

**CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)**  
**NORTHERN ZONE JOINT EXAMINATION SYNDICATE (NZJES) 2024**  
**FORM FOUR PRE-NATIONAL EXAMINATION**  
**ENGINEERING DRAWING**

**CODE : 091**

**TIME: 3:00 HOURS**

**INSTRUCTIONS**

- **This paper consists of sections A, B and C with the total of six (06) questions**
- **Answer all questions in sections A and C and any three questions in section B**
- **Use blue or black pen in writing and pencil in sketches and drawings**
- **All writing must be in blue or black ink except drawings which will be in pencil**
- **Write your name on every page of booklet**

**SECTION A (10marks)**

**Answer all questions**

1. For each of the following items i-x, choose the most correct answer from among the given alternatives

i. What is the method of drawing isometric circles in the pictorial drawing?

- |                              |                             |
|------------------------------|-----------------------------|
| (A). The four -centre method | (C). The coordinates method |
| (B). The off -set method     | (D). The cabinet method     |

ii. What is to be observed during oblique sketching of a cube

- |   |   |
|---|---|
| (A). Both receding axes are at 30 degrees to the horizontal | (D). The depth distance must be reduced |
| (B). The front face appears in it's true shape              |   |
| (C). All faces are equally distorted                        |   |

iii. Which statement is true about isometric drawings?

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| (A). Two axes are perpendicular    | (C). All faces are equally distorted |
| (B). True measurements can be made | (D). The axes are parallel           |

iv. Which type of line is a part of dimension

- (A). Break lines
- (B). Extension lines
- (C). Phantom lines
- (D). Cutting plane lines

v. Which of the following is false regarding sketching?

- (A). Sketching is performed using instruments
- (B). Sketching is made incorrect proportional
- (C). Initial ideas are represented sketch
- (D). Sketching does not need a scale

vi. What is the procedure of drawing horizontal lines in free hand sketching?

- (A). From right to left
- (B). From left to right
- (C). From centre to both sides
- (D). From ends to centre

vii. The purpose of drawing auxiliary views in engineering drawing is

- (A). To show the true shape of a slanted surface
- (B). To simplify drawings
- (C). To show the picture of the object
- (D). To make arrangements

viii. The purpose of passing cutting plane through orthographic views of a detailed component is to

- (A). Reduce the weight of the component
- (B). Simplify the drawing
- (C). Show internal details of a component
- (D). Show true shape

ix. A point traced on the circumference of a circle as the circle rolls along a straight line is called

- (A). The cycloid
- (B). The involute
- (C). The helix
- (D). The spiral

x. Two types of working drawing are

- (A). Detail drawing and assembly drawing
- (B). Pictorial drawing and orthographic drawing
- (C). Isometric and oblique
- (D). First angle and third angle

**SECTION B (60 marks)**

**Answer any three questions**

2. a). Draw a regular Pentagon by using general method ( $45^\circ$  and  $60^\circ$ ). Given side AB = 40mm

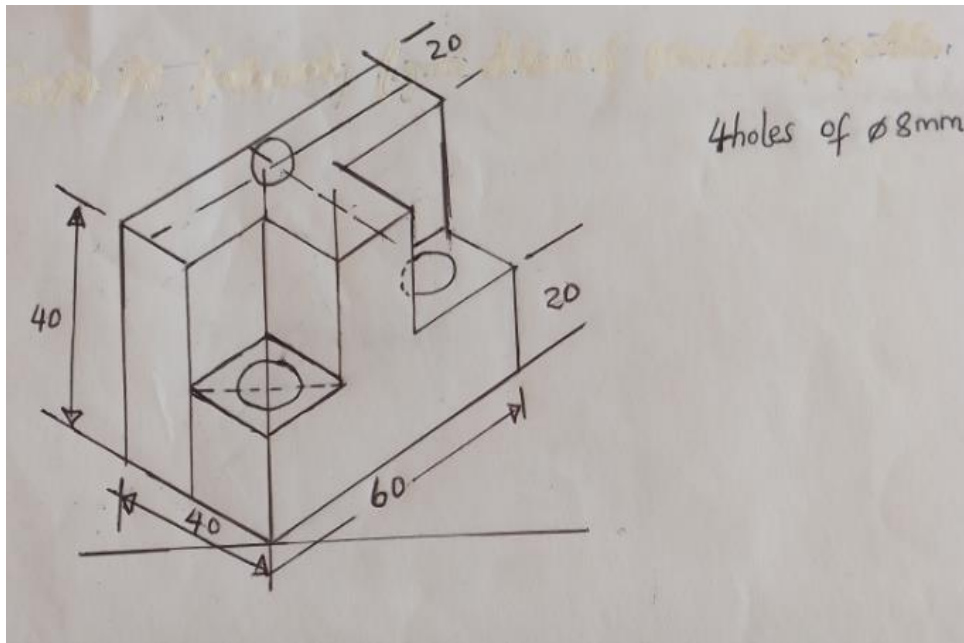
(b). Construct a regular hexagon in a given circle of diameter 60mm

(c). A clearance fit has to be provided for a shaft and bearing assembly taking a diameter of 40mm. Tolerances on the hole and shaft are 0.006mm and 0.004mm respectively. If an allowance of 0.002mm is provided, find the limits of size for hole and shaft when

(i). Hole basis system is used

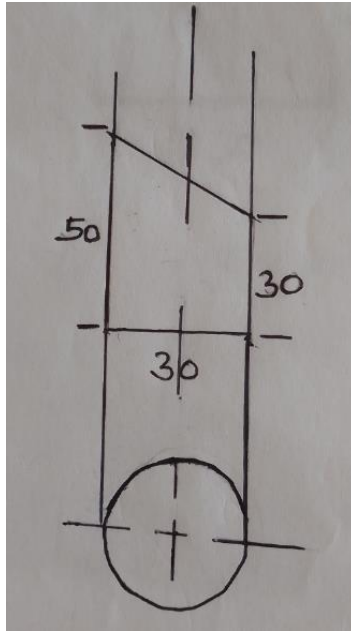
(ii). Shaft basis system is used

3. a).



b). Draw orthographic views in first angle projection

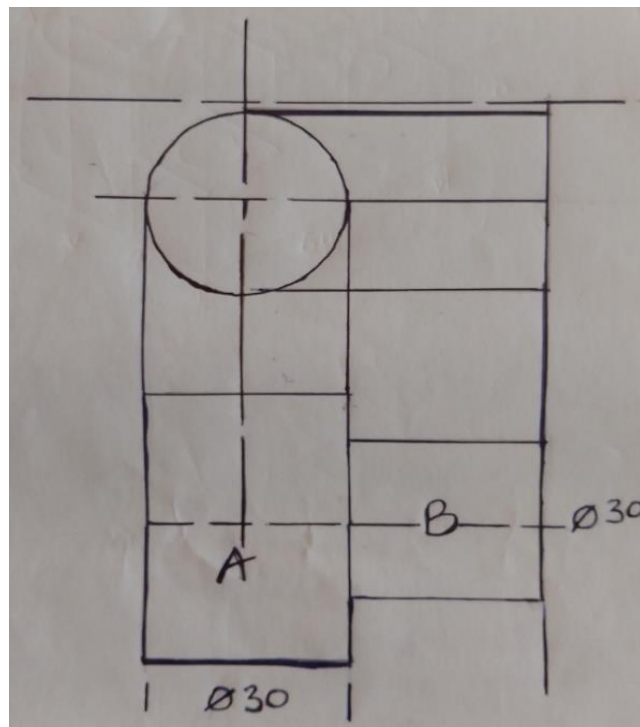
4. a). Draw the auxiliary view of a truncated cylinder



b). Draw the development of the above truncated cylinder

5.(a). Draw the lines of intersection of two cylindrical pipes of the same diameters of 30mm and length of 50mm each from the given orthographic views

(b). Draw the development of pipe B

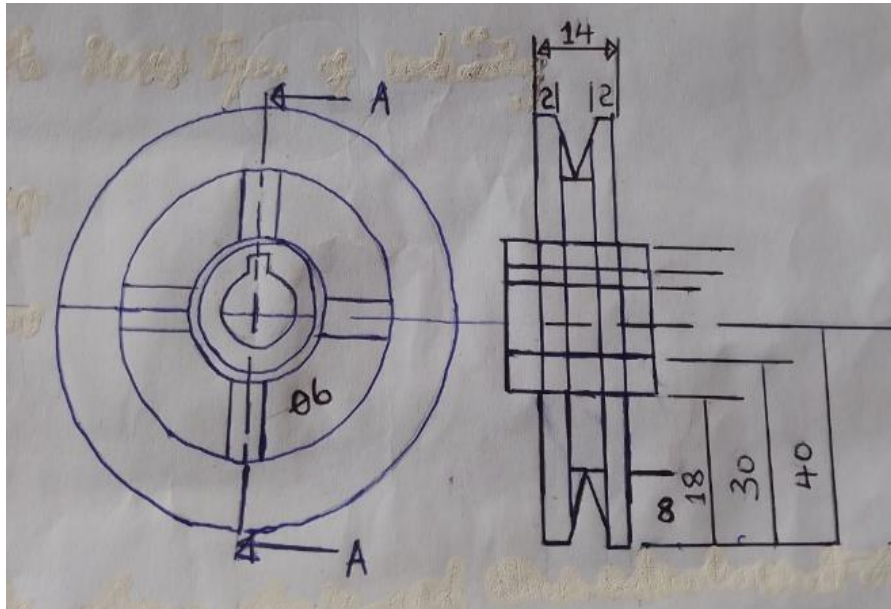


**SECTION C (30 marks)**

6. a). What is the difference locking devices and fasteners. Write three examples of each.

(b). Write six (6) types of sectioning

(c). Slopes of wheel in sectional view.



Redraw the given views and show section lines A-A

**MARKING SCHEME CSSC – 2024**  
**ENGINEERING DRAWING**  
**FORM FOUR PRE-NATIONAL EXAMINATION**  
**SECTION A (10 MARKS)**

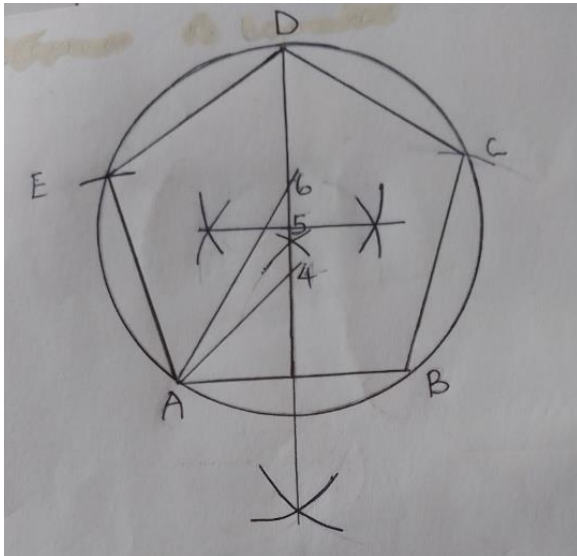
1.

i).	ii)	iii).	iv).	v).	vi).	vii).	viii).	ix).	x).
C	B	C	B	A	B	A	C	A	A

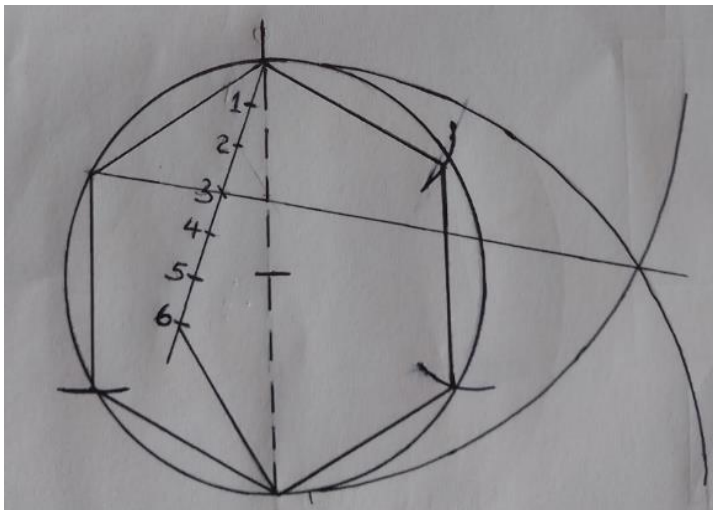
(10 marks)

**SECTION B (60 marks)**

2. (a). (05 marks)



(b) (05 marks)



c).

i). When hole basis system is used

**Data given**

Hole size=?

- Lower limit = 40.000mm, Higher limit = 0.006mm

Hole basis system = lower limit + higher limit

Hole basis system = 40.000mm + 0.006mm = 40.006mm

- The allowance provided is 0.002mm.

Higher limit of shaft = lower limit of hole - Allowance

- Higher limit shaft = 40.000 - 0.002 = 39.998mm

Lower limit of shaft = Higher limit of shaft - Tolerance

- Lower limit of shaft = 39.998 - 0.004 = 39.994mm

**(05 marks)**

(b). When shaft basis system is used

- Shaft size: Higher limit of shaft = 40.000mm

Lower limit of shaft = 40.000mm - 0.004mm = 39.996mm

- The allowance provided = 0.002mm

Therefore lower limit of hole = Higher limit of shaft + Allowance

Lower limit of hole = 40.000 + 0.002mm = 40.002mm

Higher limit of shaft = lower limit of hole + Tolerance

- Higher limit of hole = 40.002mm + 0.006mm = 40.008mm

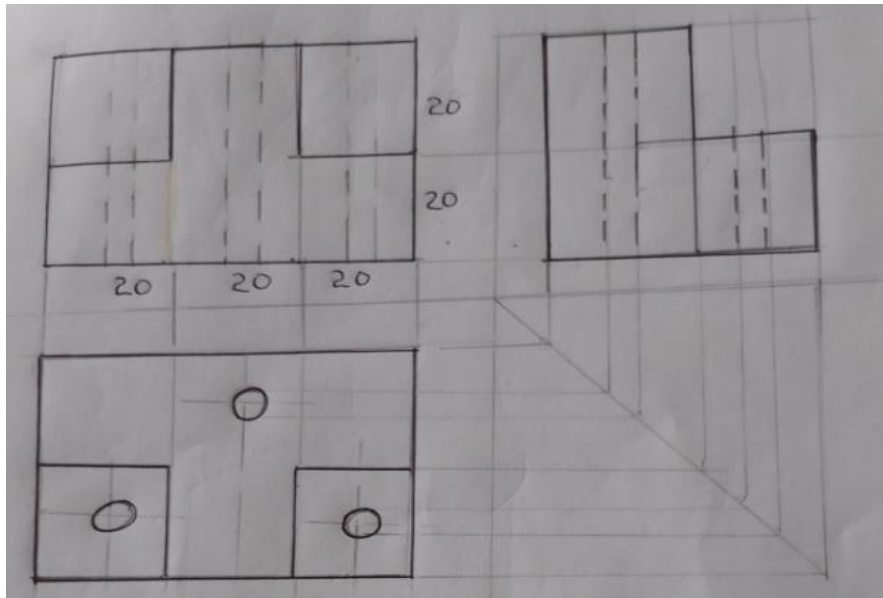
**(05 marks)**

**3. (a) Three-dimensional drawing**

**Two-dimensional drawing**

**(02 marks)**

(b)



**Front:**

**Outlines = 02 marks**

**Hidden lines = 02 marks**

**Dimensions = 02 marks**

**Plan:**

**Outlines = 02 marks**

**Hidden lines = 02 marks**

**Dimensions = 02 marks**

**Side:**

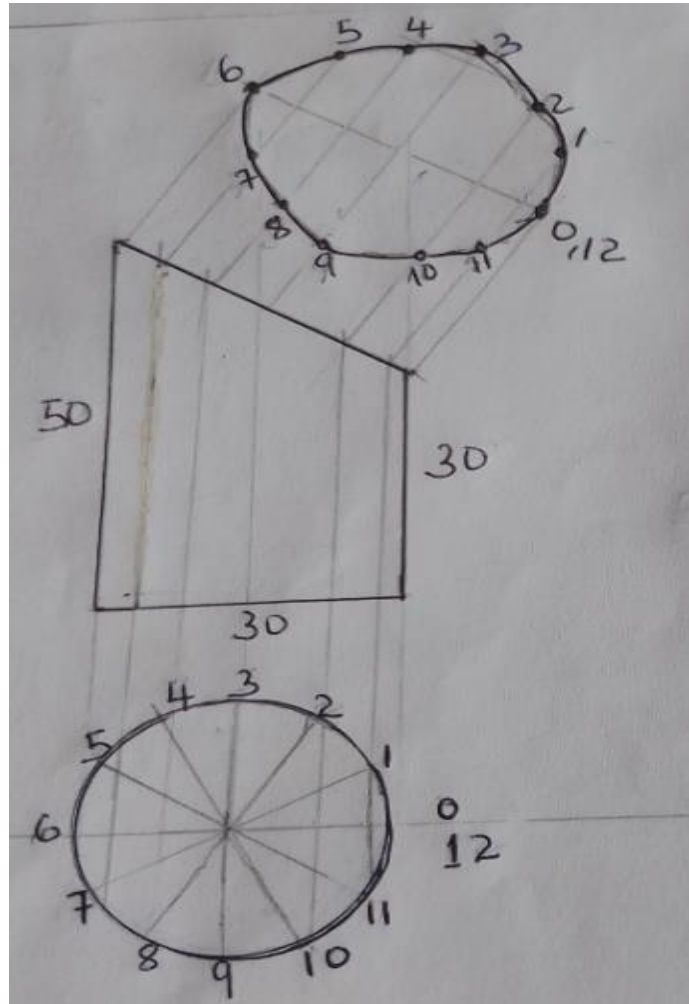
**Outlines = 02 marks**

**Hidden lines = 02 marks**

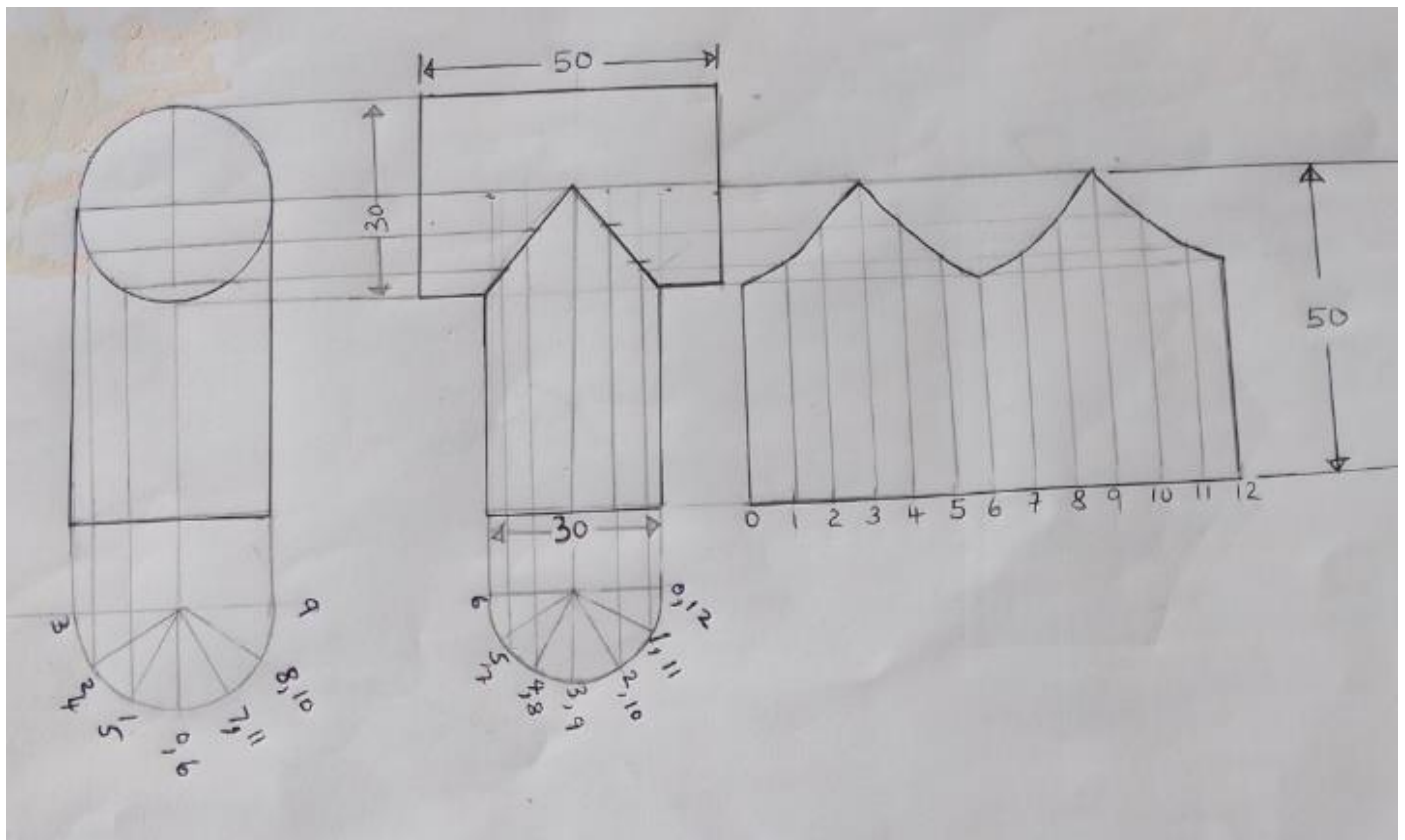
**Dimensions = 02 marks**



4. (10 marks)



5.



Dimensions = 02 marks

Intersection = 02 marks

Centre lines = 02 marks

Development = 02 marks

Division of circle = 02 marks

**SECTION C (30 MARKS)**

6. a). i). Locking devices Are used to prevent bolts, nuts and screw from working loose. Examples keys and Key-ways, spring washer, toothed washers, wired bolts, lock nut and castle nuts. **(03 marks)**

While

Fasteners devices: Are the devices used for holding components parts together. Eg . Nuts, bolt, screw studs. **(03 marks)**

(b).

i). Full sectioning,

ii) half sectioning

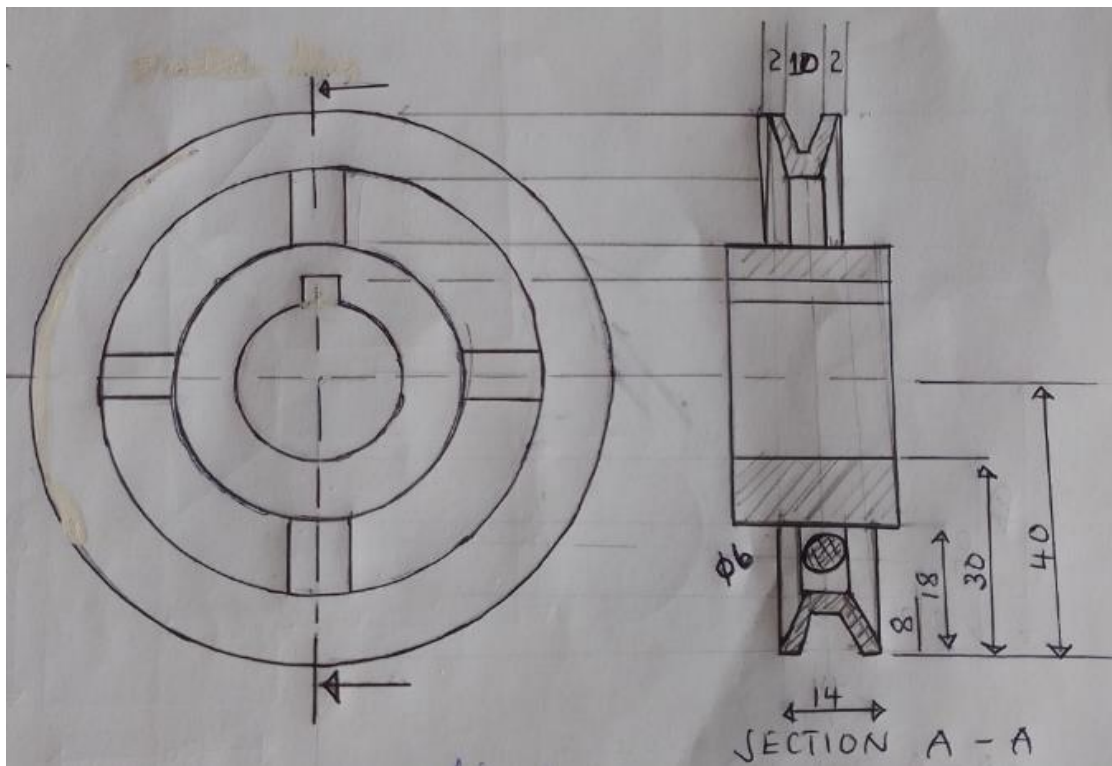
iii) Offset sectioning

iv) Aligned sectioning,

v) Revolved sectioning

vi) removed sectioning. **(1.5 x 6 = 09 marks)**

(c)



Copying = 10 marks

True circle = 02 marks

Dimension = 02 marks

Visible outlines = 04 marks

**SECTION A—A, dimension = 05 marks**

**Cross-hatching line = 2 x 5 = 10 marks**