

TECHNICAL DRAWING - ORDINARY LEVEL

PAPER II (A) - ENGINEERING APPLICATIONS

200 Marks

INSTRUCTIONS

- (a) Answer question 1 and two other questions.
- (b) Drawings and sketches should be in pencil unless otherwise stated.
- (c) Where dimensions are omitted they may be estimated.
- (d) Credit will be given for neat orderly presentation of work.
- (e) Candidates should work on one side of the paper only.
- (f) The Examination Number should be written on each drawing sheet used.
- (g) All dimensions are in millimetres.

1. Details of a SCREW JACK are given in Fig. 1 with the parts list tabulated below.

INDEX	PART	REQUIRED
1	Body	1
2	Screw	1
3	Support	1
4	Locking Nut	1
5	Grub Screw	1
6	Lever	1

- (a) Make the following drawings of the assembled parts in first or third angle projection.
- A sectional front elevation on section plane AA.
 - A side elevation viewed in the direction of arrow X.
- (b) Insert the following on the drawing:
- Title: SCREW JACK.
 - ISO projection symbol.
 - Four leading dimensions.

(100 marks)

2. Fig. 2 shows the elevation of a hopper to a square section feed tube.

- Draw the given elevation and a plan of the hopper and tube.
- Draw the surface development of the hopper using XX as the seam.
- Make a large sketch of a wired edge.

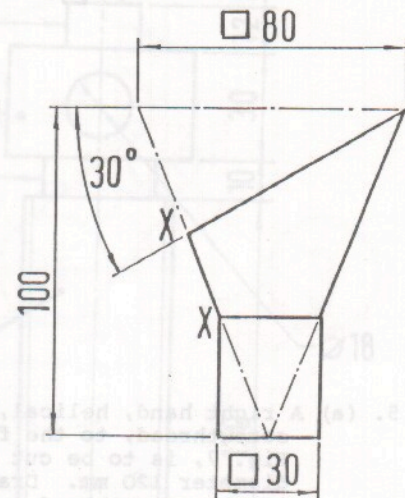


FIG.2 FIG. 2

(50 marks)

3. (a) Draw a radial cam with minimum radius of 30 mm and clockwise rotation to give the following motion to an in-line knife edge follower:-
- | | |
|-------------|--|
| 0° - 120° | Rise 20 mm with uniform velocity |
| 120° - 210° | Rise 30 mm with simple harmonic motion |
| 210° - 270° | Dwell |
| 270° - 360° | Fall 50 mm with uniform velocity. |

Include the displacement diagram as part of the solution.

- (b) Fig. 3 shows a crank/rod/slider mechanism. Crank AB rotates about A while C slides up and down the centre line of the slider. Using a line diagram to represent the linkage, plot the locus of point P for one revolution of B about A.

(50 marks)

4. (a) Using the data table below make a fully dimensioned drawing of the machine part in Fig. 4.

1	Screwthread:	Metric 30, Pitch 3.5, length 40
2	Undercut:	Length 5, Diameter 20
3	Taper:	Length 50, Minimum diameter 50, Maximum diameter 70, Woodruff keyway $\varnothing 30$ and depth 6 mid length.
4	Shaft:	Diameter 70, Length 40, Fillet radius 10
5	Flange:	Length 20, Diameter 100, Recess 10 deep and 60 square

- (b) (i) Identify the engineering mechanism shown in Fig. 5.
- Name the parts 1, 2, 3, 4.
 - Part A is fixed to part B by means of a square section key. Make a neat freehand sketch showing the arrangement.

(c) Identify the standard steel sections (i), (ii) and (iii) shown in Fig. 6.

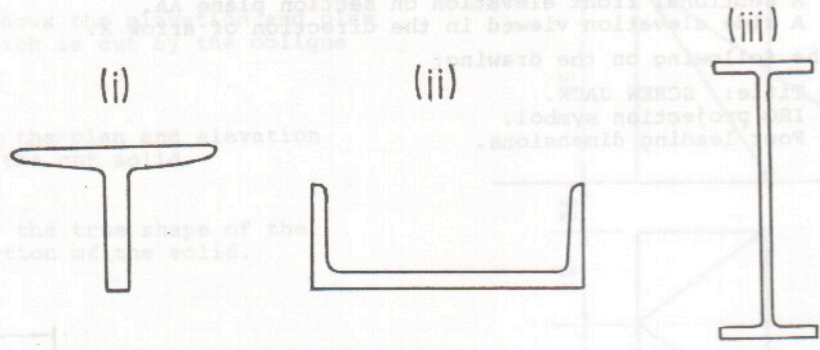


FIG. 6 FÍOR 6

(50 marks)

5. (a) A right hand, helical, single start screwthread, to the form shown in Fig. 7, is to be cut on a bar of diameter 120 mm. Draw two revolutions of the screwthread. Pitch 60 mm.

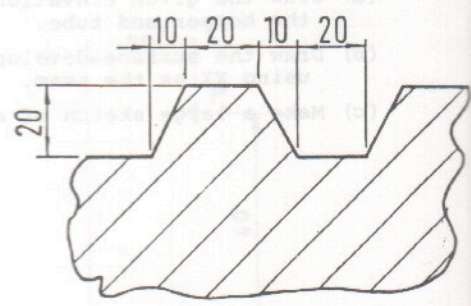


FIG. 7 FÍOR 7

(b) With the aid of freehand sketches, explain the following abbreviations:-

- (i) CSK HD
- (ii) A/F
- (iii) S'FACE

(50 marks)

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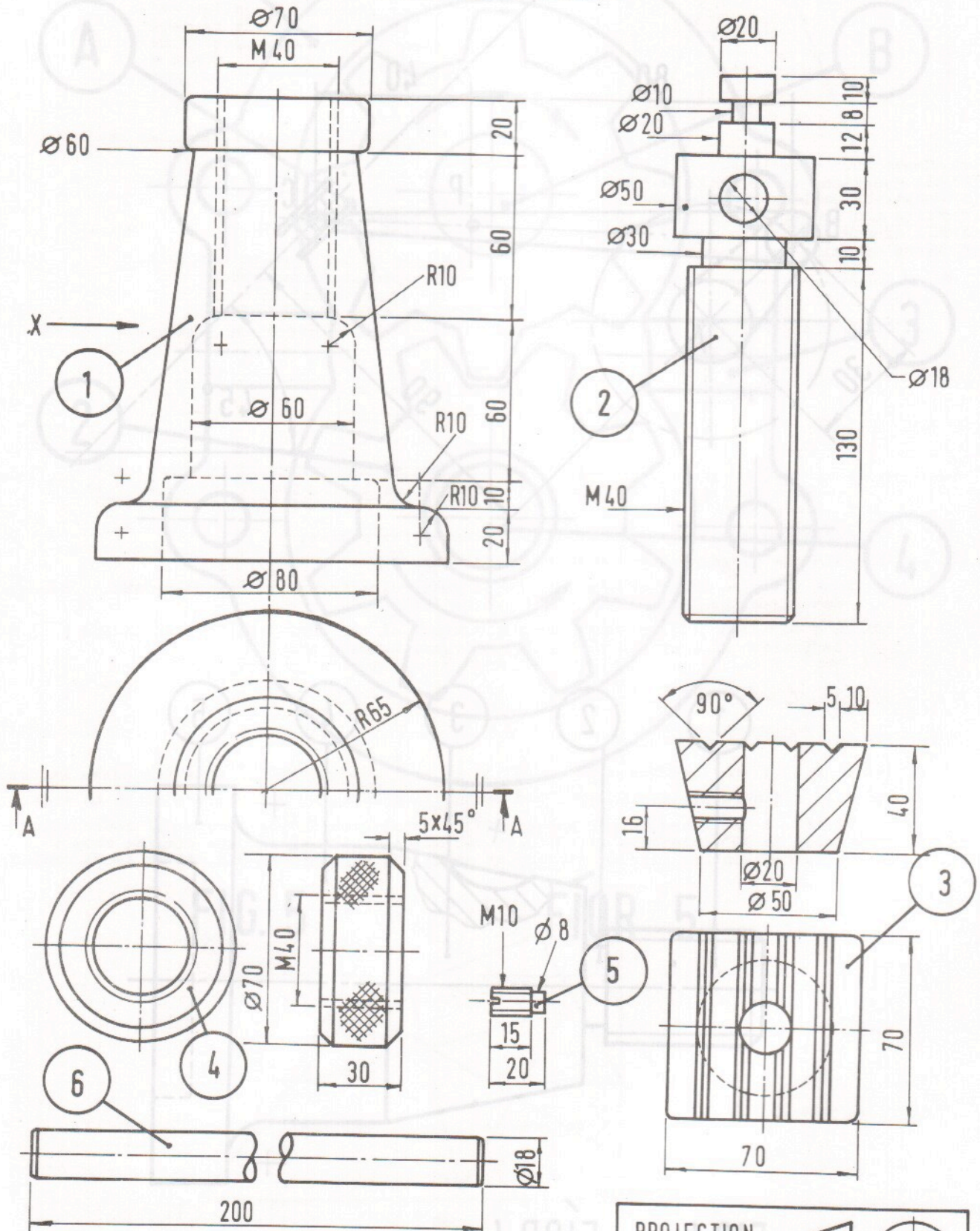


FIG. 1 FÍOR 1

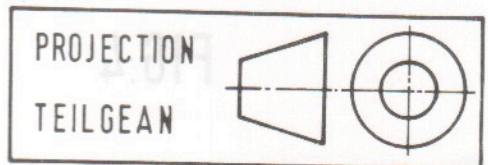


FIG. 3

FÍOR 3

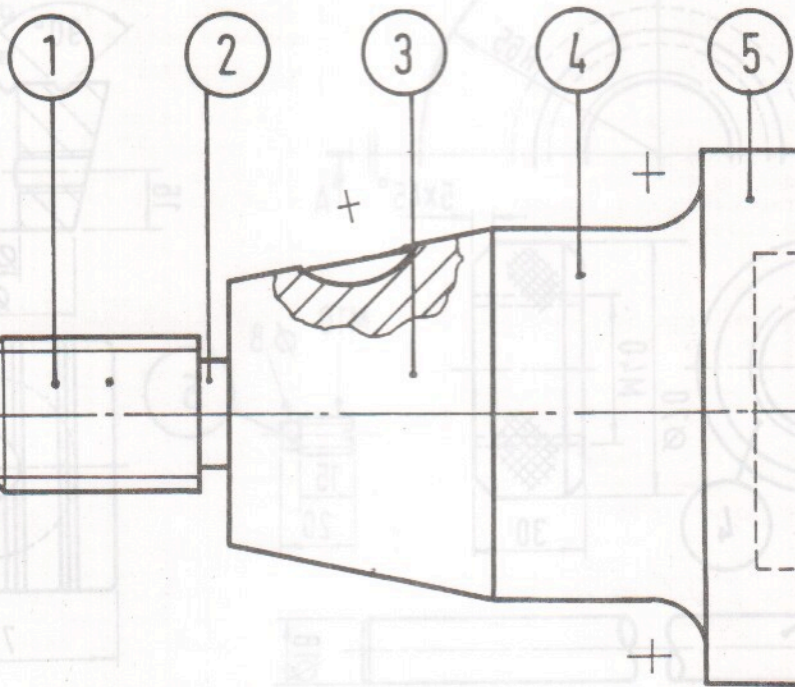
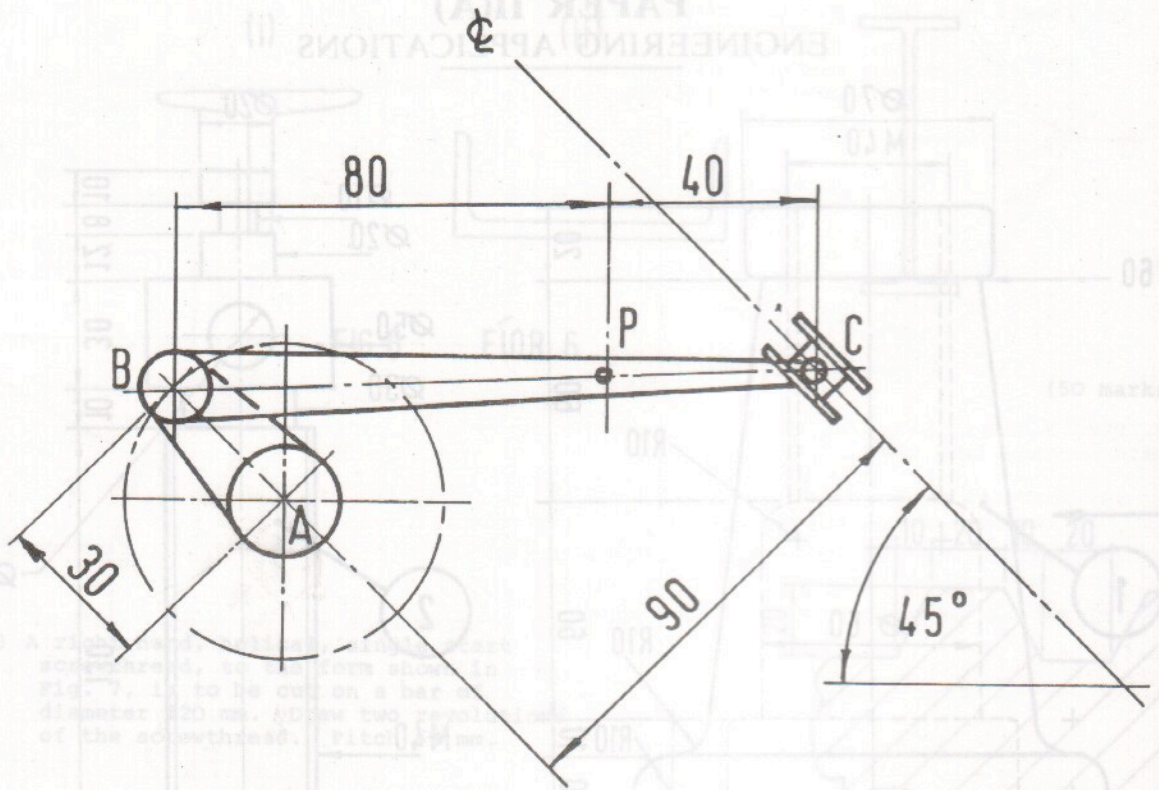


FIG. 4

FÍOR 4

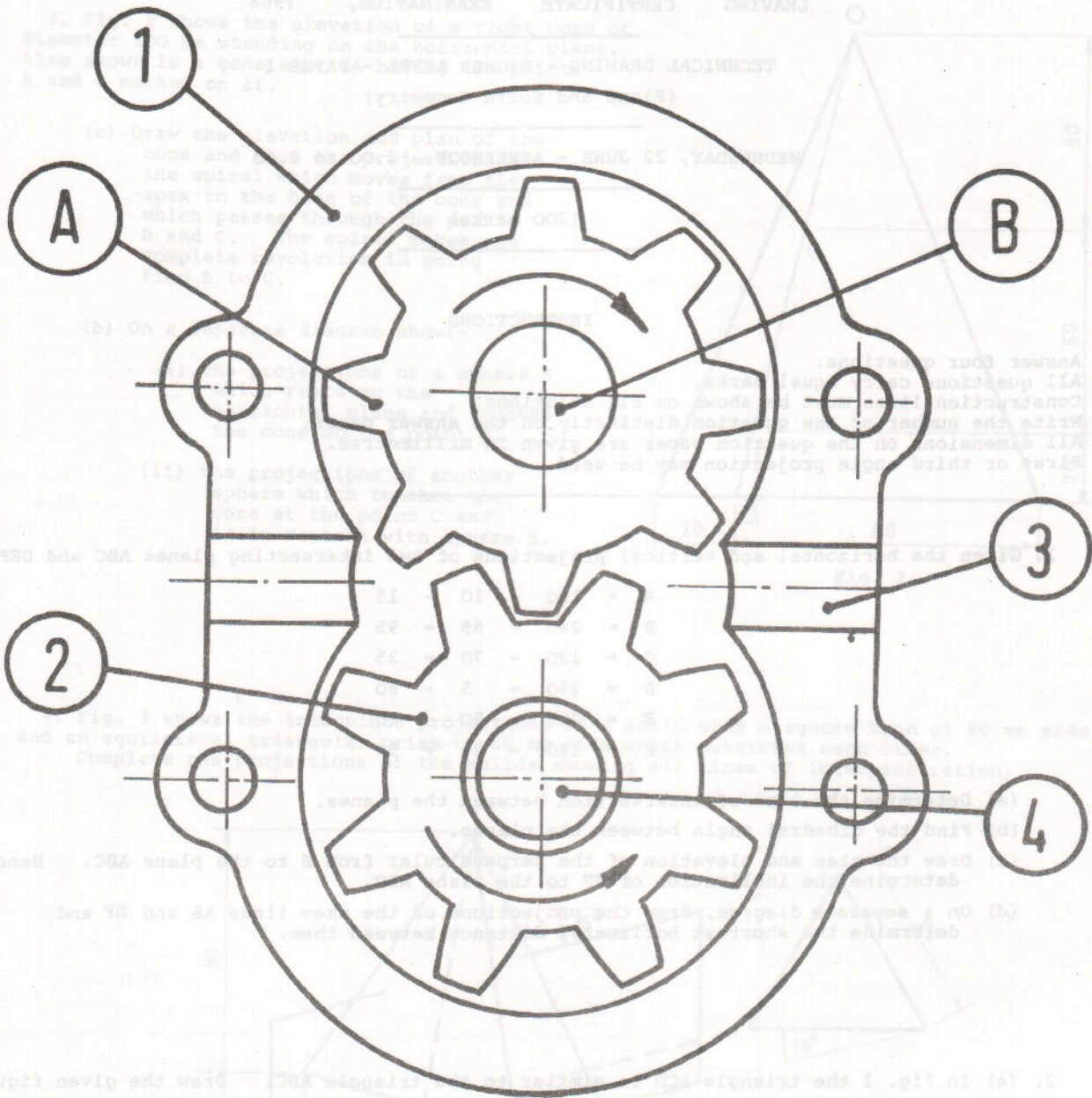


FIG. 5

FÍOR 5

