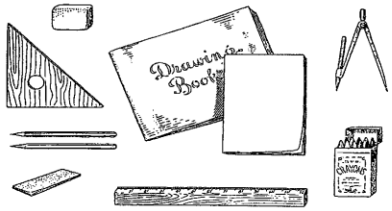
# HILLCREST HIGH SCHOOL

## MIDYEAR EXAMINATION

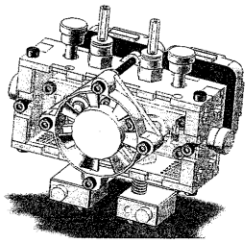
## ENGINEERING, GRAPHICS & DESIGN



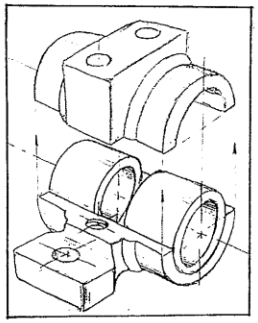

GRADE 12

2017

PAPER 2



**MARKS**: 100 **TIME**: 3 HOURS



**INSTRUCTIONS TO CANDIDATES**

1. This question paper consists of **5 pages** including the cover page and **3 questions**.
2. **All** questions must be answered.
3. Unless specified otherwise, all questions are in **Third AngleOrthographic Projection**.
4. Unless specified otherwise, all questions are to be completed to a **scale of 1:1**.
5. **All** answer sheets must be re-stapled in numerical order, even questions that are not attempted/blank.
6. All **construction work** must be shown, even if a stencil was used.
7. Print your **NAME** neatly on each page.
8. Use only the **drawing sheets** provided.
9. Your drawings should reflect **neatness** and **accuracy**.
10. All dimensions or detail not given may be **assumed** in **good proportion**.

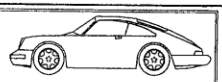
| QUESTION | SECTION | MARK | MODERATE | MAXIMUM |
|---|---|---|---|---|
| 1 | MECHANICAL ANALYTICAL | | | 25 |
| 2 | ISOMETRIC PROJECTION | | | 50 |
| 3 | MECHANICAL ASSEMBLY | | | 100 |
| TOTAL | | | | 175 |
| SYMBOL | | | | 100 |

NAME:

# HIRUNDI .V. BAKSHI MOTORS

"we like to fix it"

est. 1956. Phoenix

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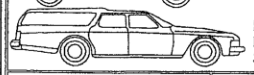
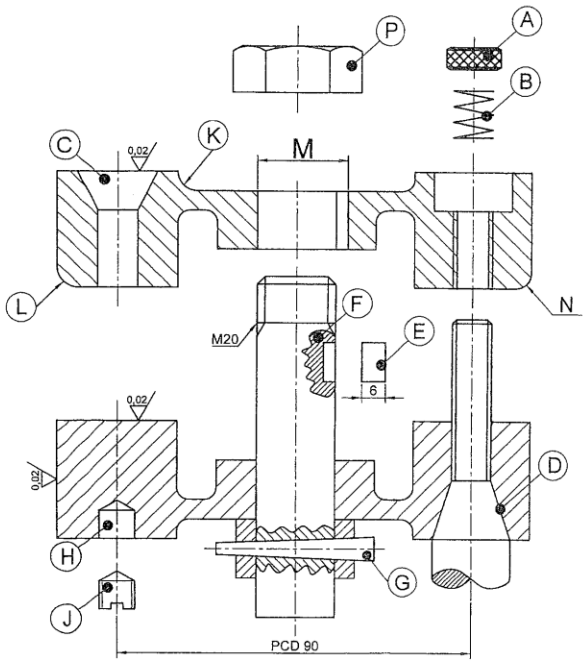
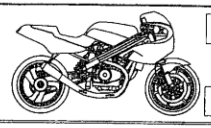


| | | | |
|---|---|---|---|
| DRAWN BY: WILLY NAIDOO | DRAWN DATE: 10 - 09 - 2009 | MATERIAL: MILD STEEL | REVISION 1:COLOUR [17-09-2009] |
| CHECKED BY: JOE MAHARAJ | CHECKED DATE: 14 - 09 - 2009 | NO REQUIRED: 2001 | REVISION 2:MODEL [19-09-2009] |
| APPROVED BY: H.V. BAKSHI | APPROVED DATE:16 - 09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

| WELDING SYMBOLS | |
|---|---|
| Q | |
| R | |
| S | |



GRADE 12 P2

MECHANICAL ANALYTICAL

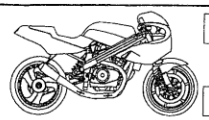
| REFER TO THE DRAWING AND INFORMATION AND ANSWER THE QUESTIONS THAT FOLLOW | |
|---|---|
| 2.1. What is the drawing number? | |
| 2.2. How is a motorcar workshop harmful to the environment? | |
| 2.3. In what suburb is the company situated? | |
| 2.4. Who approved the drawing? | |
| 2.5. Why was the drawing revised for a second time? | |
| 2.6. Why is a bleeding mechanic removed from the workshop? | |
| 2.7. What is the tolerance on all dimensions? | |
| 2.8. Describe the lay of machining ? | |
| 2.9. Which company does this company's machining? | |
| 2.10. How many surfaces require machining? | |
| 2.11. What does component B represent? | |
| 2.12. What does component E represent? | |
| 2.13. What does component G represent? | |
| 2.14. What does component J represent? | |
| 2.15. What does feature A represent? | |
| 2.16. What does feature D represent? | |
| 2.17. What type of sectioning is shown at F? | |
| 2.18. What type of hole does H represent? | |
| 2.19. What does feature K represent? | |
| 2.20. What does feature L represent? | |
| 2.21. What is the dimension M? | |
| 2.22. What is the dimension N? | |
| 2.23. What is the height of the M20 hexagonal nut (part P)? | |
| 2.24. What type of hole does C represent? | |
| 2.25. What is the roughness value of the machining symbols? | |

25

ANSWER SHEET

NAME

PLEASE TURN OVER



GRADE 12 P2

ISOMETRIC PROJECTION

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.

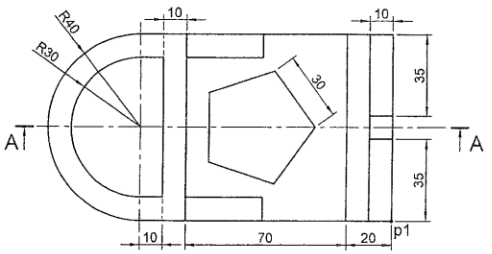
Use your instruments to draw a Sectional Isometric view of the casting, on the cutting plane A-A. Use scale 1:1. Use point P as a reference point on your drawing. Do **NOT** show hidden details. Show all construction. X-Hatch all the sectioned areas.

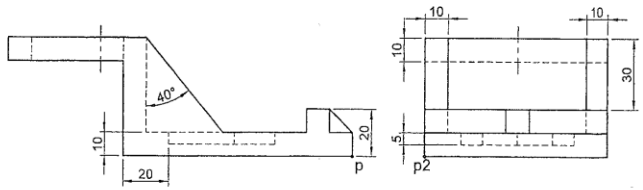
**ASSESSMENT CRITERIA**

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

- draw the isometric view
- draw the isometric circle arcs
- draw the isometric construction for circle
- draw the construction for the pentagon
- areas of no section
- draw the angle construction
- X-Hatch the sectioned areas

**50**




P

ANSWER SHEET

NAME

PLEASE TURN OVER

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MECHANICAL ASSEMBLY

Answer this question on **ANSWER SHEET 1**

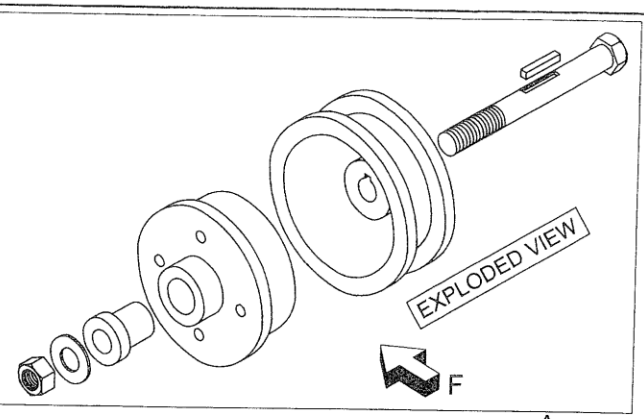
The figure shows the multi-views of components of a **CLUTCH ASSEMBLY**, drawn in third angle orthographic projection.

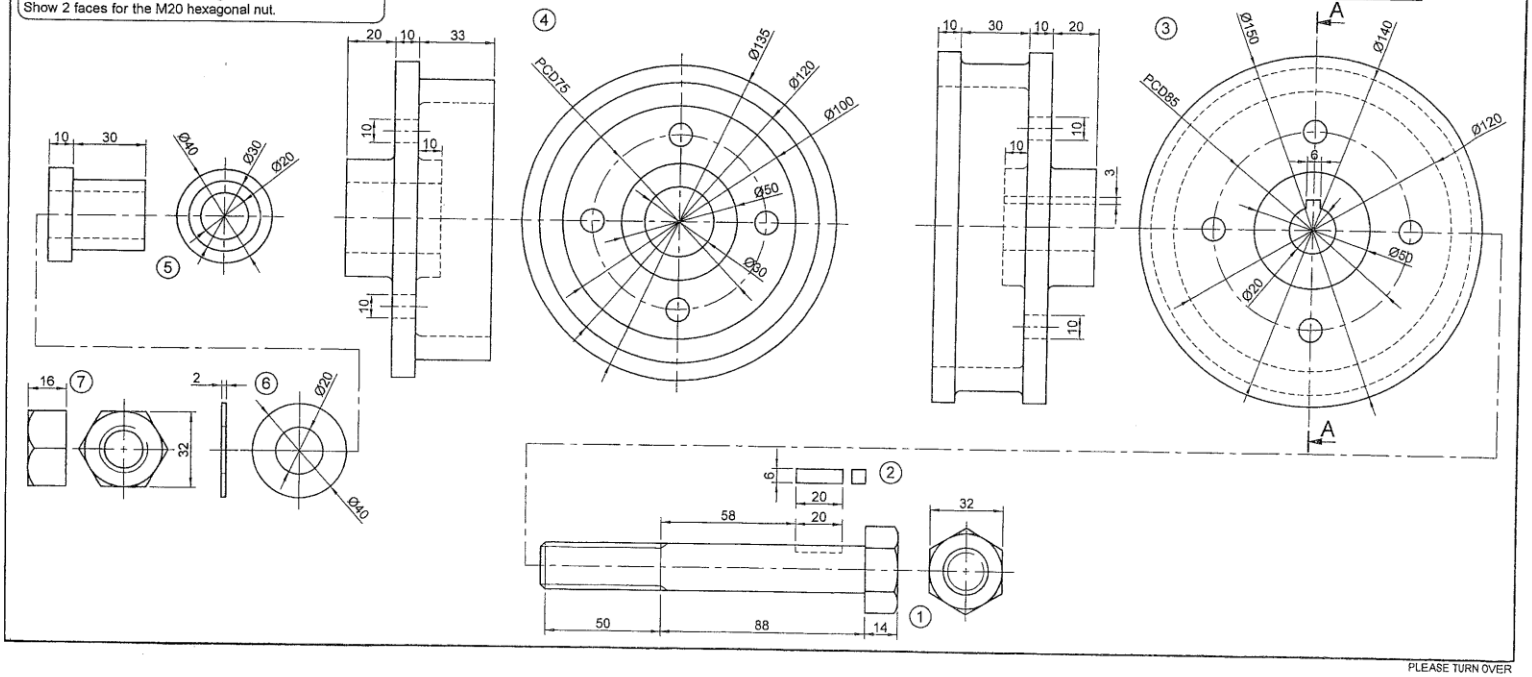
Draw to a scale 1:1the following:

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 |




PLEASE TURN OVER

MECHANICAL ASSEMBLY

**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 | |
|---|---|---|---|
| | | | |
| | | | |

ANSWER SHEET

TITLE:

SCALE:

HEADING:

PROJECTION SYMBOL

NAME