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basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE/
NATIONAL SENIOR CERTIFICATE**

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2020

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label



INSTRUCTIONS AND INFORMATION

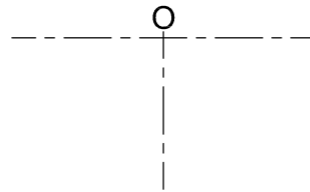
1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER, as instructed.
7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
8. Time management is essential in order to complete all the questions.
9. Print your examination number in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY															
QUESTION	MARKS OBTAINED			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING			$\frac{1}{2}$	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

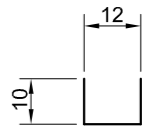
FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER





The diagram shows a semi-circular arch with center O. A vertical dashed line represents the axis of symmetry. Two concentric semi-circular arcs are shown. The outer arc has a radius labeled R16. The inner arc has a radius labeled R28. Arrows point from the labels R16 and R28 to their respective arcs.



CHUTE PROFILE

ASSESSMENT CRITERIA 2.1				
1	GIVEN	1		
2	CONSTRUCTION	6		
3	HELIX + CL	13		
4	CURVE QUALITY	2		
PENALTY (-)				
SUBTOTAL		22		

ASSESSMENT CRITERIA 2.2				
1	CONSTRUCTION	6		
2	POINTS + CURVES	9		
PENALTIES (-)				
SUBTOTAL 2.2		15		
SUBTOTAL 2.1		22		
TOTAL		37		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3



S

QUESTION 3: ISOMETRIC DRAWING

Given:

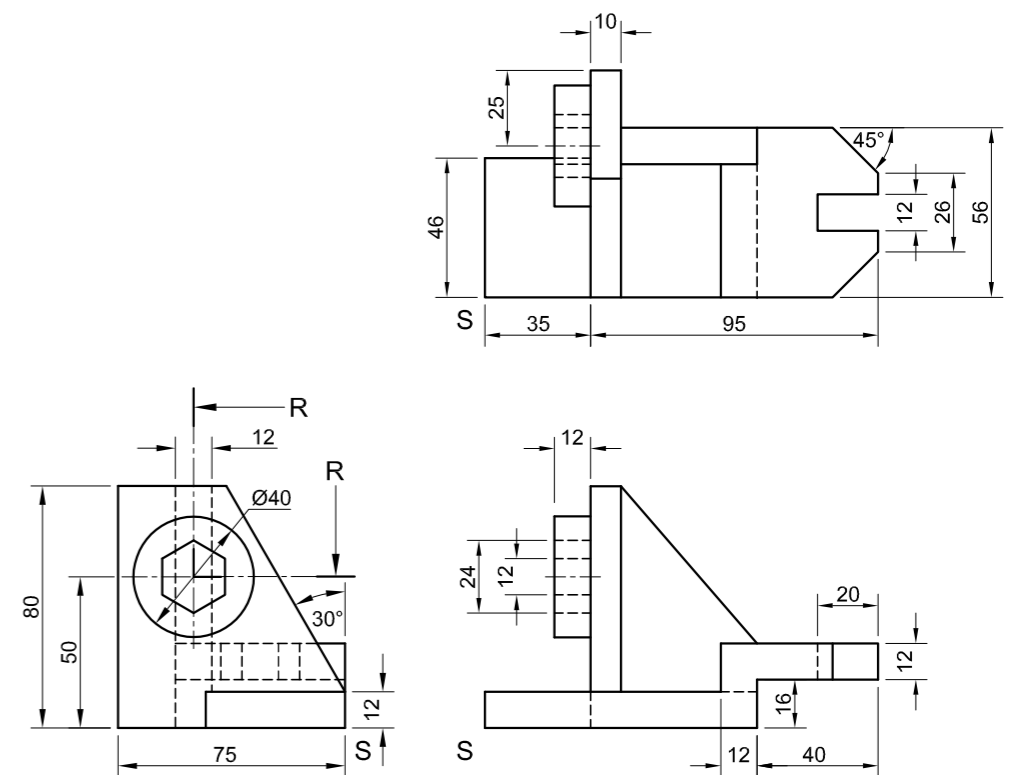
- The front view, top view and left view of a jig
- The position of point S on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the jig into a sectional isometric drawing on cutting plane R-R.

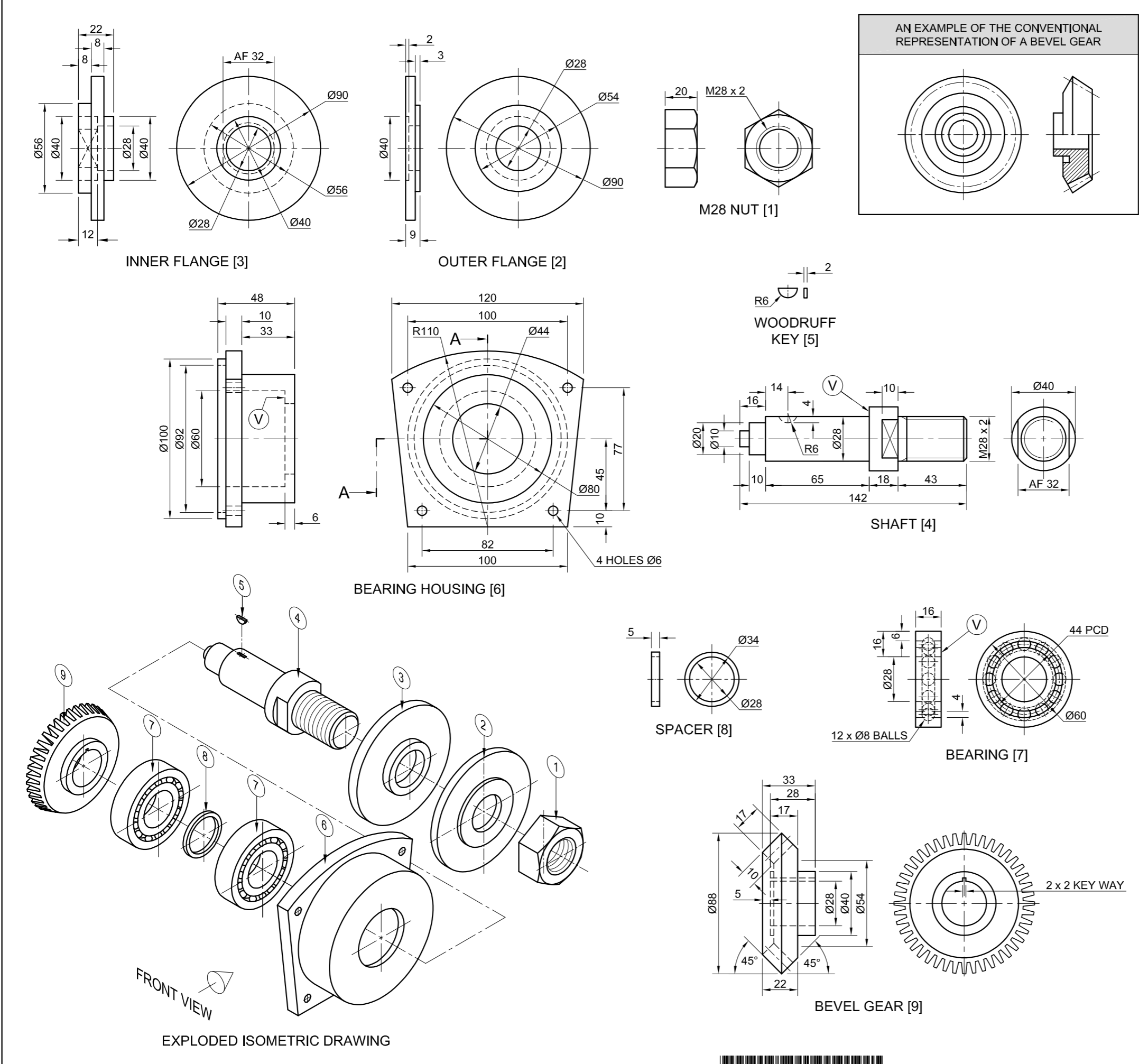
- Make S the lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

[40]



ASSESSMENT CRITERIA				
1	PLACEMENT + AUX VIEW	3		
2	BASE	13		
3	UPRIGHT	4 $\frac{1}{2}$		
4	CIRCLE + HEZAGON	9 $\frac{1}{2}$		
5	SECTION	10		
PENALTIES (-)				
TOTAL		40		
EXAMINATION NUMBER				
EXAMINATION NUMBER				4





QUESTION 4: MECHANICAL ASSEMBLY

- Given:**
- The exploded isometric drawing of the parts of a shaft assembly, showing the position of each part relative to all the others
 - Orthographic views of each part of the shaft assembly
 - An example of the conventional representation of a bevel gear

- Instructions:**
- Answer this question on page 6.
 - Draw, to scale 1 : 1 and in third-angle orthographic projection, the following views of the assembled parts of the shaft assembly:
 - 4.1 **A half-sectional front view** on cutting plane A-A. Show the top half in section, as seen from the direction of the arrow on the exploded isometric drawing. The cutting plane is shown on the right view of the bearing housing (part 6).
 - 4.2 **The right view**

- NOTE:**
- Planning is essential.
 - The drawing must comply with the guidelines as contained in the *SANS 10111*.
 - The convention of symmetry may NOT be applied.
 - The surfaces marked **V** on the shaft (part 4) and the right bearing (part 7), must be aligned with the surface marked **V** on the inside of bearing housing (part 6).
 - Show **THREE** faces of the M28 nut (part 1) in the half-sectional front view.
 - Draw the **left** bearing in detail and the **right** bearing as a convention representation.
 - Add cutting plane A-A.
 - **NO** hidden detail is required.

[93]

PARTS LIST			
PART		QUANTITY	MATERIAL
1	M28 NUT	1	MILD STEEL
2	OUTER FLANGE	1	MILD STEEL
3	INNER FLANGE	1	MILD STEEL
4	SHAFT	1	TOOL STEEL
5	WOODRUFF KEY	1	TOOL STEEL
6	BEARING HOUSING	1	PEWTER
7	BEARING	2	TOOL STEEL
8	SPACER	1	MILD STEEL
9	BEVEL GEAR	1	TOOL STEEL

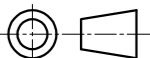
GSP

SHAFTS AND GEARS

CYLINDER STREET
INDUSTRIAL PARK
www.shaftsgalore.co.za

SHAFT ASSEMBLY

ALL DIMENSIONS ARE IN MILLIMETRES



5



FOR OFFICIAL USE ONLY	
INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

ASSESSMENT CRITERIA					
RIGHT VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	BODY	4½			
2	SHAFT	1½			
3	M28 NUT + FLANGE	3½			
SUBTOTAL		9½			
HALF SECTIONAL FRONT VIEW					
1	BODY	13			
2	SHAFT + KEY	16			
3	BEARING + SPACER	9			
4	FLANGES	13			
5	M28 NUT	4½			
6	GEAR	11			
SUBTOTAL		66½			
GENERAL					
1	CENTRE LINES	4			
2	CUTTING PLANE A-A	4			
3	ASSEMBLY	9			
SUBTOTAL		17			
TOTAL		93			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6

