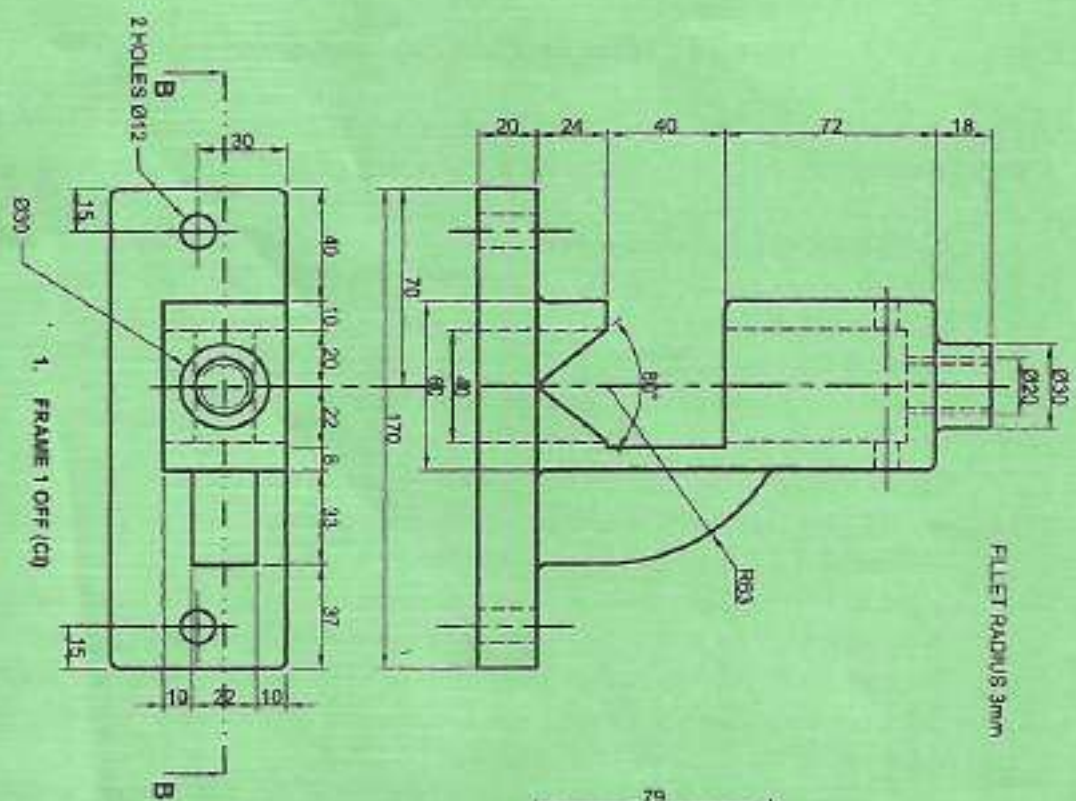
Candidates should check the question paper to ascertain that all the pages are printed as indicated as printed and that no questions are missing.

SECTION A

COMPULSORY for Production, Automotive, Welding and Fabrication and Construction Plant Engineering Options.

41. Figure 1 shows the parts of a Pipe clamp. Draw in First angle projection, the following views of the assembled Pipe clamp holding a galvanised steel pipe of external diameter 30 mm, thickness 5 mm and 60 mm long:
- (a) The sectioned Front Elevation in the direction of arrow BB.
 - (b) The end elevation.
 - (c) Include the following:
 - (i) six major dimensions;
 - (ii) parts list. (40 marks)

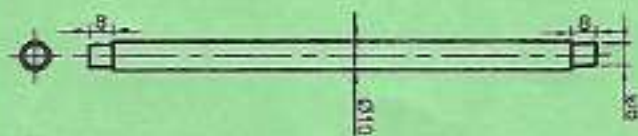
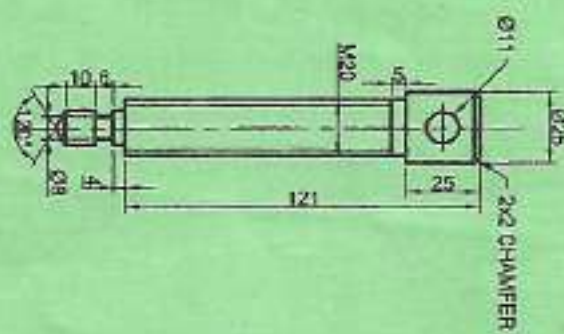
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3. SCREW 1 OFF (MS)

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Turn over

SECTION B

COMPULSORY for Plant Engineering Option.

2. A Paper manufacturing plant is to be set up comprising of wood process and chemical re-circulation sections. Wood processing section consists of the following process unit:
- Wood receiving and storage yard.
 - Conveyor belt for moving the tree trunks to the de-backer.
 - Chipper that reduces the de-backed tree trunks in to chips.
 - Chip bin for temporarily storage of chips from the chipper.
 - Digester tank stores and digests the chips from the chip bin.
 - Screens; separates the chip sizes.
 - Brown storage tank that stirs and cooks the chips from the screens.
 - Washer tank; hot water is sprayed on the cooked chips from the brown storage tank and re-circulates the hot water back to the brown tank.
 - Screens; Further sieves the chips to ensure only suitable sized chips are processed.
 - Breach tank; Cold water is sprayed on the screened chips for further processing.
 - Screens; Sieves the washed chips before further pressure screens are used.
 - Dryers; The pressure screened chips are dried by use of steam to form a paper sheet and conveyed to the size press for pressing.
 - Coolers; Dried paper sheet are passes in a water cooler to lower the temperature.
 - Real colander; Dried paper sheets are rolled to form a real of paper.
 - Shell cutter; Cuts and trims the real of paper to the required length and size.

Chemicals Re-circulation section consists of the following process unit:

Weak liquid tank; Receives the diluted brown liquor from the brown tank and feed it into the multiple evaporators -Multiple evaporators; Heats the diluted liquor from the weak liquid tank by use of steam before it is fed into the heavy liquid liquor tank and is them feed to the direct evaporator where cold water is added then fed into the Absorber tank -Absorber tank; Vapour from the Direct evaporator is absorbed to form weak acid that is fed into the weak liquid tank and then supplied into the digester.

Using CAD software, draw in good proportion the paper manufacturing plant layout and include the essential services. (40 marks)

SECTION C

Answer any **THREE** questions from this section.

3. Figure 2 shows the orthographic view of a shaped block. Draw the isometric view of the block with corner X as the lowest point. Dimension your drawing.
(Approximate the dimensions that are not indicated) (20 marks)

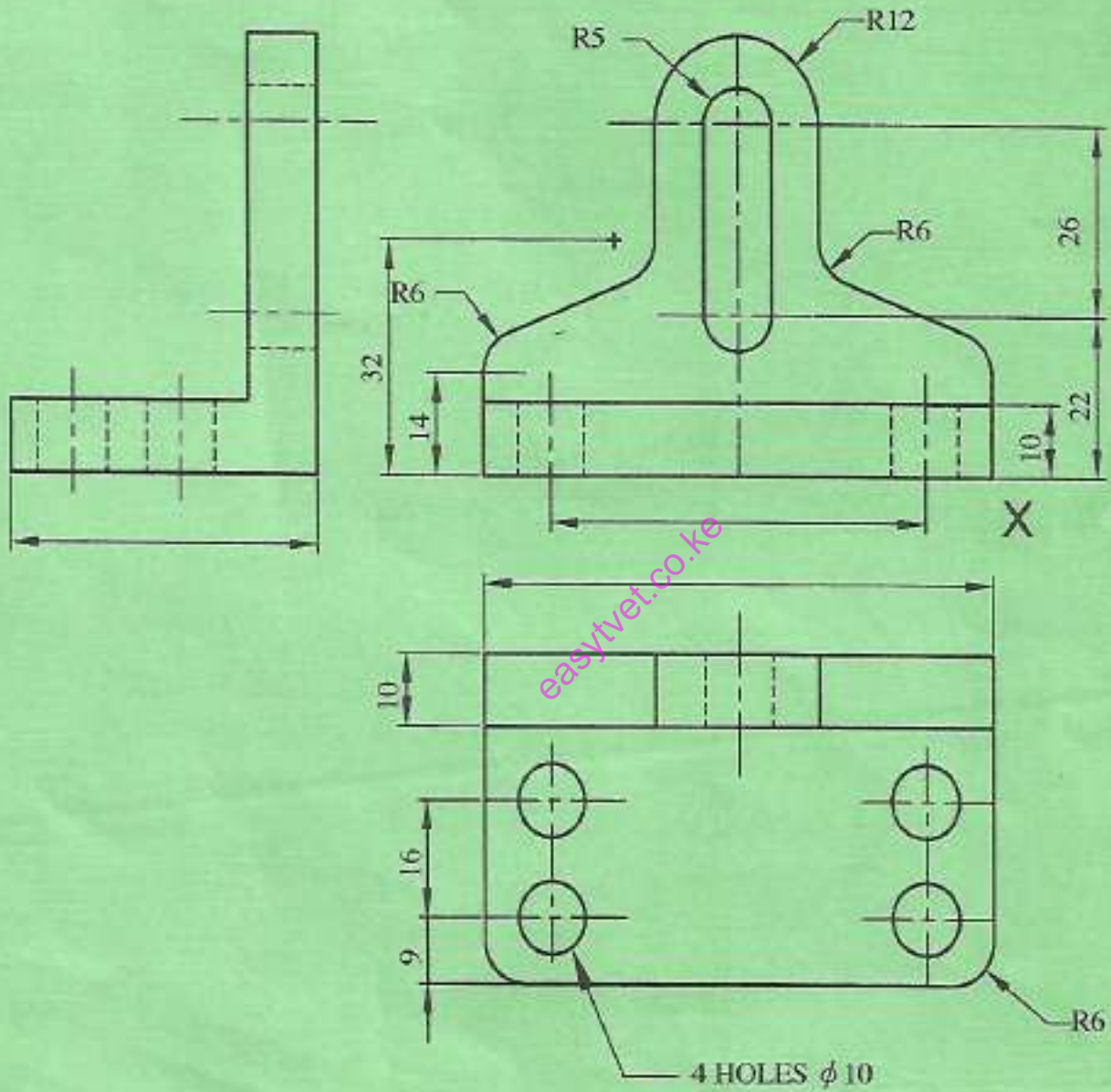


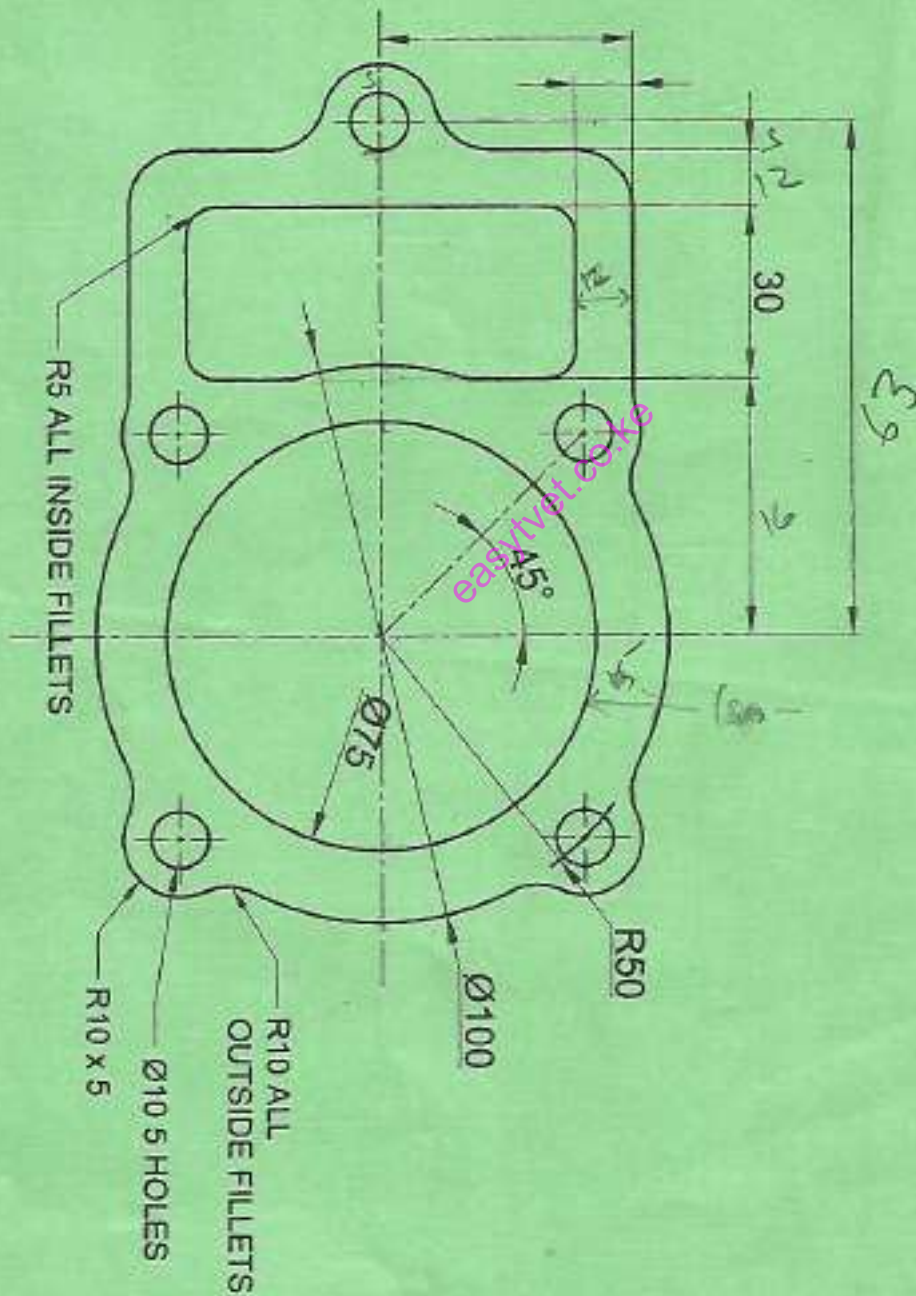
Fig. 2

4. Using a CAD drafting program set the layers properties manager as shown in the table below. Use the setup to draw the Compressor gasket profile as shown in Figure 3 below. Include all the dimensions. (Approximate the dimensions that are not indicated)

Layer Name	Colour	Line Type	Line Weight
Outline	Black/Black	Continuous	0.6mm
Centre line	Yellow	Centre	Default
Dimension line	Magenta	Continuous	0.2 mm

(20 marks)

Fig. 3



5. Figure 4 shows the views of a shaft guide. Use view ports to extract the following views in conceptual visual style. (Approximate the dimensions that are not indicated)

- (a) 3 Dimensional view in South East plane;
- (b) Front View;
- (c) Plan View;

(20 marks)

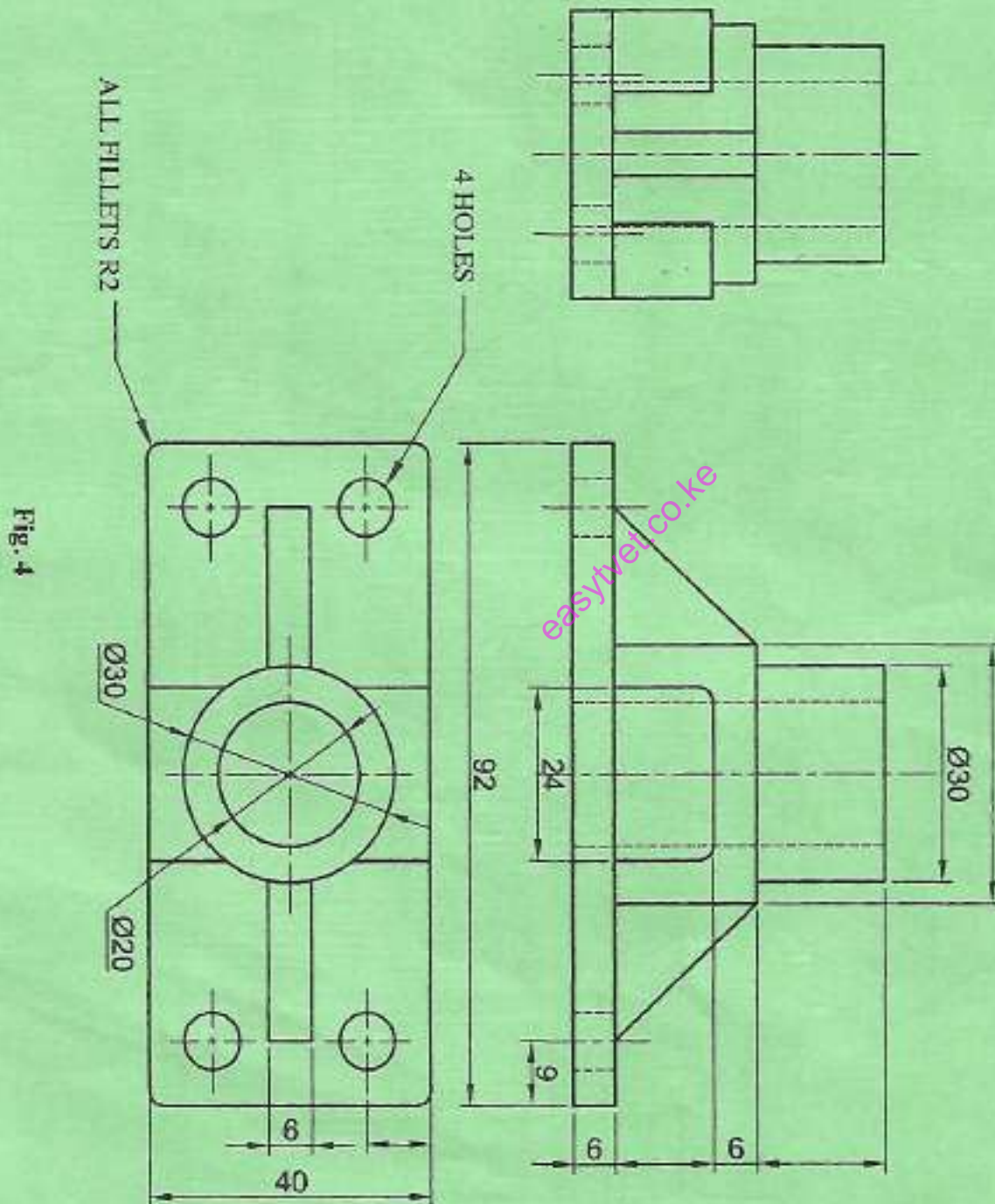


Fig. 4

6. Figure 5. Shows a shaped block. Approximate the dimensions that have been left out. Draw the following views in First and projection:

- (a) Front Elevation in the direction of the arrow F;
- (b) End Elevation
- (c) Plan

Include all the dimensions and hidden details

(20 marks)

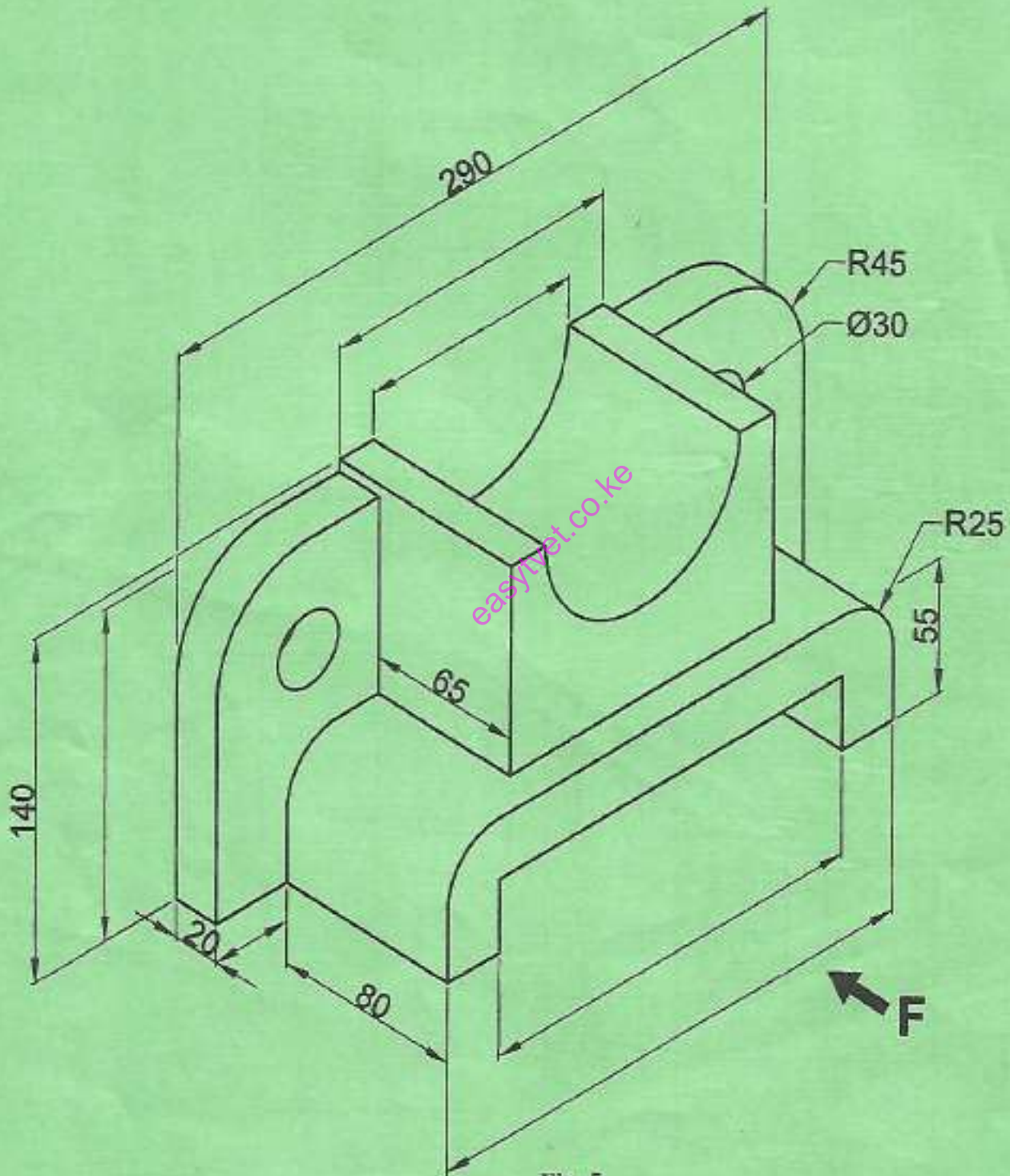


Fig. 5

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