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COMPUTER AIDED DESIGN

Oct./Nov. 2021

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 question 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 TWO sections; A and B.

Answer FIVE questions as follows:

Answer Question 1 (COMPULSORY) and either question 2 or 3 according to area of specialization from section A and THREE questions in section B.

Create a folder named CADN20-XXXXXXX on your desktop, where XXXXXXX is your college code and index number. Save all your work 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 index number on each printed page.

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

Maximum marks for each part of the question are indicated.

All drawing questions should be answered using CAD program.

Candidates should answer the questions in English.

All dimensions are in millimetres unless otherwise indicated.

This paper consists of 8 printed pages.

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

SECTION A

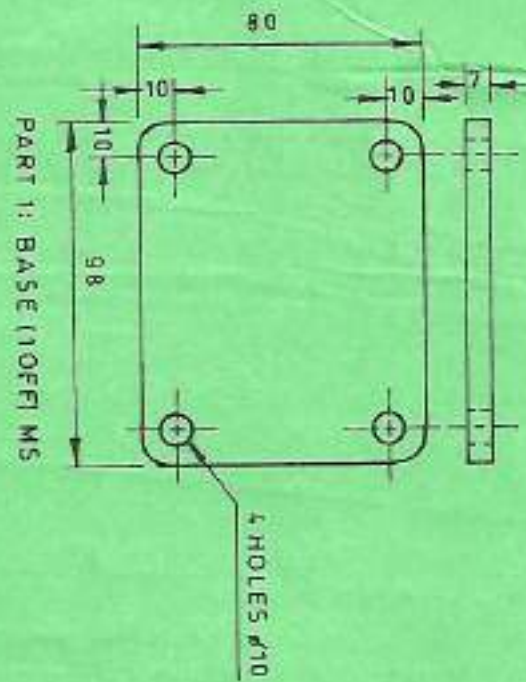
This section is compulsory.

1. (a) State **three** properties modified by the layers properties manager (3 marks)
- (b) Joseph intends to use CAD software to design some furniture. State **three** reasons why he should use the software (3 marks)
- (c) State **three** properties modified by Hatch edit command. (3 marks)
- (d) State the functions of the following tools as used in CAD:
- (i) Presspull;
 - (ii) Extrude;
 - (iii) Viewports. (3 marks)

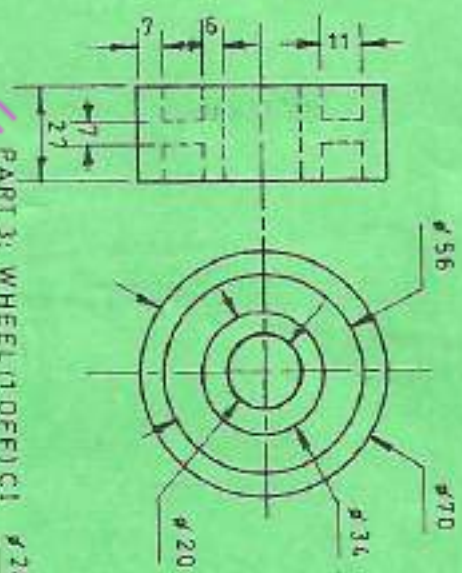
SECTION B

*Question 2 is Compulsory for
Automotive, Construction Plant, Production, Welding and Fabrication Options.*

2. Figure 1 shows the parts of a Castor wheel. Draw in First angle projection, the following views of the assembled castor wheel:
- (a) The Front Elevation;
 - (b) The sectioned End Elevation in the direction of arrow A;
 - (c) Include the following:
 - (i) six major dimensions;
 - (ii) parts list. (28 marks)



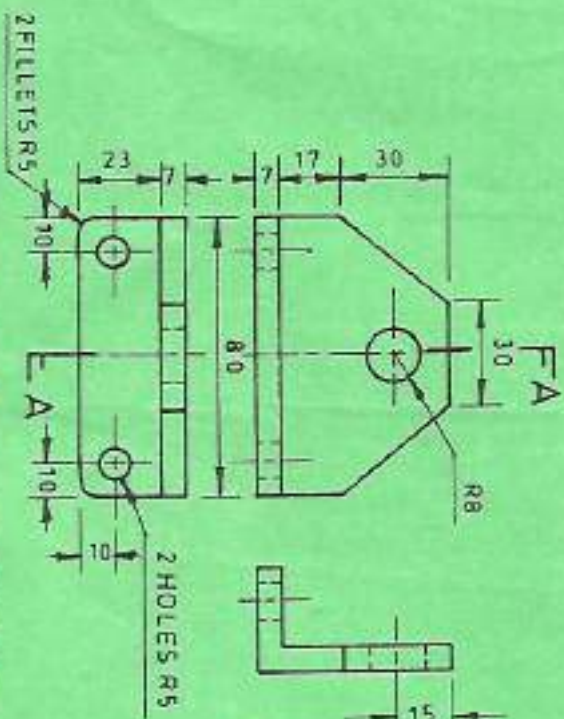
PART 1: BASE (10OFF) MS



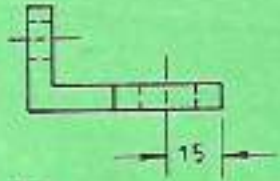
PART 3: WHEEL (10OFF) CI



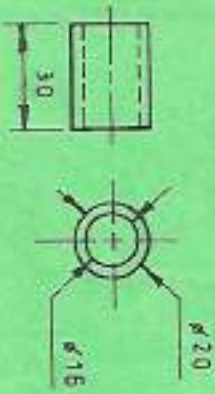
PART 8: PIN (4OFF) CI



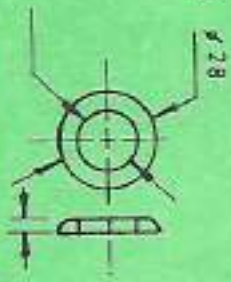
PART 2: SUPPORT BRACKET (20FF) MS



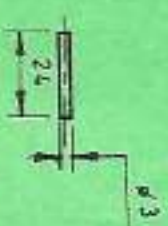
PART 4: SHAFT (10FF) MS



PART 5: BUSH (10FF) BRONZE



PART 6: WASHER (20FF) MS



PART 7: LOCK PIN (10FF) MS

Fig. 1

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Turn over

SECTION C

This section is compulsory for Plant Engineering Option.

3. A Factory is to be set up for manufacturing white sugar from sugar canes. The factory process will consist of the following units:

- Cane storage and marshalling yard
- Tipper weigh bridge to determine the weight of the cane from the yard
- Shredder; reduces the canes size
- Three Milling trains in series; squeezes out juice from the canes
- Mixed juice tank the juice from the milling trains
- Heater; heats the juice from the mixed tank by use of steam.
- lime tank; supply lime to the juice fed to the clarifiers from the heaters
- Three evaporators in series; Evaporates water contained in the juice from the clarifiers
- Vacuum pan; starts the juice crystallization process from the evaporators
- Three Centrifuges in series; controls the sugar crystals by centrifugal action.
- Rotary sugar driers; Further dries the sugar by use of steam.
- Sugar bulk storage tank; receives and stores the sugar from the rotary driers
- Filters; sieve molasses from the mud as it leaves the clarifier
- Baggage house; receives and stores bagasse from the mill train.

Using Auto CAD, draw in good proportion the plant layout of the factory including the essential services. (28 marks)

SECTION D

Answer any THREE questions from this section.

4. Figure 2 shows a shaped block. Draw the following views in First angle orthographic projection:

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

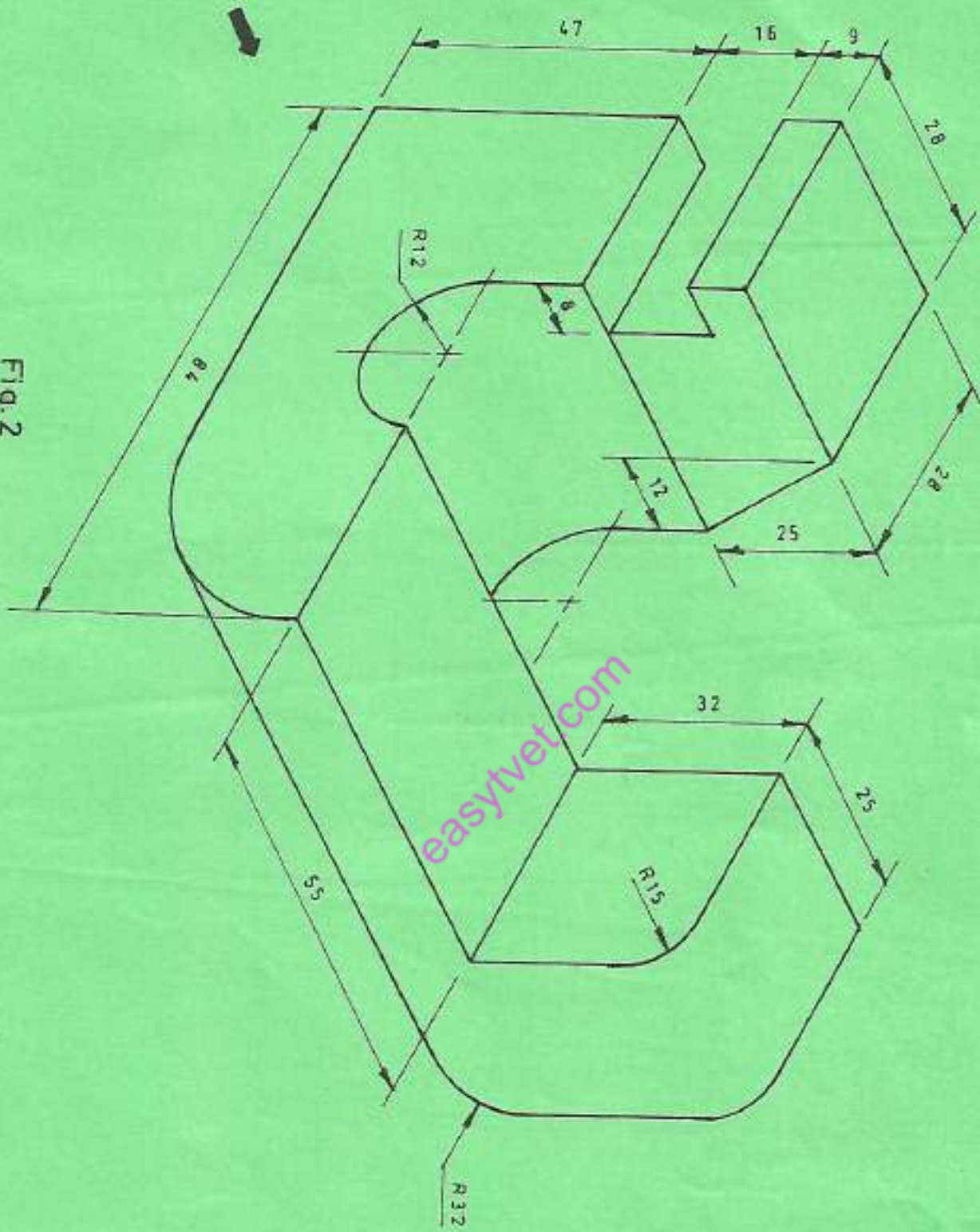
Include six major dimensions and hidden details (20 marks)

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Fig. 2



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5. Figure 3 shows the views of a shaft cover. Use viewports to extract the following views in shades of grey visual style:

- (a) 3 Dimensional view in South West plane;
- (b) Plan View;
- (c) End view.

(20 marks)

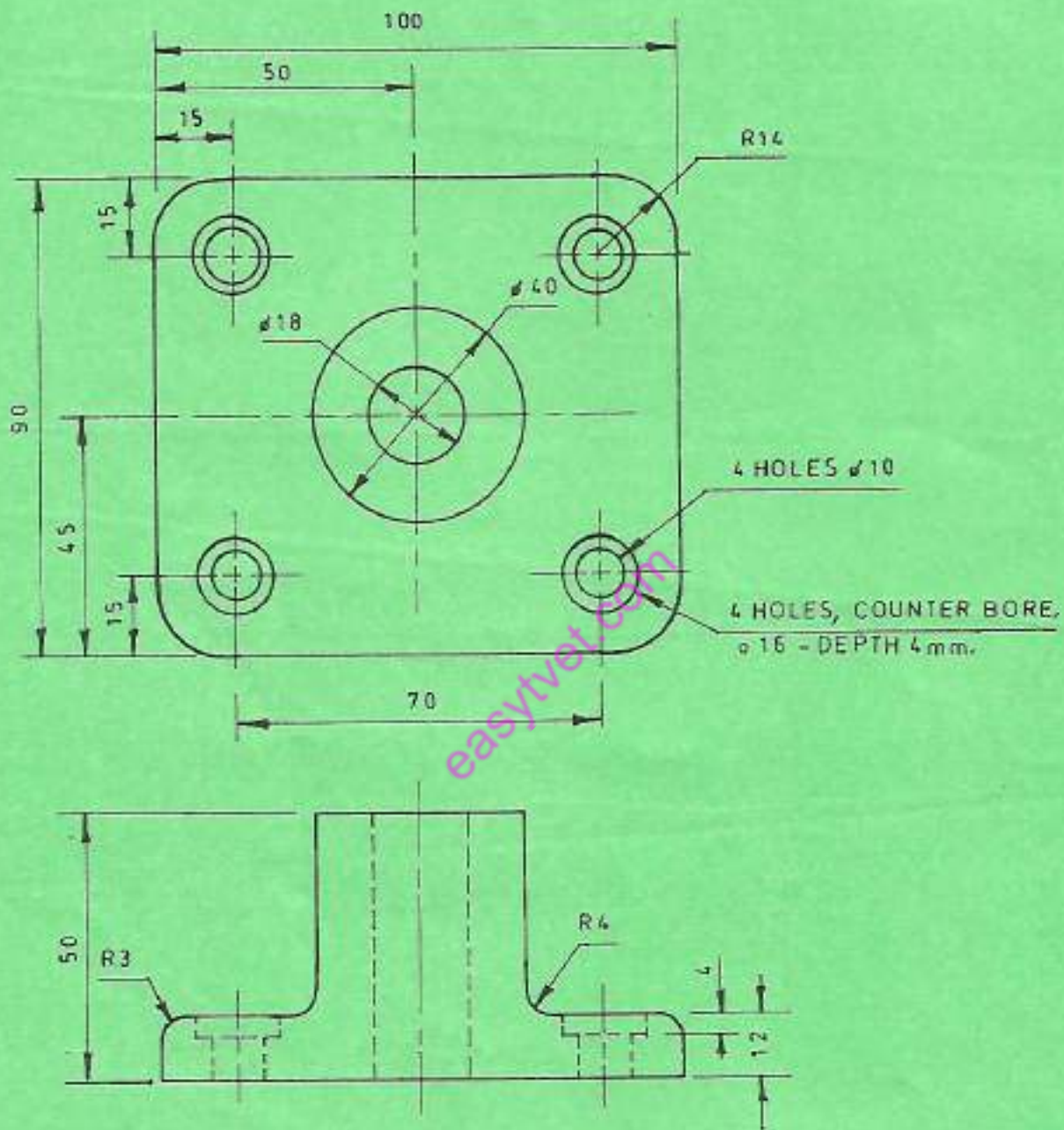


Fig. 3

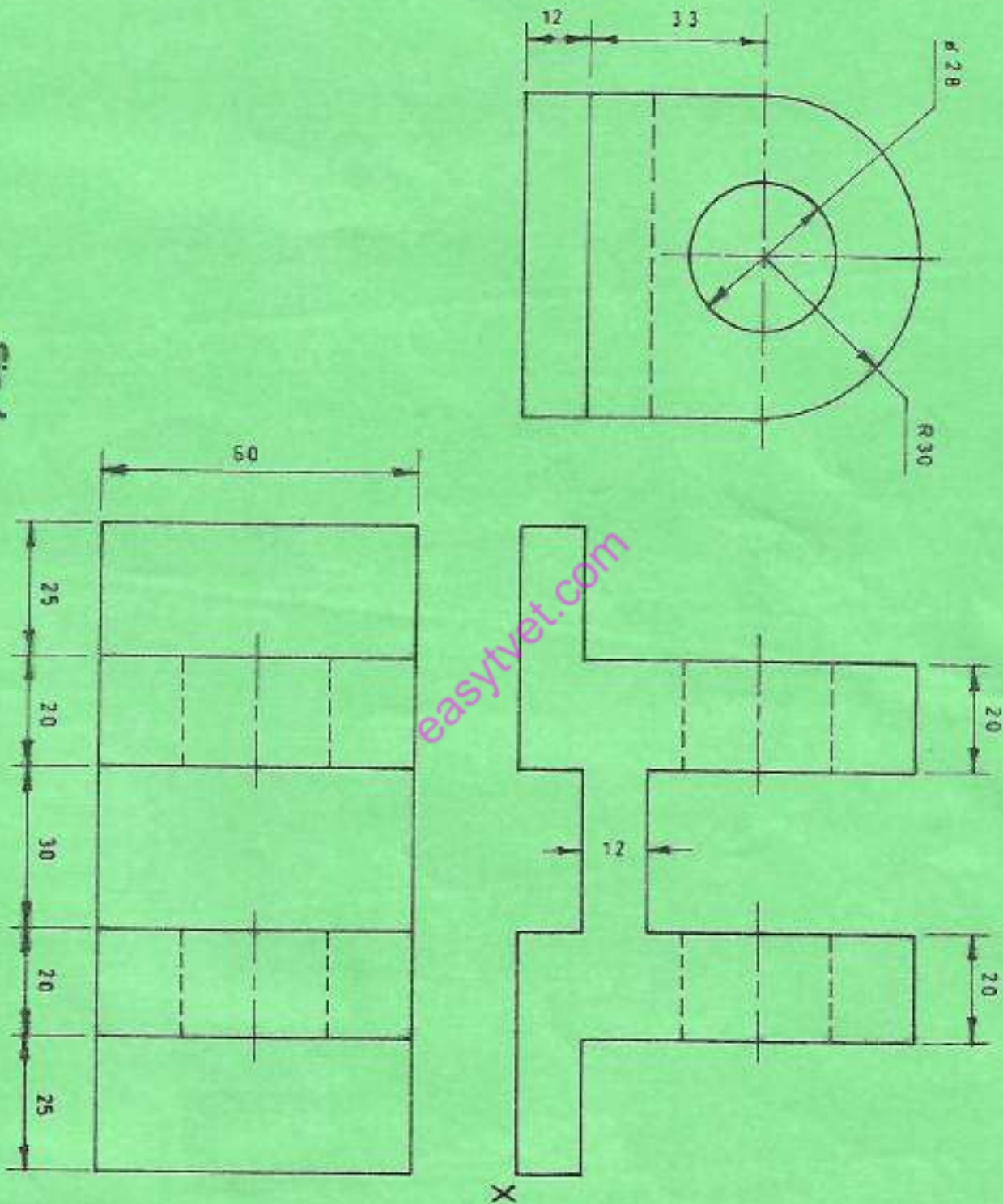
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6. Figure 4 shows the orthographic view of a shaped block. Draw the isometric view of the block with the lowest point shown by point X. Include six major dimensions (20 marks)

(20 marks)

Fig. 4



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7. Draw the gasket profile shown in Figure 5. Include six major dimensions.

(20 marks)

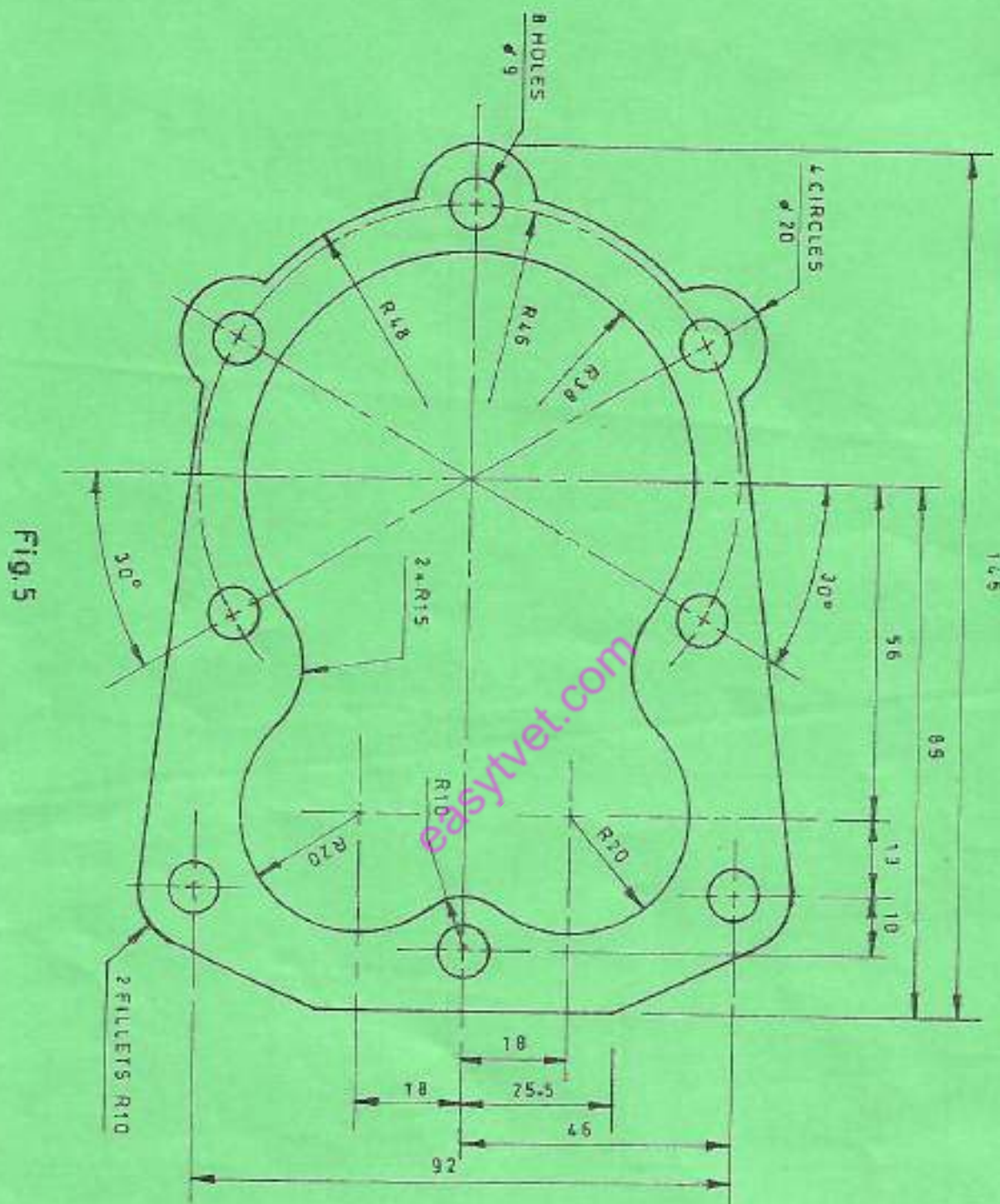


Fig. 5

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18
93.5

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