

MARKING SCHEME

Senior School Certificate Examination – 2017

Subject : ENGINEERING GRAPHICS
 Sub Code : 046
 Paper Code : 68

ALL QUESTIONS ARE TO BE ANSWERED CORRECTLY AND ACCURATELY.

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.

VALUE POINTS

		<u>Distribution of Marks</u>
Q 1.	<u>MULTIPLE CHOICE QUESTIONS</u>	5
	(i) (b) <i>or</i> Orthographic Projection.	1
	(ii) (b) <i>or</i> J.	1
	(iii) (d) <i>or</i> 3d.	1
	(iv) (c) <i>or</i> To hold the jaws of the fork from opening wide when the cotter is inserted.	1
	(v) (d) <i>or</i> A combination of pulleys and belt.	1
Q 2. (i)	<u>ISOMETRIC SCALE</u>	4
	(i) Marking of divisions of 10 mm, including division of first part of 1 mm on true length.	1
	(ii) Projections from scale 1:1 to get points on isometric scale, construction of isometric scale.	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 FRUSTUM OF A INVERTED TRIANGULAR PYRAMID</u>	7
(i) Drawing helping figure of both triangles.	$1\frac{1}{2}$
(ii) Drawing isometric triangle, on top and at the base.	2
(iii) Drawing three slant edges.	$1\frac{1}{2}$
(iv) Marking the vertical axis ($\frac{1}{2}$) and direction of viewing ($\frac{1}{2}$).	1
(v) Dimensions.	1

NOTE: For incorrect position, 1 mark should be deducted.

(iii) <u>ISOMETRIC PROJECTION OF A PENTAGONAL PRISM PLACED, CENTRALLY, ON A HEMISPHERE</u>	13
<u>HEMISPHERE</u>	6
(i) Drawing isometric ellipse ($2\frac{1}{2}$) along with centre lines ($\frac{1}{2}$).	3
(ii) Drawing semicircular portion of hemisphere.	$1\frac{1}{2}$
(iii) Marking the vertical axis.	$\frac{1}{2}$
(iv) Dimensions.	1
<u>PENTAGONAL PRISM</u>	7
(i) Drawing helping figure.	1
(ii) Drawing both isometric pentagons.	2
(iii) Drawing vertical edges.	2
(iv) Marking the vertical axis ($\frac{1}{2}$) and direction of viewing ($\frac{1}{2}$).	1
(v) Dimensions.	1

NOTE: For incorrectly placed solids, deductions, as proposed in (ii) above, should be used.

Q 3. (i) <u>KNUCKLE THREAD PROFILE</u>	8
(i) Horizontal distances (equal to half of pitch), vertical distance (0.5P) marked correctly.	2
(ii) Semicircular profile for crests and roots of threads (minimum two), drawn correctly.	3
(iii) Drawing hatching lines.	1
(iv) Standard dimensions.	2

[OR]

HEXAGONAL NUT (with axis perpendicular to H.P.) **8****FRONT VIEW** (A/C or A/F):

- | | |
|--|---|
| (i) Boundary lines with chamfering and hidden lines showing threads with axis vertical and two opposite edges parallel to V.P. | 2 |
| (ii) Drawing arcs with radius method or 60° angle method. | 1 |

TOP VIEW :

- | | |
|---|---|
| (i) Hexagon, circumscribing chamfer circle. | 2 |
| (ii) Drawing three circles as per convention. | 1 |

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

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|--|-------------------------------|
| (ii) <u>PAN HEAD RIVET</u> | 5 |
| (i) Front view with its axis vertical. | 2 ¹ / ₂ |
| (ii) Top view. | 1 ¹ / ₂ |
| (iii) Standard dimensions. | 1 |

[OR]

- | | |
|----------------------------|----------|
| <u>WOODRUFF KEY</u> | 5 |
| (i) Front view. | 2 |
| (ii) Top view. | 1 |
| (iii) Side View. | 1 |
| (iv) Standard dimensions. | 1 |

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

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|---|-----------|
| Q 4. <u>TURNBUCKLE (Assembly)</u> | 14 |
| (i) <u>FRONT VIEW</u> (Upper Half in Section) : | 14 |
| (a) Drawing upper half portion of the body, with hatching lines. | 5 |
| (b) Drawing lower half portion of the body. | 4 |
| (c) Drawing both rods with 56 mm threaded portion inserted of each, showing threads and hatching lines at the rod ends. | 5 |

- | | |
|---|----------------|
| (ii) <u>SIDE VIEW</u> (looking from left): | 8 |
| (a) Drawing three circles along with conventional hatching lines. | $4\frac{1}{2}$ |
| (b) Drawing hidden lines. | 3 |
| (c) Drawing cutting plane. | $\frac{1}{2}$ |

- DETAILS : **6**
- Printing title (1), scale used (1), drawing projection symbol (1) and six dimensions (3).

[OR]

UNPROTECTED FLANGE COUPLING (Dis-assembly)

- (A) FLANGE – B
- | | |
|---|----------------|
| (i) <u>FRONT VIEW</u> (Upper Half in Section) : | 8 |
| (a) Drawing the upper, sectioned half of flange (2), with keyway (1). | 3 |
| (b) Drawing the lower half portion of flange. | 2 |
| (c) Drawing hole of $\phi 12$ mm and 3 mm extended portion of $\phi 40$ mm. | 2 |
| (d) Hatching lines. | 1 |
| (ii) <u>SIDE VIEW</u> (looking from right) : | 8 |
| (a) Drawing four circles (4) and pitch circle for bolts ($\frac{1}{2}$). | $4\frac{1}{2}$ |
| (b) Drawing four circles of bolt hole of $\phi 12$ mm. | 2 |
| (c) Drawing keyway. | 1 |
| (d) Cutting plane. | $\frac{1}{2}$ |
- (B) SQUARE BOLT
- | | |
|---|----------------|
| (i) <u>FRONT VIEW:</u> | 3 |
| (a) Head. | $1\frac{1}{2}$ |
| (b) Threaded and unthreaded portion of shank. | $1\frac{1}{2}$ |
| (ii) <u>LEFT SIDE VIEW :</u> | 3 |
| (a) Square, hidden chamfer circle. | $1\frac{1}{2}$ |
| (b) Drawing two circles as per convention. | $1\frac{1}{2}$ |

- DETAILS : **6**
- Printing titles of both (1), scale used (1), drawing projection symbol (1) and six dimensions (3).







