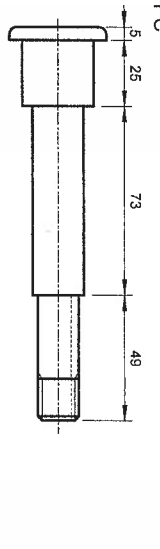
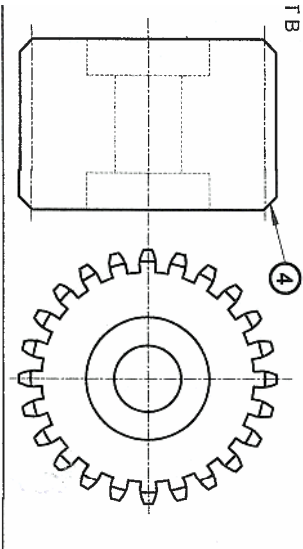
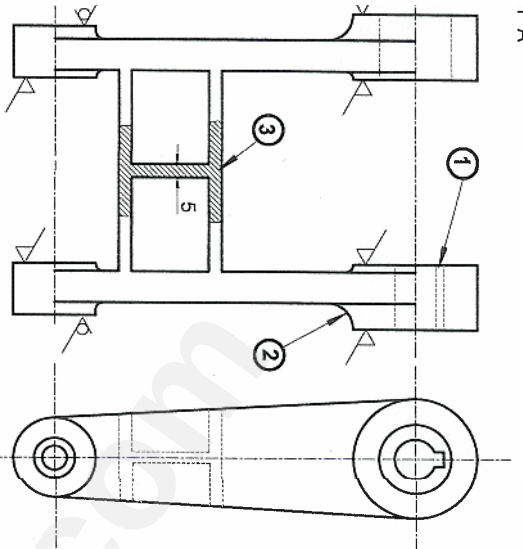




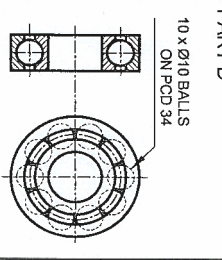
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ANALYST

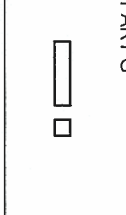
T A



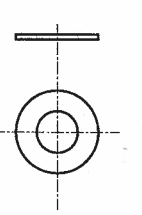
PART D



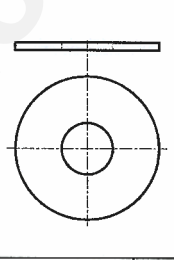
PART G



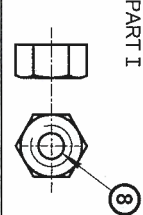
PART H



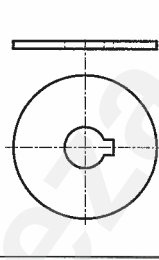
PART E



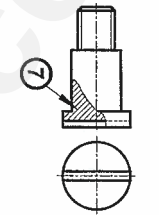
PART I



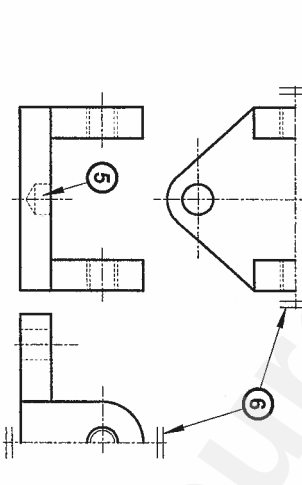
PART F



PART J



PART K



PART	QUANTITY	MATERIAL
FRAME	1	CAST IRON
GEAR	1	CAST IRON
SHAFT	1	HIGH TENSILE STEEL
BALL BEARING	2	STEEL
SPACER 1	1	PHOSPHOR BRONZE
SPACER 2	1	PHOSPHOR BRONZE
KEY	1	MILD STEEL
WASHER	1	MILD STEEL
M16 HEXAGONAL NUT	1	MILD STEEL
M12 THREADED PIN	2	MILD STEEL
BASE	1	CAST IRON

DRAWN BY: BERNARD JAMESON	TITLE: BELT TENSIONER
CHECKED BY: AMINA NADAR	SCALE 1:2
APPROVED BY: FRANCO	
DATE: 18 NOVEMBER 2017	
SIGNED: CARLOS MOLELE	
ALL UNSPECIFIED RADII ARE R3.	
TOLERANCES ON ALL DIMENSIONS ARE: ±0.25	

STUDY THE ADJACENT DRAWING AND ANSWER THE QUESTIONS THAT FOLLOW:

1.1 What scale is indicated for the drawing?	SCALE 1:2
1.2 How many parts make up the belt tensioner?	13
1.3 What material is used for the bearing?	STEEL
1.4 What should all unspecified radii be?	R3
1.5 What is the diameter of the balls for the bearing?	10
1.6 What is feature 1 in Part A called?	KEY SLOT / KEY WAY
1.7 What is feature 2 in Part A called?	FILLET
1.8 Name the type of sectioning at 3 in Part A.	REVOLVED SECTIONING
1.9 What is feature 4 in Part B called?	CHAMFER
1.10 What type of hole is shown by feature 5 in Part K?	BLIND HOLE
1.11 Explain the meaning of feature 6 in Part K.	SYMMETRICAL
1.12 What does the abbreviation "PCD" in Part D stand for?	PITCH CIRCLE DIAMETER
1.13 How many surfaces in Part A need to be machined?	6
1.14 Name the type of sectioning at 7 in Part J.	PARTIAL / PART SECTIONING
1.15 Calculate the exact dimension at 8 in Part I.	12.8
1.16 What is the length of the shaft?	152
1.17 Which part prevents the shaft from turning in the frame?	KEY / PART G
1.18 In the space below, draw in NEAT freehand, a welding symbol indicating a fillet weld all round.	

WELDING SYMBOL

ANSWER SHEET 1

EXAMINATION NUMBER

20 MARKS

PLEASE TURN

QUEST
LO
CA

The incomplete **graph of displacement of a wedge-follower** as well as the centre of the camshaft, as shown the given centre lines, is given.

The cam imparts the following motion to the follower:

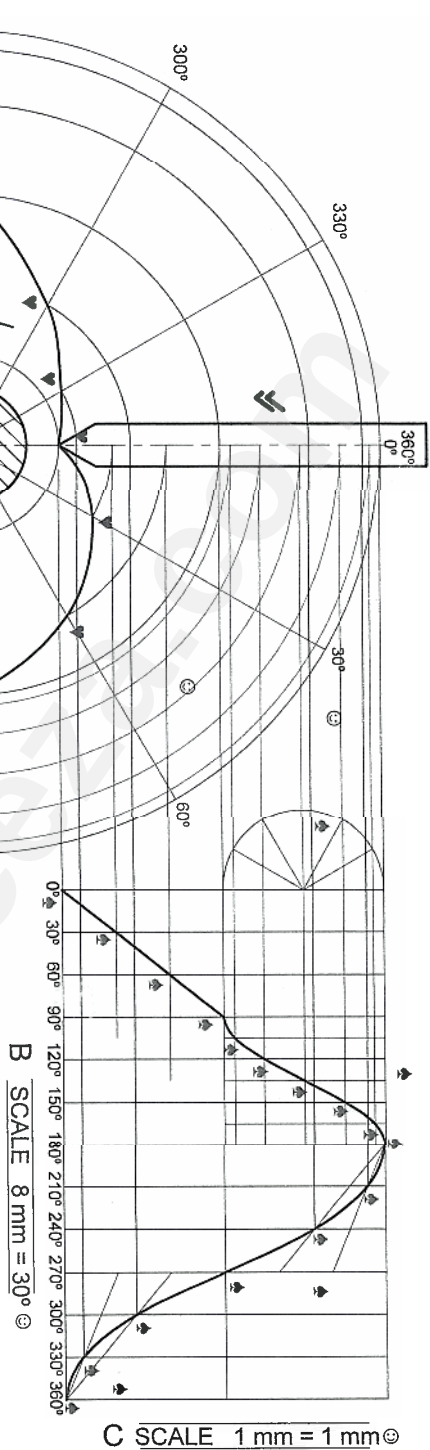
- 0°–90° the follower **rises** 30 mm with **uniform** motion.
- 90°–180° the follower **rises** 30 mm with **simple harmonic motion**.
- 180°–360° the follower returns to its original position with **uniform acceleration and retardation**.

The cam profile has the following specifications:

- The direction of turn is **anti-clockwise**.
- The **camshaft** has a diameter of 22 mm.

- 2.1 Draw the complete graph of displacement.
- 2.2 Draw the cam profile from the displacement graph.
- 2.3 Draw and hatch the camshaft.
- 2.4 Draw the wedge-ended follower (to your own appropriate size and measurements)
- 2.5 Draw the direction of rotation.
- 2.6 Print, in capitals, the required **label** for the graph of displacement at A, the horizontal scale at B and the vertical scale at C.
- 2.7 Show all constructions.
- 2.8 Draw and label all the divisions on the cam profile.

A DISPLACEMENT GRAPH



B SCALE 8 mm = 30°

C SCALE 1 mm = 1 mm

ASSESSMENT CRITERIA

• Graph	20/2 = 10
• Plot Points	15
• Locus	3
• Shaft and Hatching	2
• Direction	1
• Follower	2
• Label, constructions & scale	7

GRI	20/2	PTs	15	LOC	3
SHF	2	DIR	1	FOI	2
LB	7				

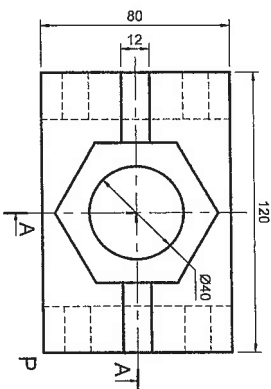
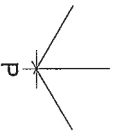
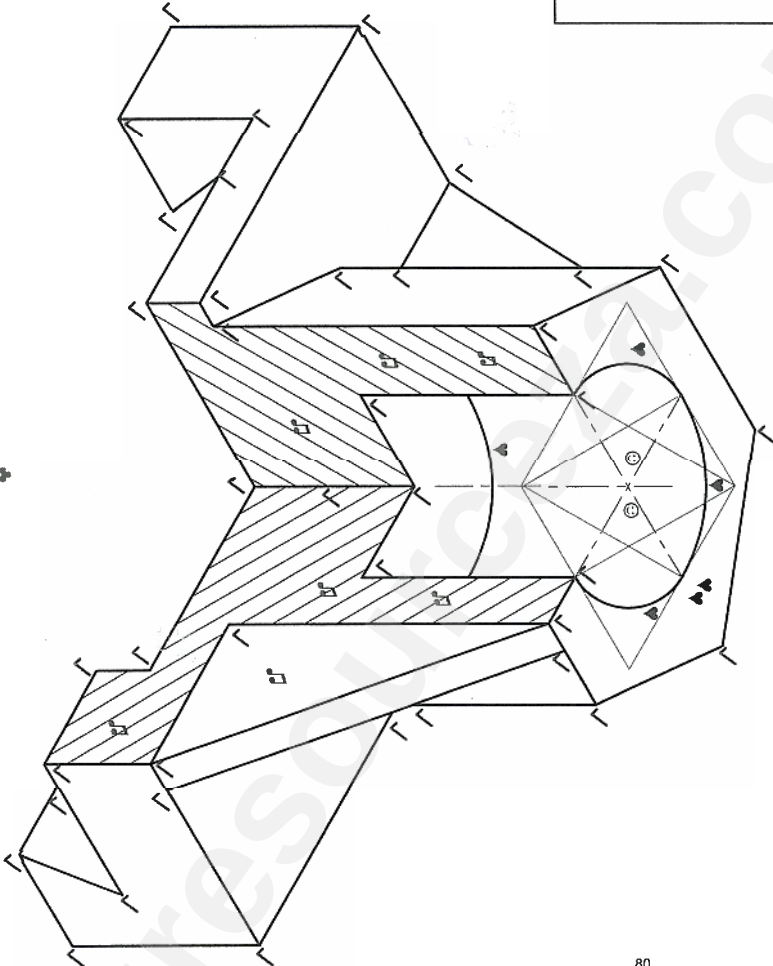
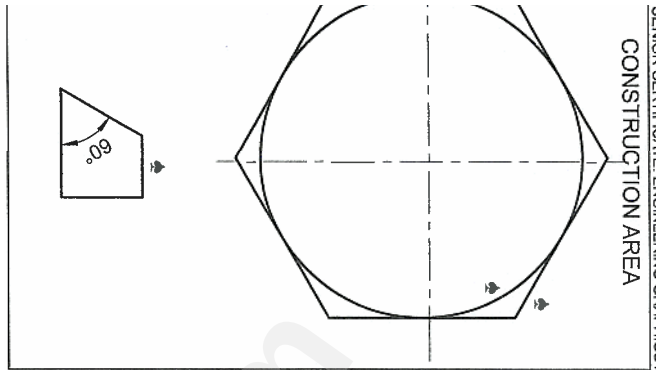
EXAMINATION NUMBER

40 MARK

ANSWER SHEET 2

PLEASE 1

CONSTRUCTION AREA



The figure below shows the front view, top view and side view of a **CASTING**. The **CASTING** is cut by **cutting-plane A-A**.

3.1 Draw a neat **half-sectioned isometric** drawing on **cutting-plane A-A**.

3.2 Show the construction for the hexagon and any other auxiliary views.

3.3 Draw the centre lines for the circle.

3.4 Make point **P** the lowest part of your drawing.

3.5 Start your drawing on the given crosshairs.

ASSESSMENT CRITERIA

- Constructions 3
- Isometric Points 40/2 20
- Isometric Circles 6
- Centre Lines 2
- Hatching / Non-Hatching 7
- Positioning 2

40 MARKS

EXAMINATION NUMBER

ANSWER SHEET 3

FIGURE 1

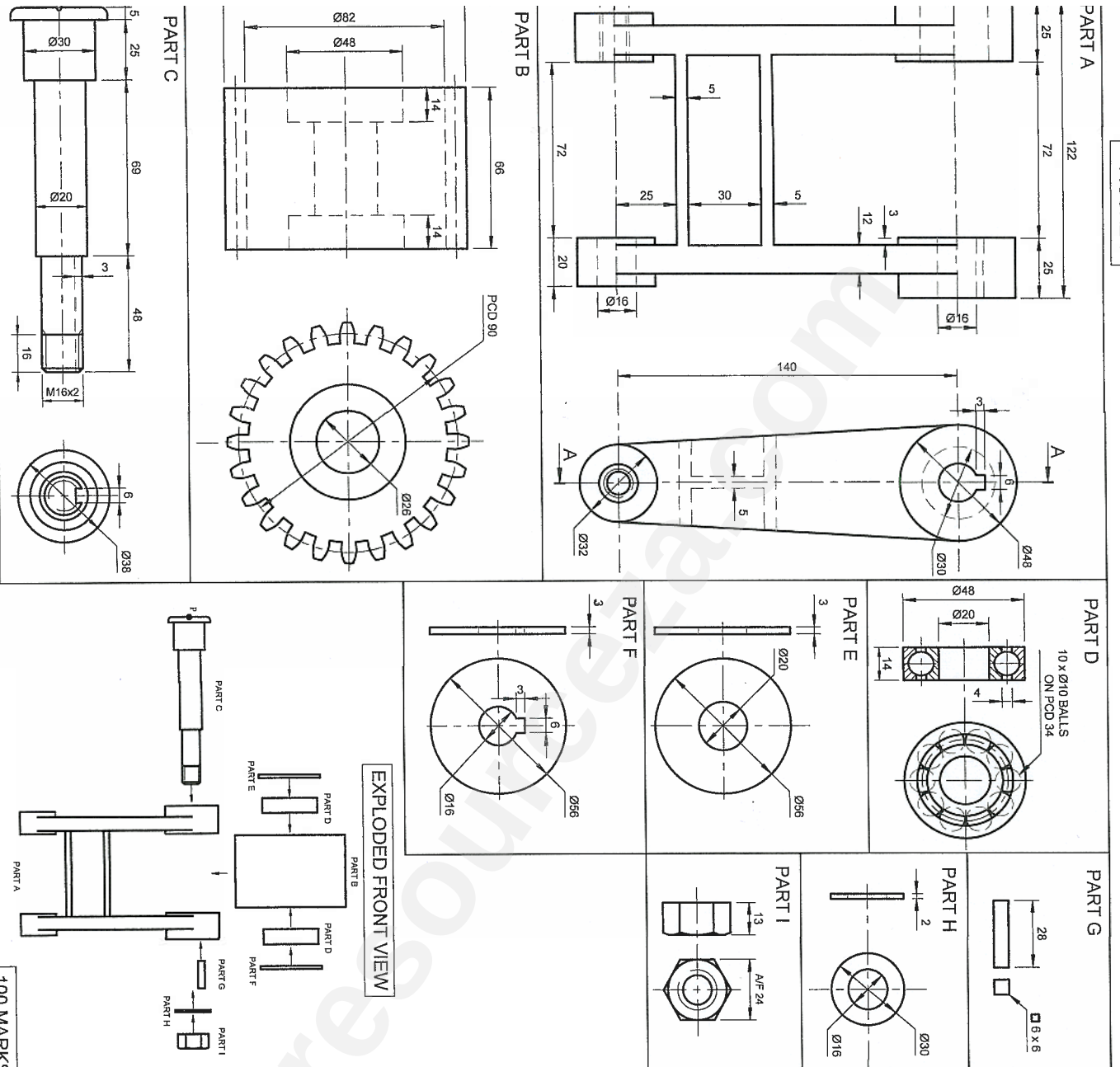


Figure 1 shows the different parts (not to scale) for a BELT TENSIONER needs to be assembled.

The exploded front view of how the parts are assembled is also shown.

Complete the following on Answer Sheet 4 to a scale of 1:1. Use the given centre lines and point P on the shaft (Part C) as a reference to plan the drawing layout.

- 4.1 Draw a full sectional front view of the assembled parts on cutting plane A.
- 4.2 Draw an outside right view of the assembled parts on the given centre line.
- 4.3 Please note the following:
 - 4.3.1 Show 3 faces of the hexagonal nut in the front view.
 - 4.3.2 Show the hidden detail of only the frame (Part A) in the right view.
 - 4.3.3 Draw the cutting plane and the missing centre lines.
 - 4.3.4 Insert 3 functional dimensions in the front view.
 - 4.3.5 Draw the projection symbol in the space provided.
 - 4.3.6 Print the title and scale in the space provided.
 - 4.3.7 Correctly label the completed front view.
 - 4.3.8 The bearings (Part D) must be drawn in convention.

PARTS LIST		
NO	PART	QUANTITY
A	FRAME	1
B	GEAR	1
C	SHAFT	1
D	BALL BEARING	2
E	SPACER 1	1
F	SPACER 2	1
G	KEY	1
H	WASHER	1
I	M16 HEXAGONAL NUT	1

EXAMINATION NUMBER

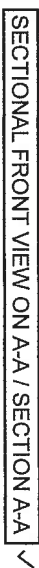
PLEASE

FRONT VIEW

TOTAL	52	
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TOTAL	19		
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TOTAL	100	
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SCALE 1:1 ✓

ANSWER SHEET 4

EXAMINATION NUMBER