

2501/301      2508/301  
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2503/301

COMPUTER AIDED DESIGN

Oct./Nov. 2022

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
DIPLOMA IN MECHANICAL ENGINEERING  
(PLANT OPTION)  
(PRODUCTION 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 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 CADN22-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.*

*(Approximate the dimensions that are not indicated)*

*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

*Question 1 is Compulsory for Automotive, Construction Plant, Production, Welding and Fabrication options.*

1. **Figure 1** shows the parts of a plunger crank. Draw in first angle orthographic projection the following views of the assembled plunger crank:
- (a) A sectional front elevation along cutting plane A - A.
  - (b) An end elevation;
  - (c) Include the following:
    - (i) six major dimensions;
    - (ii) parts list.

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## SECTION B

*This section is Compulsory for Plant Engineering option.*

2. A plant for refining edible oil from cotton seed crude oil is to be set up. The plant will incorporate the following units and equipment:

### Degumming unit

Degumming unit will consist of the following:

- Mixer: oil degumming by coagulation using concentrated phosphoric acid.
- Centrifuge: gums and soaps removed.
- Water addition: Water is added on line followed by re-degumming and re-centrifugation.
- Bleach tank: adsorptive bentonite clays are added to bleach oil.
- Vacuum drier
- Filter press
- Storage tank

### Hydrogenation unit

- Catalyst addition on line
- Compressed hydrogen is added in hydrogenation column
- Hydrogenation column: oil is held to complete hydrogenation
- Filter press

### Deodorizing and colour unit

- Deodorizer still - superheated steam is blown to oil
- Freezer
- Packaging - done under atmospheric nitrogen

Using a CAD software, draw in good proportion the plant layout of the edible oil refining plant and include the essential services.

(28 marks)

## SECTION C

12.10.

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

3. Figure 2 shows a pictorial view of a support bracket. Draw the following views in first angle projection.
- a front elevation in the direction of arrow F;
  - a plan;
  - an end elevation in the direction of arrow E.
    - show hidden details;
    - insert six major dimensions.

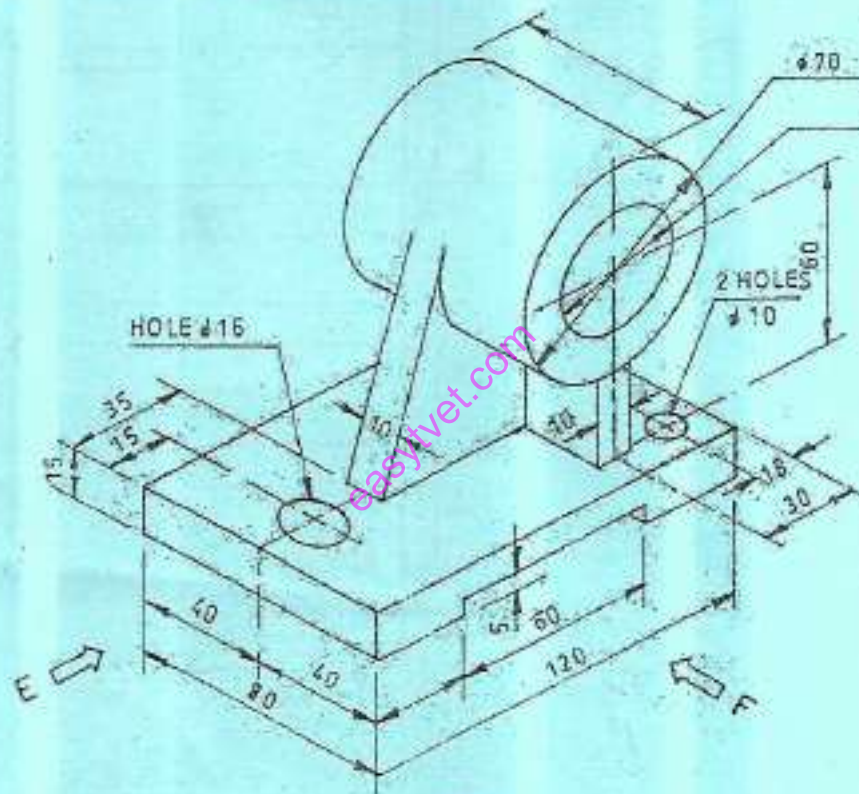


Fig. 2

4. Figure 3 shows views of a machine block. Draw full size the block in isometric projection with corner X as lowest point. (20 marks)

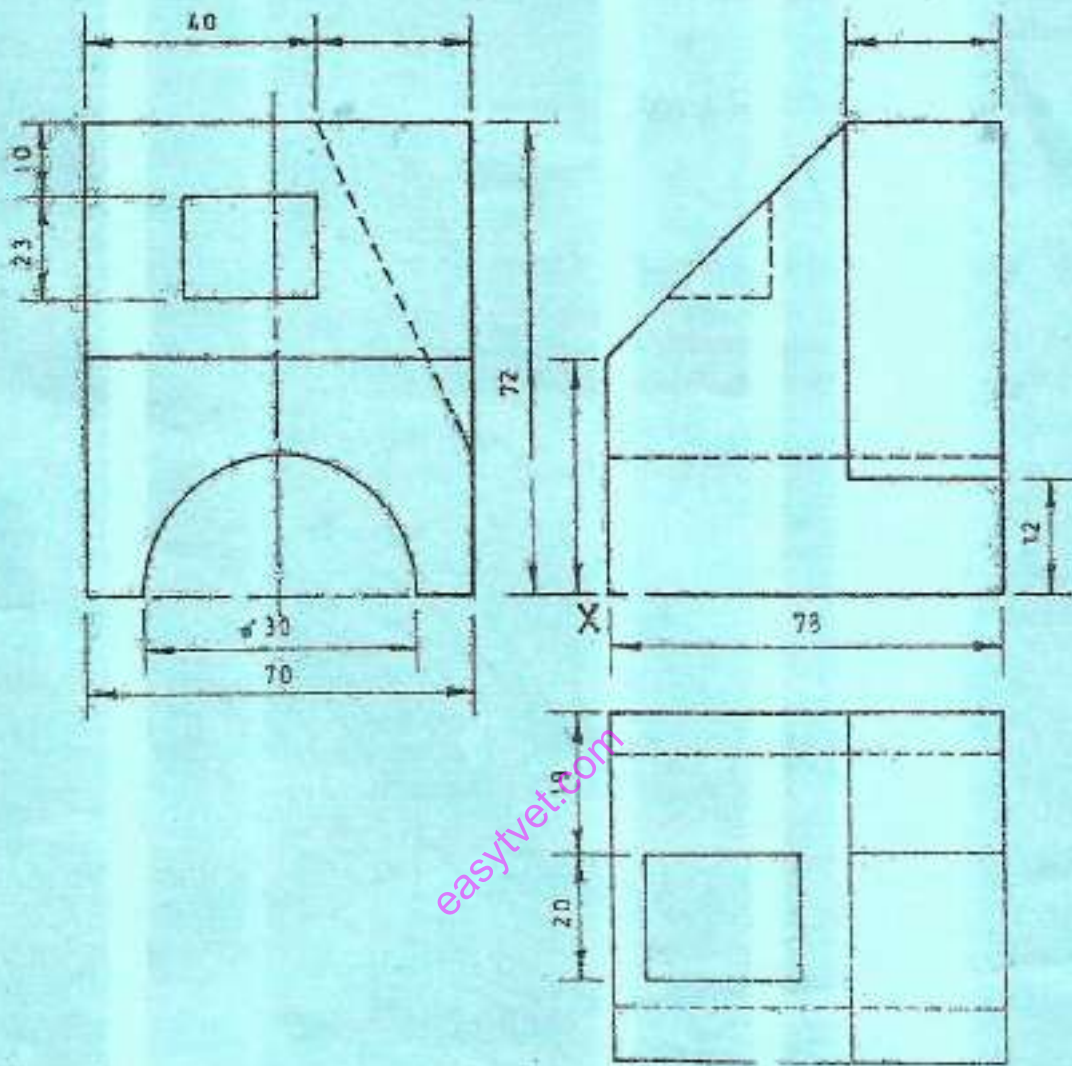


Fig. 3

5. Figure 4 shows two views of a bracket. Use view ports to extract the following views in conceptual visual style.

- (a) 3 dimensional view in south west, plane;
- (b) plan view;
- (c) front view.

(20 marks)

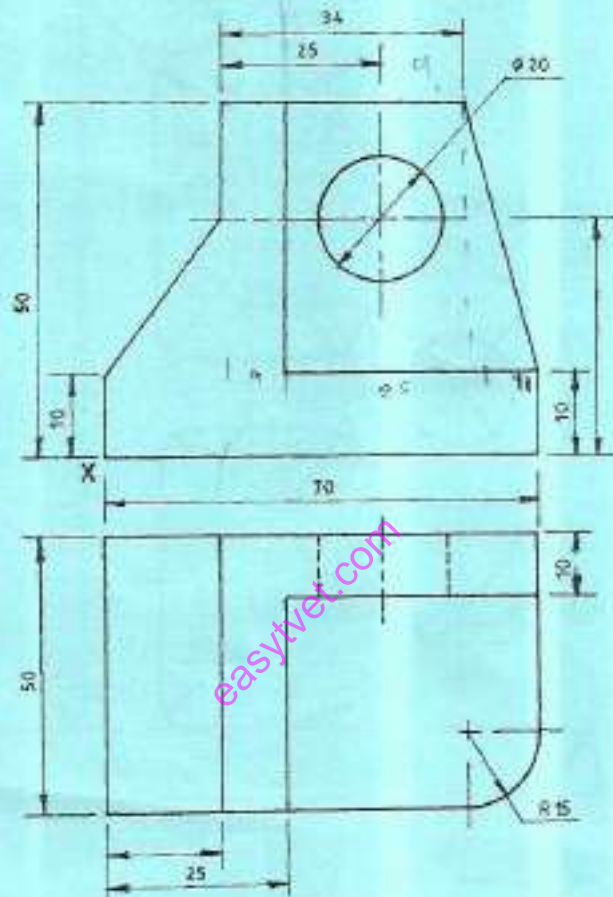


Fig. 4

6. Figure 5 shows a support stand. Construct the profile.

(20 marks)

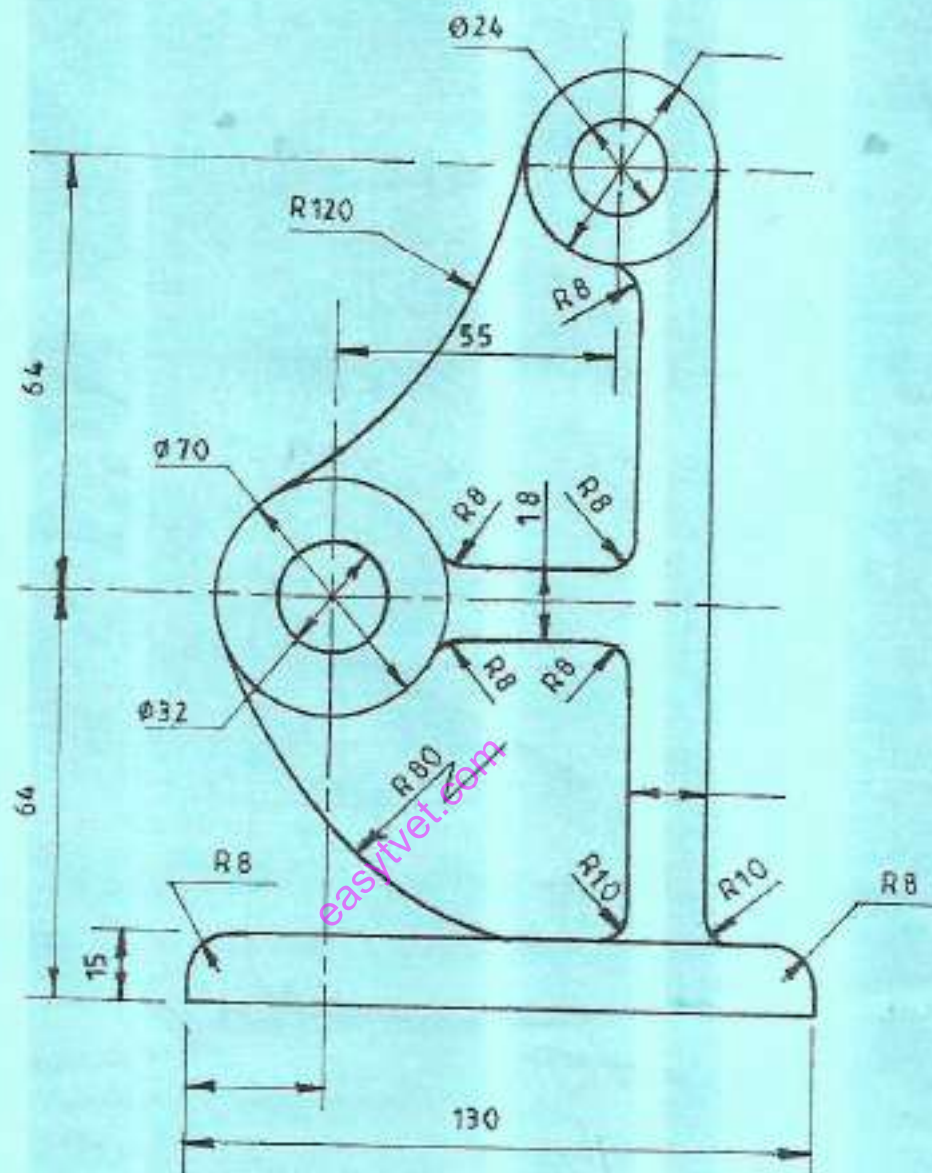


Fig.5

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