

Strictly Confidential: (For Internal and Restricted use only)
Secondary /Senior School Certificate Examination-2020
Marking Scheme – ENGINEERING GRAPHICS
(SUBJECT CODE - 046) (PAPER CODE – 68)

ALL QUESTIONS ARE TO BE ANSWERED CORRECTLY AND ACCURATELY.

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully. **Evaluation is a 10-12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. Evaluators will mark (√) wherever answer is correct. For wrong answer 'X' be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
5. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the

- question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
6. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
 7. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
 8. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
 9. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
 10. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).
 11. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
 - Leaving answer or part thereof unassessed in an answer book.
 - Giving more marks for an answer than assigned to it.
 - Wrong totaling of marks awarded on a reply.
 - Wrong transfer of marks from the inside pages of the answer book to the title page.
 - Wrong question wise totalling on the title page.
 - Wrong totaling of marks of the two columns on the title page.
 - Wrong grand total.
 - Marks in words and figures not tallying.
 - Wrong transfer of marks from the answer book to online award list.
 - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
 - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
 12. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

13. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
14. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
15. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.
16. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

General Note:

- a) Marks are to be awarded in proportion to the work done.
- b) Mistakes in dimensioning up to ± 1.0 mm may be ignored.
- c) In dimensioning, arrow-heads of various types, as per SP: 46-2003 codes are acceptable. However, where space is too small for an arrowhead, oblique stroke or dot may be employed.
- d) In question no. 2 and in sectioned view of question no. 4, if hidden edges / lines are drawn, no marks should be deducted.
- e) Other standard methods of drawing / proportions for features like nuts, heads of bolts, screws etc. employed by examinees, may also be accepted.
- f) The answers/solutions must be evaluated adhering to marking scheme and no marks should be deducted without mistake.

VALUE POINTS

		<u>Distribution of Marks</u>
1.	<u>MULTIPLE CHOICE QUESTIONS</u>	5
	(i) (A) or The object lies between the observer and the plane of projection.	1

(ii)	(C) or SQ 40x4	1
(iii)	(B) or Prevent the bolt rotation while tightening.	1
(iv)	(D) or Rod with fork end, eye end rod, gib and cotter.	1
(v)	(A) or 2 mm.	1
2. (i)	<u>ISOMETRIC SCALE</u>	4
(i)	Marking of main divisions of 10 mm (at least seven divisions) with smaller divisions of 1 mm in first part, on true length.	1 ^{1/2}
(ii)	Projections from scale 1:1 to get points on isometric scale, to get isometric length.	1 ^{1/2}
(iii)	Printing 'True Length/Scale 1:1', 'Isometric Length/Isometric Scale' and marking angles of 30° & 45°.	1
(ii)	<u>ISOMETRIC PROJECTION OF A CONE</u>	7
(i)	Drawing the isometric ellipse, with centre lines.	3
(ii)	Drawing the generators.	2
(iii)	Marking the axis (1/2) and direction of viewing (1/2).	1
(iv)	Dimensions.	1
NOTE: For incorrect position, 1 mark should be deducted.		
(iii)	<u>ISOMETRIC PROJECTION OF A HORIZONTAL PENTAGONAL PRISM, PLACED CENTRALLY, ON THE TOP SURFACE OF A CUBE</u>	13
	<u>CUBE</u>	6
(i)	Drawing the top surface of rhombus (2) and base surface of rhombus (1 ^{1/2}).	3 ^{1/2}
(ii)	Drawing the vertical edges.	1 ^{1/2}
(iii)	Dimension.	1
	<u>PENTAGONAL PRISM</u>	7
(i)	Drawing helping figure.	1
(ii)	Drawing isometric pentagon in front (1 ^{1/2}), rear (1).	2 ^{1/2}
(iii)	Drawing horizontal edges.	2
(iv)	Indicating the direction of viewing.	1/2
(v)	Dimensions.	1

NOTE:

- a) As there is no possibility to show the common axis, no marks to be deducted for axis.
- b) For incorrectly placed solids, deductions, as proposed in 2(ii) above, should be used.

3. (i) <u>B.S.W. THREAD PROFILE</u>	8
(i) Marking of horizontal distances (equal to half of pitch), vertical distances ($D=0.96P$, $D/6$).	2
(ii) Drawing crests (1), roots (1) of threads (minimum two) and flanks (1).	3
(iii) Drawing hatching lines and conventional break.	1
(iv) Standard dimensions.	2

[OR]

<u>SINGLE RIVETED LAP JOINT</u>	8
(i) Drawing both the plates, including shank of the rivet and 10° taper at ends.	3
(ii) Drawing both rivet heads (Any type).	2
(iii) Drawing hatching lines.	1
(iv) Standard dimensions.	2

NOTE: 2 marks should be deducted, in all, if sketched freehand, instead of drawing to scale 1:1.

(ii) <u>COLLAR STUD</u>	5
(i) Front view with horizontal axis.	2 ^{1/2}
(ii) Side view.	1 ^{1/2}
(iii) Standard dimensions.	1

[OR]

<u>CHEESE HEAD SCREW</u>	5
(i) Front view with vertical axis.	2 ^{1/2}
(ii) Top view.	1 ^{1/2}
(iii) Standard dimensions.	1

NOTE: 1 mark should be deducted, if these components are drawn with instruments, instead of being sketched freehand.

4. <u>OPEN BEARING (Assembly)</u>	14
(i) <u>FRONT VIEW LEFT HALF IN SECTION:</u>	
(a) Drawing the left half of the body (4) with hatching lines (1).	5
(b) Drawing the left half of the bush (1) with hatching lines (1).	2
(c) Drawing the right half of the body.	4

- (d) Drawing collar of the bush in the right half. 1
 (e) Drawing the bolt hole in left half ($1\frac{1}{2}$) and the axis of the bolt hole in right half ($\frac{1}{2}$). 2

- (ii) TOP VIEW: 8
 (a) Drawing body with 4 vertical hidden lines of sole. $3\frac{1}{2}$
 (b) Drawing the bush with collar. 2
 (c) Drawing bolt holes. 2
 (d) Drawing cutting plane. $\frac{1}{2}$

- DETAILS : 6
 (a) Printing title. 1
 (b) Scale used. 1
 (c) Projection symbol. 1
 (d) Six important dimensions. 3

NOTE: *As per the feedback, the printed figures were dim/faded; some of the dimensions were unclear. Thus, the dimensions assumed/taken may also be considered.*

[OR]

UNPROTECTED FLANGE COUPLING (Disassembly)

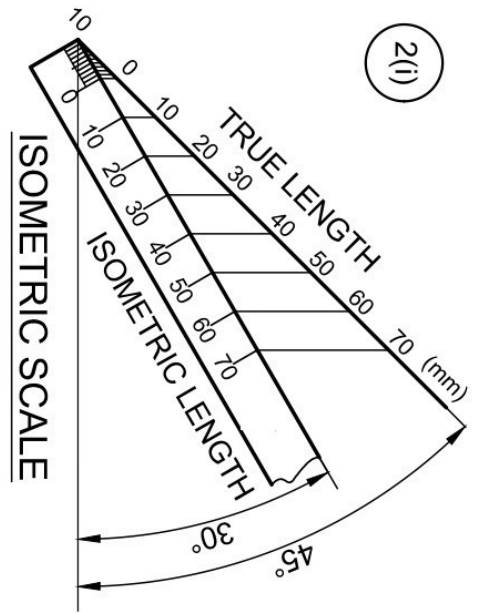
- (i) **FLANGE A**
 (a) FRONT VIEW UPPER HALF IN SECTION : 8
 (i) Drawing the upper half portion of flange (2) with keyway (1). 3
 (ii) Drawing hole of $\varnothing 8$ (1) and socket of 4mm (1). 2
 (iii) Hatching lines 1
 (iv) Drawing the lower half portion of flange without section and centre line of $\varnothing 8$ hole. 2
 (b) LEFT SIDE VIEW : 7
 (i) Drawing five circles including pitch circle. 5
 (ii) Drawing keyway ($\frac{1}{2}$) & four holes of $\varnothing 8$ (1). $1\frac{1}{2}$
 (iii) Cutting plane. $\frac{1}{2}$
- (ii) **SHAFT B**
 (a) FRONT VIEW: 4
 (i) Drawing shaft with conventional end. 3
 (ii) Keyway. 1

- | | |
|--|----------|
| (b) <u>RIGHT SIDE VIEW</u> : | 3 |
| (i) Drawing circle (1) with conventional hatching (1). | 2 |
| (ii) Keyway. | 1 |

- | | |
|-------------------------------|----------|
| <u>DETAILS</u> : | 6 |
| (a) Printing titles. | 1 |
| (b) Scale used. | 1 |
| (c) Projection symbol. | 1 |
| (d) Six important dimensions. | 3 |

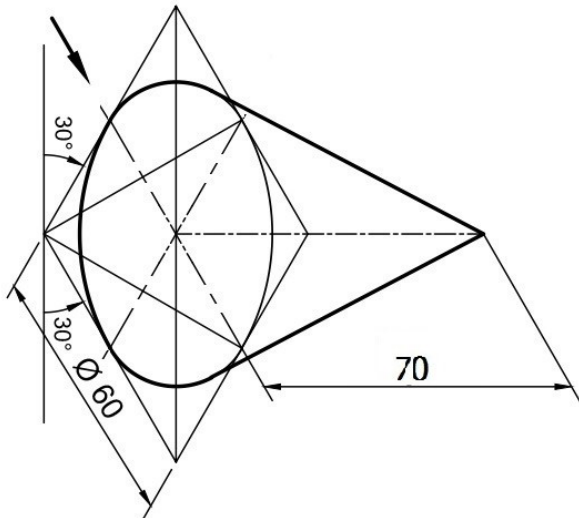
NOTE: *As per the feedback, the printed figures were dim/faded; some of the dimensions were unclear. Thus, the dimensions assumed/taken may also be considered.*

2(i)

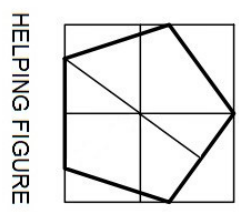


2(ii)

ISOMETRIC PROJECTION

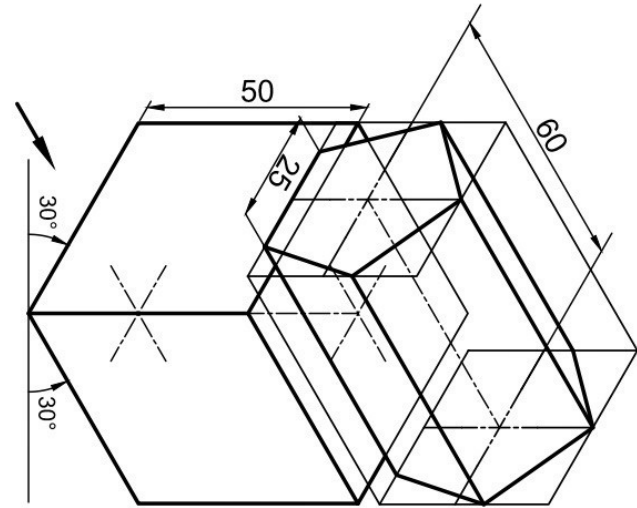


2(iii)

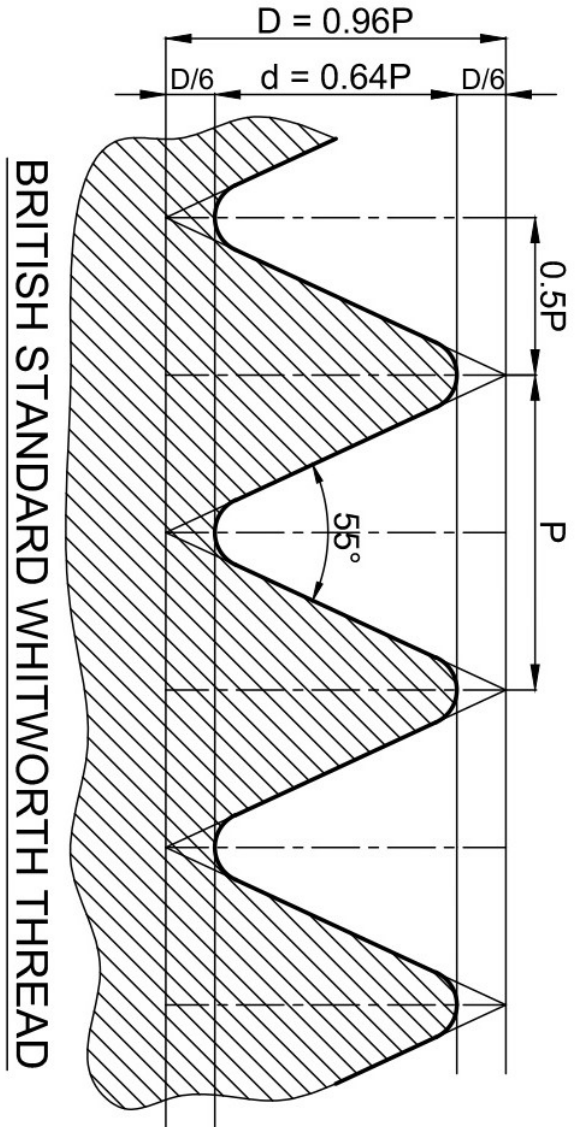


HELPING FIGURE

ISOMETRIC PROJECTION

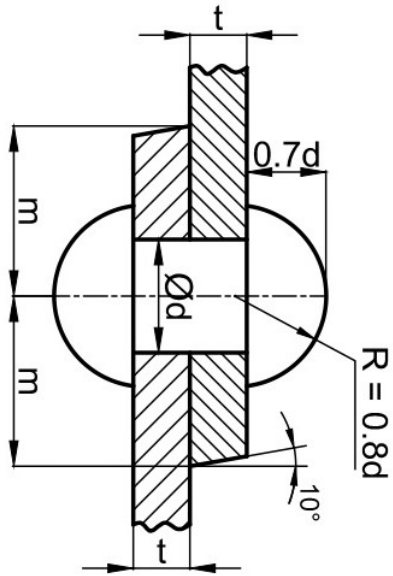


3(i)



P	40
D	38.4
d	25.6
D/6	6.4
0.5P	20

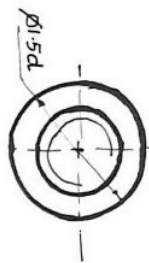
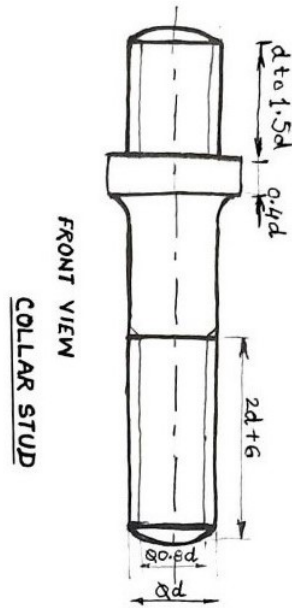
OR



t	9
$d = 6\sqrt{t}$	18
$R = 0.8d$	14.4
0.7d	12.6
$m = 1.5d$	27

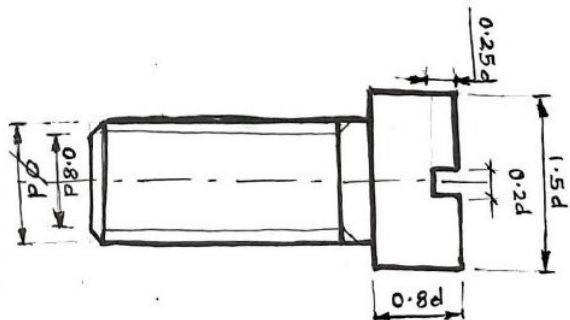
SECTIONAL FRONT VIEW
SINGLE RIVETED LAP JOINT

3(ii)

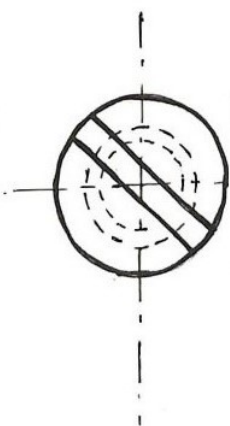


d	0.4d	0.8d	1.5d	2d+6	3d
15	6	12	22.5	36	

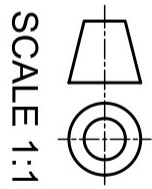
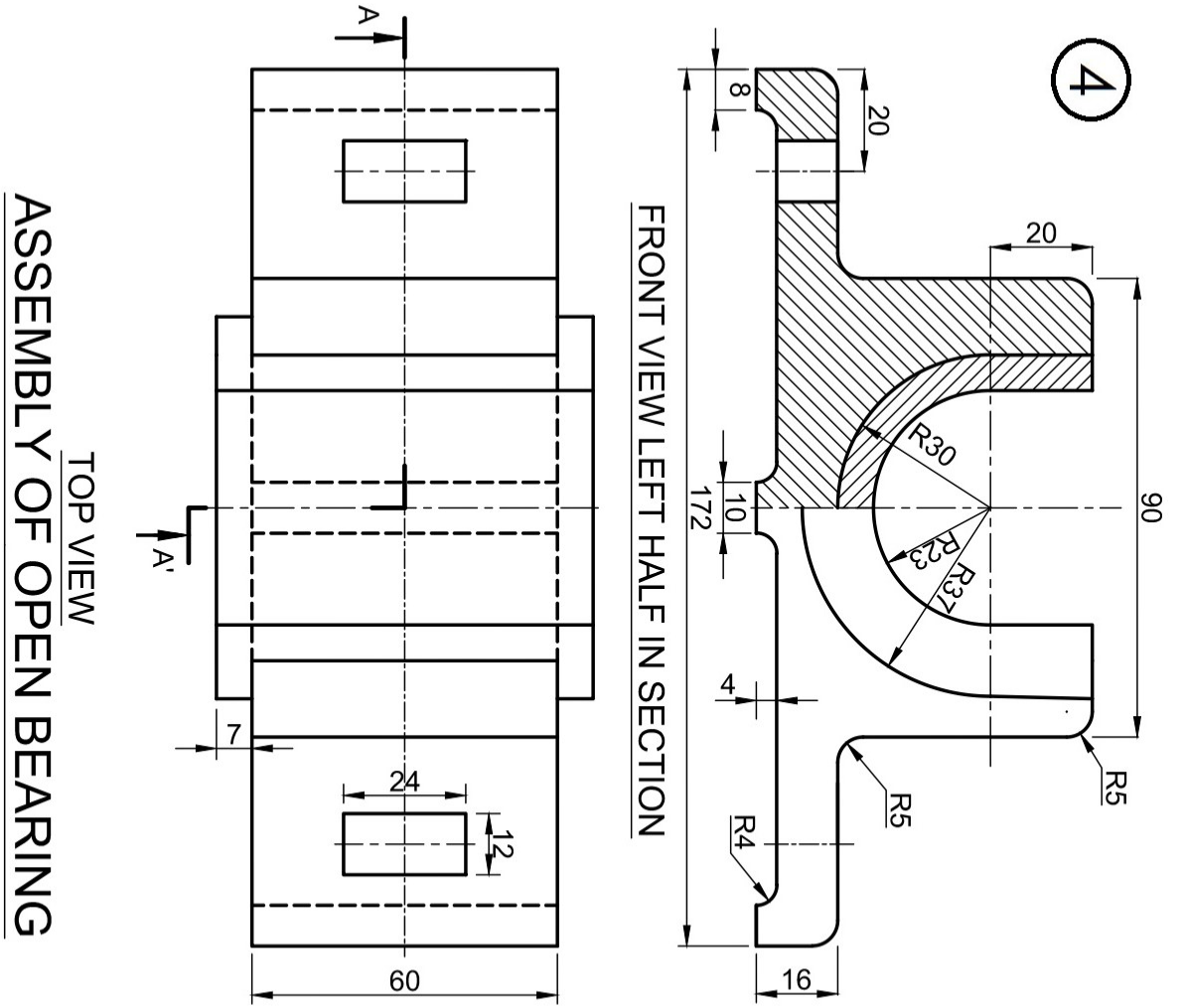
OR



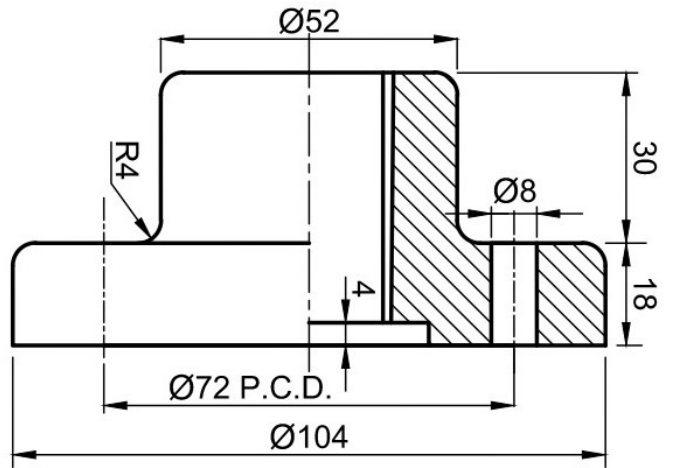
d	20
0.2d	4
0.25d	5
0.8d	16
1.5d	30



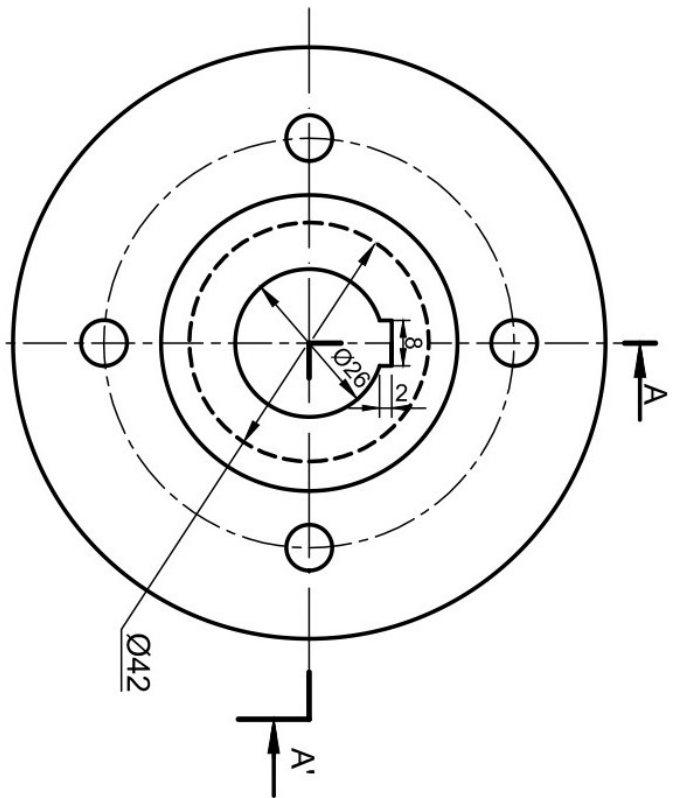
CHEESE HEAD SCREW



OR

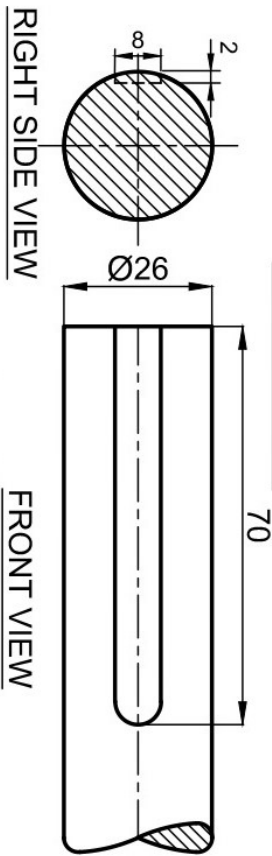


FRONT VIEW UPPER HALF IN SECTION



LEFT SIDE VIEW

FLANGE - A



RIGHT SIDE VIEW

FRONT VIEW

SHAFT - B



SCALE 1:1

DISASSEMBLY OF UNPROTECTED FLANGE COUPLING