


SECTION A: MATERIAL PROCESSES AND WORKSHOP TECHNOLOGY

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

- 1/ (a) Explain the following properties of engineering materials:
- (i) hardness;
 - (ii) malleability. (4 marks)
- (b) (i) State **two** reasons why 'finishing' is done on an engineering product.
- (ii) Distinguish between lacquering and enamelling finishing processes. (6 marks)
- (c) Describe the **two** techniques of filling. (4 marks)
- (d) Draw a labelled diagram showing the extraction of aluminium by electrolysis. (6 marks)
- 2/ (a) State **two**:
- (i) (I) reasons for the formulation of IEE regulations;
 - (II) conditions upon which a person can get an electric shock. (4 marks)
 - (ii) List **four** obligations on an employer at a work place as stipulated in the Safety and Health Act. (4 marks)
- (b) Outline **two** reasons for using a cutting fluid with high speed tools. (2 marks)
- (c) Describe the functions of the following lathe machine parts:
- (i) bed;
 - (ii) headstock. (4 marks)
- (d) Sketch the following 'left hand' lathe machine cutting tools:
- (i) facing;
 - (ii) roughing;
 - (iii) finishing. (6 marks)

3. ✓ (a) Define the term 'tolerance' with reference to workshop measurements. (1 mark)
- (b) State **three**:
- (i) categories of fits;
- (ii) functions of a steel rule. (6 marks)
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- (c) Draw a labelled diagram of a vernier callipers. (8 marks)
- (d) Outline:
- (i) **two** factors considered when selecting a hacksaw blade;
- (ii) **three** safety precautions observed when cutting a work piece using a hacksaw blade. (5 marks)

4. (a) Describe the following metal joining processes:
- (i) riveting;
- (ii) bolting. (4 marks)
- (b) Distinguish between 'soft soldering' and 'brazing'. (4 marks)
- (c) Sketch the following self secured joints used in sheet metal:
- (i) 'paned down' bottom joint;
- (ii) slip joint;
- (iii) grooved seam. (6 marks)
- (d) (i) List **two** machines used in sheet metal fabrication.
- (ii) Outline **four** safety precautions observed when sharpening cutting tools on a grinding wheel. (6 marks)

SECTION B: ENGINEERING DRAWING

Answer TWO questions from this section.

5. **Figure 1** shows a pictorial view of an object. Draw, full size in first angle projection, the following views:

- (i) front elevation in the direction of arrow A;
- (ii) end elevation in the direction of arrow B;
- (iii) plan in the direction of arrow P.

Insert six major dimensions.

(20 marks)

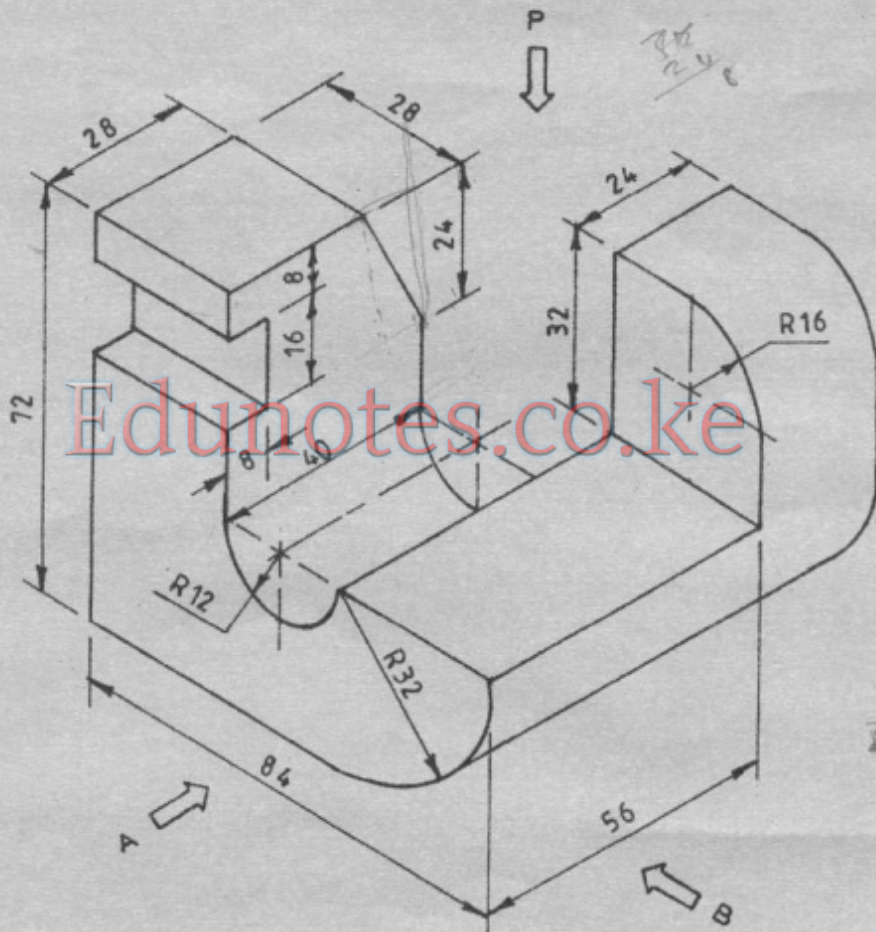


Fig. 1

6. **Figure 2** shows the intersection of a square prism and a square base pyramid. Re-draw the given views and draw the following:

- (i) line of intersection;
- (ii) complete plan;
- (iii) end elevation;
- (iv) development of the pyramid.

(20 marks)

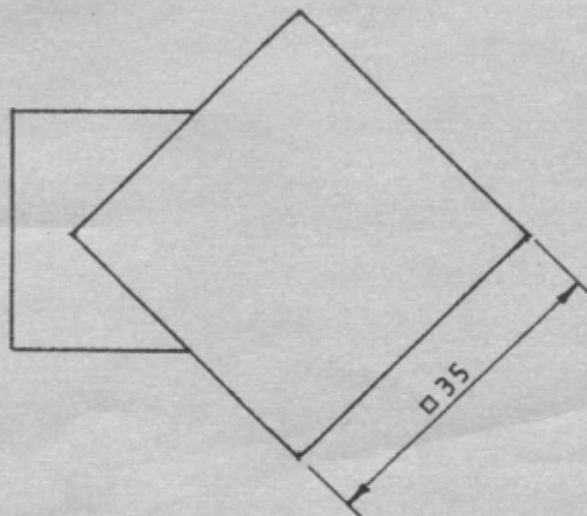
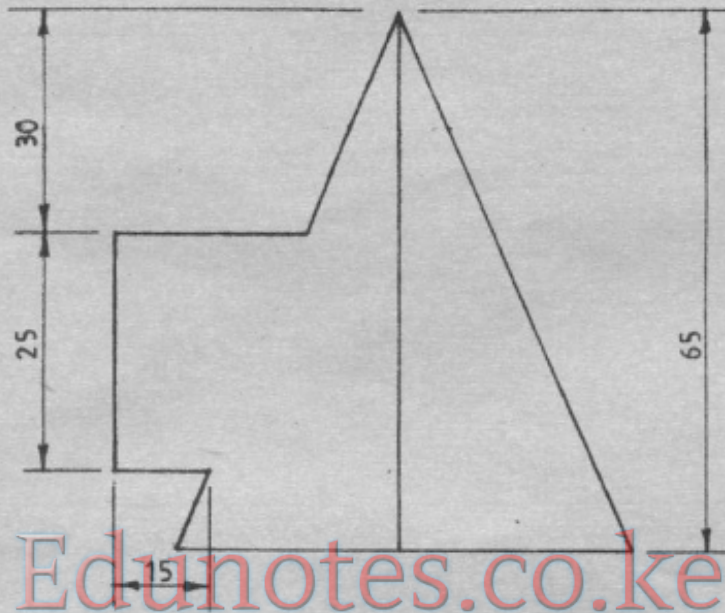
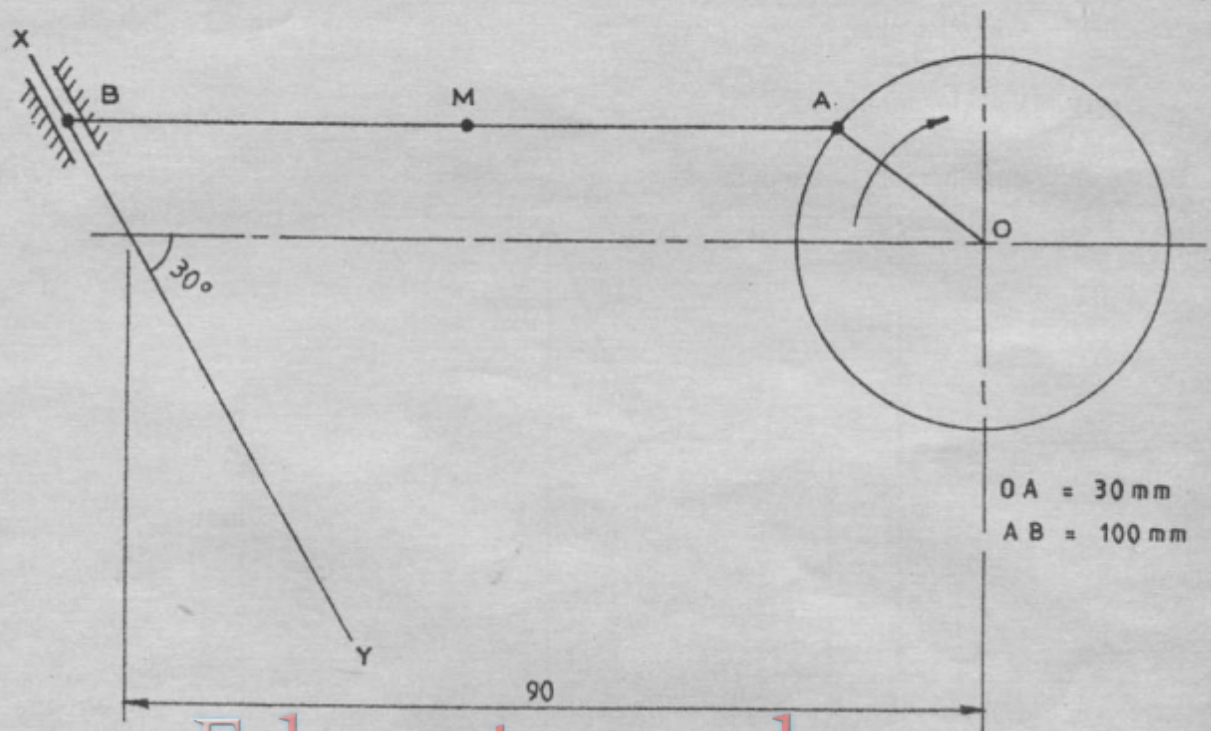


Fig. 2

7. (a) **Figure 3** shows a link AB pin-jointed at end A. End B is constrained to slide along the path XY. Draw the locus of the midpoint M for one revolution of the crank. (15 marks)



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Fig. 3

- (b) Construct a hexagon, using a pair of compasses and a ruler only, in a circle of diameter 80 mm. (5 marks)
8. (a) Sketch the following hand tools:
- (i) ball peen hammer;
 - (ii) flat screw driver. (4 marks)

- (b) **Figure 4** shows two views of a solid drawn in 3rd angle projection. Draw an isometric view of the object taking corner P as the lowest point. (16 marks)

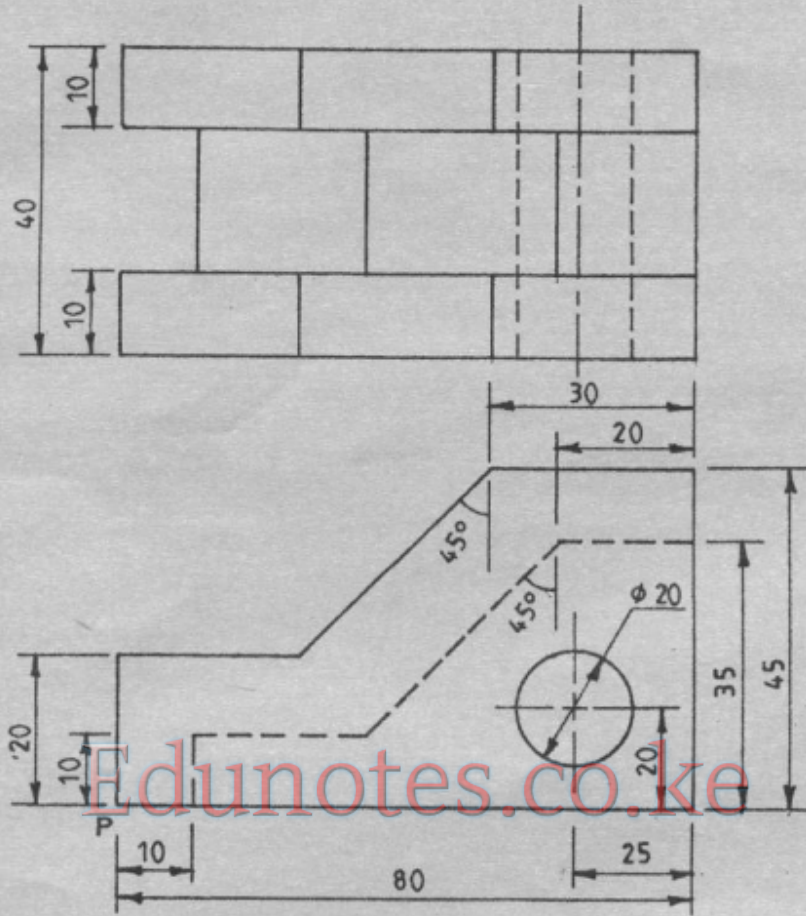


Fig. 4

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