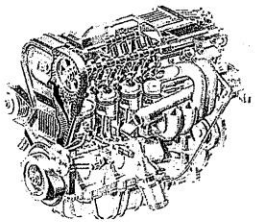
HILLCREST HIGH SCHOOL

ENGINEERING GRAPHICS AND DESIGN EXAM

MIDYEAR EXAM



GRADE 12
2019
PAPER 2

TIME: 3 hours
Examiner: Mrs Tonkin

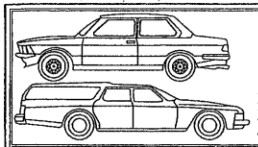
MARKS: 190
Moderator: Mr Victor

NB: READ THE INTRUCTIONS

1. This paper consists of **6 pages** including the cover page and **4 questions**.
2. Answer **ALL** questions.
3. Take note of the mark allocation in each question.
4. The questions must be answered on the answer sheets provided.
5. All the answer sheets must be **re-stapled** in **NUMERICAL** sequence and handed in irrespective of whether the question was attempted or not.
6. Time management is essential in order to complete all the questions.
7. Print your Name in the block provided on EVERY answer sheet.
8. All answers must be drawn accurately and neatly.
9. Any details or dimensions not given must be assumed in good proportion.

QUESTION	SECTION	MARK	MODERATE	MAXIMUM
1	MECHANICAL ANALYTICAL			30
2	LOCI - CAM			30
3	ISOMETRIC			30
4	MECHANICAL ASSEMBLY			100
TOTAL				**190**
SYMBOL				**100**

NAME:
TEACHER:



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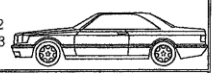
"we like to fix it"

est. 1956. Phoenix



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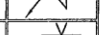
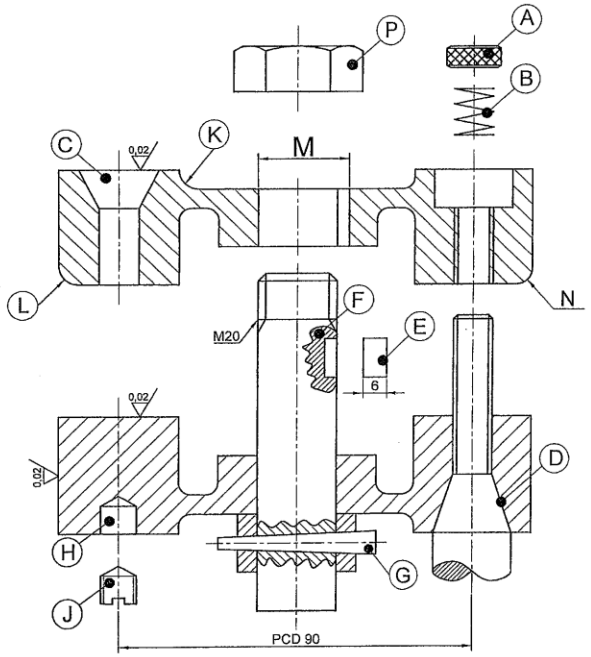
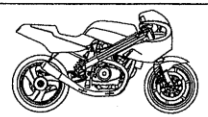
DRAWN BY: WILLY NAIDOO	DRAWN DATE: 10 - 09 - 2009	MATERIAL: MILD STEEL	REVISION 1: COLOUR [17-09-2009]
CHECKED BY: JOE MAHARAJ	CHECKED DATE: 14 - 09 - 2009	NO REQUIRED: 2001	REVISION 2: MODEL [19-09-2009]
APPROVED BY: H.V. BAKSHI	APPROVED DATE:16 - 09 - 2009	SI UNIT: MILLIMETRES	TOLERANCES: ± 0,03
DRAWING NO: 2812 - SAM	DRAWING SYSTEM: AutoCAD	DRAWING TITLE: COUPLING	MACHINING: 0,02
REFERENCE NO: 2812/12	DRAWING SCALE: 1:5	UNSPECIFIED RADII: R4	MACHINING COMPANY: B.O.E PTY

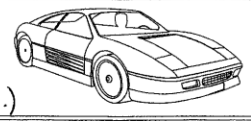
WELDING SYMBOLS	
Q	
R	
S	





REFER TO THE DRAWING AND INFORMATION AND ANSWER THE QUESTIONS THAT FOLLOW	
1. What is the drawing number?	
2. How is a motorcar workshop harmful to the environment?	
3. In what suburb is the company situated?	
4. Who approved the drawing?	
5. Why was the drawing revised for a second time?	
6. Why is a bleeding mechanic removed from the workshop?	
7. What is the tolerance on all dimensions?	
8. Describe the lay of machining ?	
9. Which company does this company's machining?	
10. How many surfaces require machining?	
11. What does component B represent?	
12. What does component E represent?	
13. What does component G represent?	
14. What does component J represent?	
15. What does feature A represent?	
16. What does feature D represent?	
17. What type of sectioning is shown at F?	
18. What type of hole does H represent?	
19. What does feature K represent?	
20. What does feature L represent?	
21. What is the dimension M?	
22. What is the dimension N?	
23. What is the height of the M20 hexagonal nut (part P)?	
24. What type of hole does C represent?	
25. What is the roughness value of the machining symbols?	
26. What is the welding symbol Q?	
27. What is the welding symbol R?	
28. What is the welding symbol S?	
29. How many components are being assembled in this drawing?	

NAME	



(2.)

A disc cam rotates with uniform velocity in an anti-clockwise direction, and transmits the following motion to a wedge - ended follower which reciprocates along the vertical centre line of the cam shaft.

During the first 60° rotation the follower rises 25mm.
During the next 60° rotation the follower is at rest.
During the next 60° rotation the follower rises 25mm.
During the next 60° rotation the follower falls 25mm.
During the next 60° rotation the follower is at rest.
During the final 60° rotation the follower returns to the original position.

Cam Shaft Diameter = 20mm

Minimum distance from the centre of the cam shaft to the profile = 20mm

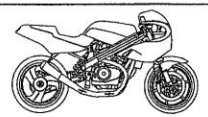
- Draw the graph of displacement using a scale of 6mm = 30°.
- Draw the profile of the cam that generates the above motion. [30]

ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:

• draw and label the graph of displacement	5
• accurately plot the minimum cam profile	4
• draw the follower	1
• draw and hatch the cam shaft	1
• draw and label the divisions	1
• draw the direction	1
• project points from graph to the profile	1
• project points from the profile to the divisions	1
• insert all centre lines	2
• accurately plot the points for the locus	11
• draw the locus joining the points	2

NAME



(3.)

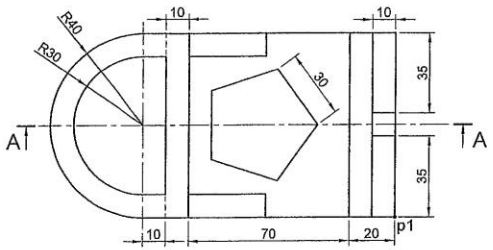
The figure shows the front view, top view and right view of a CASTING drawn in Third Angle Orthographic projection. The casting is cut by a cutting plane A-A.

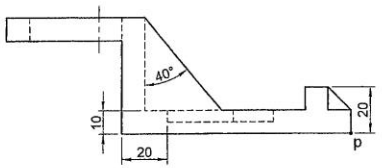
Use your instruments to draw a Sectional Isometric view of the casting, on the cutting plane A-A. Use scale 1:1. Use point P as a reference point on your drawing. Do **NOT** show hidden details. Show all construction. X-Hatch all the sectioned areas. [30]

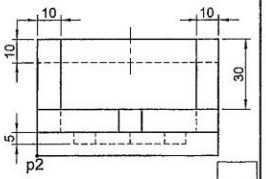
ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:

• draw the isometric view	19
• draw the isometric circle arcs	3
• draw the isometric construction for circle	1
• draw the construction for the pentagon	1
• areas of no section	1
• draw the angle construction	1
• X-Hatch the sectioned areas	4







P

NAME

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Answer this question on **ANSWER SHEET 1**

The figure shows the multi-views of components of a **CLUTCH ASSEMBLY**, drawn in third angle orthographic projection.

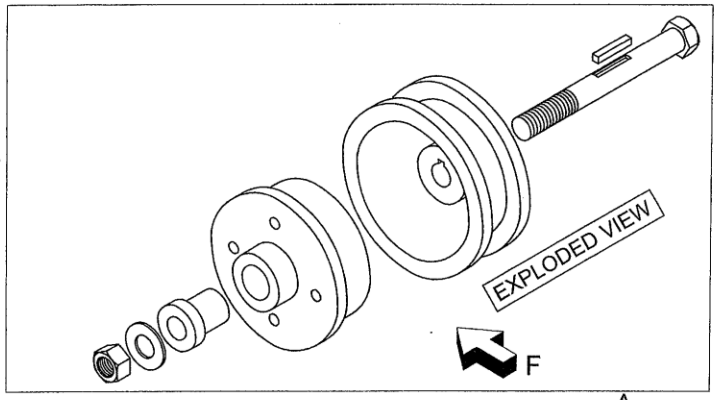
Draw to a scale 1:1the following:

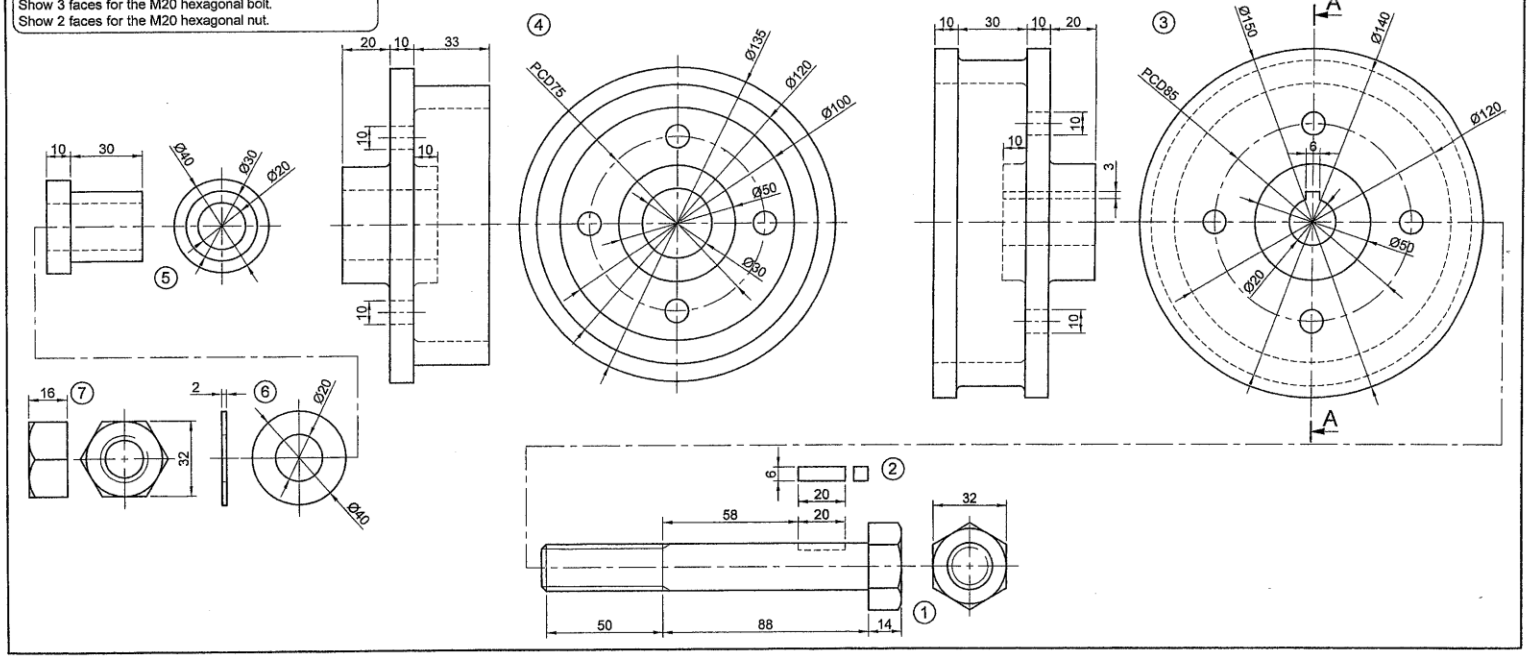
1.1 A **Sectional Front View**, on the cutting plane A-A, of the assembled components, as seen in the direction of F;

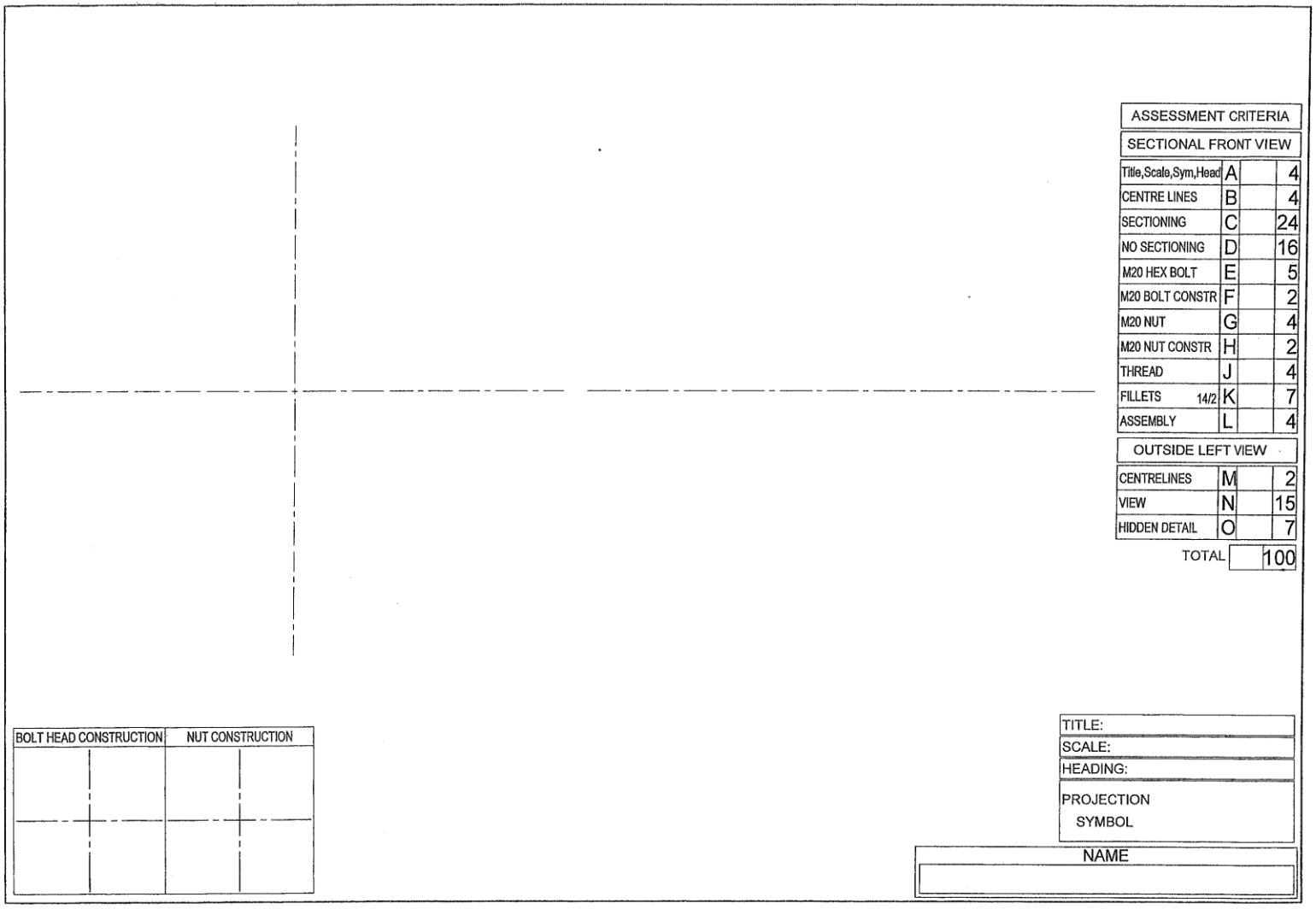
1.2 An **Outside Left View** of the assembled components. Only show the hidden detail of the ***CLUTCH*** in this view.

Show the bolt & nut construction in the space provided.
All fillets not given R2,5. *Use the centre lines for the views*
Print the title, scale and headingin the space provided.
Draw the projection symbol in the space provided.
Show 3 faces for the M20 hexagonal bolt.
Show 2 faces for the M20 hexagonal nut.

COMPONENT LIST		
NO	PART	QUANTITY
1	M20 HEXAGONAL BOLT	1
2	KEY	1
3	CLUTCH	1
4	CLUTCH HOUSING	1
5	BUSH	1
6	WASHER	1
7	M20 HEXAGONAL NUT	1







ASSESSMENT CRITERIA			
SECTIONAL FRONT VIEW			
Title,Scale,Sym,Head	A		4
CENTRE LINES	B		4
SECTIONING	C		24
NO SECTIONING	D		16
M20 HEX BOLT	E		5
M20 BOLT CONSTR	F		2
M20 NUT	G		4
M20 NUT CONSTR	H		2
THREAD	J		4
FILLETS 14/2	K		7
ASSEMBLY	L		4
OUTSIDE LEFT VIEW			
CENTRELINES	M		2
VIEW	N		15
HIDDEN DETAIL	O		7
TOTAL			100

BOLT HEAD CONSTRUCTION	NUT CONSTRUCTION

TITLE:
SCALE:
HEADING:
PROJECTION SYMBOL

NAME