

WS-13 for 8th class

Task 1

①

$$\text{Pitch} = 0.5 \text{ mm}$$

$$\text{No. of Div on Head scale} = 100$$

$$L.C = \frac{\text{Pitch}}{N} = \frac{0.5}{100}$$

$$= 0.005 \text{ mm}$$

2 ⑤ ⑥ also

④ No. of Circular Scale

$$\text{div} N = 50$$

$$\text{No. of rotation} = 2$$

$$\text{distance} = 1 \text{ mm}$$

$$\text{Pitch} = \frac{\text{distance}}{N} = \frac{0.5}{50} = 0.01 \text{ mm}$$

$$\text{Pitch} = \frac{\text{Distance}}{\text{No. of rot}} = \frac{1 \text{ mm}}{2} = 0.5 \text{ mm}$$

Zero error is Positive because

Zero of Circular Scale is below

$$\text{base line} = L.C \times C.S.R$$

$$= 0.01 \times 4$$

$$= 0.04 \text{ mm}$$

$$\text{Zero correction} = -0.04 \text{ mm}$$

$$\text{⑨ No. of rotation} = 2$$

$$\text{distance} = 1 \text{ mm}$$

$$L.C = \frac{P}{N} = \frac{\text{Distance}}{\text{Rotation}}$$

$$L.C = \frac{1 \text{ mm}}{50} = 0.01 \text{ mm}$$

$$\text{No. of divisions } C.S.R = 50, \quad Z.E = -0.03 \text{ mm}$$

$$Z.C = +0.03 \text{ mm}$$

$$M.S.R = 35$$

$$C.S.R = 35$$

$$\text{② No. of rotation} = 2$$

$$\text{distance moved} = 1 \text{ mm}$$

$$\therefore \text{Pitch} = \frac{\text{distance moved}}{\text{No. of rotation}}$$

$$= \frac{1 \text{ mm}}{2} = 0.5 \text{ mm}$$

$$= 0.05 \text{ cm}$$

⑦

$$\text{Pitch} = 0.5 \text{ mm}$$

$$\text{Reading} = 0.001 \text{ mm}$$

$$P = N \times \text{Reading}$$

$$N = \frac{P}{R} = \frac{0.5}{0.001}$$

$$N = 500$$

Number of divisions on head scale

$$\text{⑩ Total Reading} = M.S.R + C.S.R \times L.C$$

$$= 3 + 35 \times 0.01 = 3.35 \text{ mm}$$

$$\text{Correct Reading} = T.R + Z.C$$

$$= 3.35 + 0.03$$

$$= 3.38 \text{ mm}$$

⑪

$$\text{⑩ No. of rotation} = 1$$

$$\text{distance} = 0.5 \text{ mm}$$

$$\text{Pitch} = \frac{\text{distance}}{\text{No. of rotation}} = \frac{0.5}{1}$$

$$P = 0.5 \text{ mm}$$

$$L.C = \frac{P}{N} = \frac{0.5}{50} = 0.01 \text{ mm}$$

$$\text{Zero Error} = + C.S.R \times L.C$$

$$= + 5 \times 0.01$$

$$= + 0.05 \text{ mm}$$

$$\text{Zero correction} = - 0.05 \text{ mm}$$

③ Number of divisions on head scale = 50

$$\text{No. of rotation} = 2$$

$$\text{distance} = 1 \text{ mm}$$

$$L.C = \frac{\text{Pitch}}{N} = \frac{\text{distance}}{\text{No. of rotation}}$$

$$L.C = \frac{1 \text{ mm}}{2} = 0.5 \text{ mm}$$

⑧

$$M.S.R = 0.0 \text{ mm}$$

$$C.S.R = 52$$

$$L.C = \frac{M.S.D}{N} = \frac{1 \text{ mm}}{100}$$

$$L.C = 0.01 \text{ mm}$$

Diameter (or) Total Reading

$$= M.S.R + C.S.R \times L.C$$

$$= 0.0 + 52 \times 0.01$$

$$= 0.52 \text{ mm}$$

$$= 0.052 \text{ cm}$$

$$C.S.R = 85$$

Correct Reading

$$= \text{Total Reading} + Z.C$$

$$= M.S.R + L.C \times C.S.R + Z.C$$

$$= 0 + 0.01 \times 85 + (-0.05)$$

$$= 0.85 - 0.05$$

$$= 0.80 \text{ mm}$$

==



(14) No. of rotations = 2

distance = 8 mm

No. of rev on C-S = 50

Pitch = $\frac{\text{distance}}{\text{No. of rotations}}$

$P = \frac{2 \text{ mm}}{2} = 1 \text{ mm}$

$L.C. = \frac{P}{N} = \frac{1 \text{ mm}}{50}$

= 0.02 mm

(15) pitch = 1 mm

N = 100

$L.C. = \frac{P}{N} = \frac{1}{100} = 0.01 \text{ mm}$

$M.S.R = 2 \text{ mm}; C.S.R = 45$

Correct Reading = $M.S.R + C.S.R \times L.C.$

= $2 + 45 \times 0.01$

= $2 + 0.45$

= 2.45 mm

= 0.245 cm

Here C.S. zero lies below base line

So Z.E is +ve.

(16) $P = 1 \text{ mm}$

$C.S.R = N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

= 0.01 mm

$L = 0.01 \text{ mm}$

$C.S.R = 62$

$M.S.R = 2 \times \text{Pitch} = 2 \text{ mm}$

Correct Reading = $M.S.R + C.S.R \times L.C. + Z.E$

= $2 + 62 \times 0.01 + (-0.06)$

= $2 + 0.62 - 0.06$

= 2.56 mm

(17) C.S.R = 5

Pitch = 1 mm

Zero Error = $C.S.R \times L.C.$

$L.C. = \frac{P}{N} = \frac{1 \text{ mm}}{100} = 0.01 \text{ mm}$

$Z.E = 5 \times 0.01$

= 0.05 mm

$M.S.R = 3 \times \text{Pitch}$

= $3 \times 1 \text{ mm}$

= 3 mm

LTAGK

After object is placed

below jaws

$M.S.R = 3 \text{ mm}; C.S.R = 48$

∴ correct Reading is

= $M.S.R + C.S.R \times L.C. + Z.E$

= $3 + 48 \times 0.01 + (-0.05)$

= $3 + 0.48 - 0.05$

= 3.43 mm

LTAGK

$M.S.R = 1 \text{ mm}; C.S.R = 47$

$T.R = M.S.R + C.S.R \times L.C.$

= $1 + 0.01 \times 47$

= $1 + 0.47$

= 1.47 mm

$L.C. = \frac{1}{100}$

$L.C. = 0.01 \text{ mm}$

(18) No. of rotations = 1

distance = 1 mm

Pitch = $\frac{\text{distance}}{\text{No. of rotations}}$

= $\frac{1 \text{ mm}}{1} = 1 \text{ mm}$

$P = \frac{1 \text{ mm}}{1} = 1 \text{ mm}$

$L.C. = \frac{P}{N} = \frac{1}{50}$

= 0.02 mm

$L.C. = 0.01 \text{ mm}$

$M.S.R = 5 \text{ mm}$

$C.S.R = 25$

$Z.E = -0.004 \text{ cm}$

$Z.C = 0.04 \text{ mm}$

$C.R = M.S.R + C.S.R \times L.C. + Z.E$

= $5 + 25 \times 0.01 + 0.04$

= $5 + 0.25 + 0.04$

= 5.29 mm

= 0.529 cm

$L.C. = \frac{P}{N} = \frac{1}{100}$

$L.C. = 0.01 \text{ mm}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

= 4.94 mm

$r = 2.47 \text{ mm}$

$r = 2.47 \text{ mm}$

$\text{radius} = \frac{d}{2} = \frac{4.94}{2}$

$r = 2.47 \text{ mm}$

$\text{Pitch} = 1 \text{ mm}; N = 100$

$L.C. = \frac{P}{N} = \frac{1}{100}$

$M.S.R = 5 \text{ mm}; C.S.R = 34$

Distance = $M.S.R + C.S.R \times L.C.$

= $5 \text{ mm} + 0.01 \times 34$

= $5 + 0.34$

= 5.34 mm

= 0.534 cm

$T.R = D \sin \theta = M.S.R + C.S.R \times L.C.$

= $4 + 47 \times 0.02$

= $4 + 0.94$

=

$$(8) N = 50$$

$$\text{rotation} = 2$$

$$\text{distance} = 1 \text{ mm}$$

$$\text{Pitch} = \frac{P}{R_{\text{obj}}} = \frac{1}{2} = 0.5 \text{ mm}$$

$$L.C = \frac{P}{N} = \frac{0.5}{50} = 0.01 \text{ mm}$$

$$M.S.R = 0.5 \text{ mm}$$

$$C.S.R = 27$$

$$(16) L.C = 0.01 \text{ mm}$$

$$M.S.R = 1 \text{ mm}$$

$$C.S.R = 27$$

$$\text{Diameter} = 0.0 R = 1$$

$$= M.S.R + C.S.R \times L.C$$

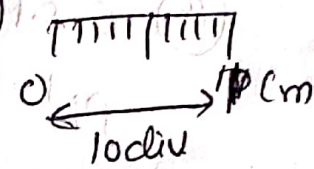
$$= 0.5 + 0.01 \times 27$$

$$= 0.5 + 0.27$$

$$= 0.77 \text{ mm}$$

$$= 0.077 \text{ cm}$$

(9)



$$\text{Pitch} = \frac{1}{10} \text{ cm}$$

$$N = 100$$

$$L.C = \frac{P}{N} = \frac{1}{100}$$

$$= 0.01 \text{ mm}$$

$$= 0.001 \text{ cm}$$

$$= 10^{-3} \text{ cm}$$

(10)

$$L.C = 0.01 \text{ mm}$$

$$N = 50$$

$$L.C = \frac{P}{N}$$

$$\text{Pitch} = N \times L.C$$

$$= 50 \times 0.01$$

$$= 0.5 \text{ mm}$$

$$\text{Diameter} = M.S.R + C.S.R \times L.C$$

$$= 1 + 27 \times 0.01$$

$$= 1 + 0.27 \text{ mm}$$

$$= 1.27 \text{ mm}$$

$$= 0.127 \text{ cm}$$

$$\text{correct reading} = 0.127 + 2 \times L.C$$

$$= 0.127 + 0.002$$

$$= 0.129 \text{ cm}$$