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"There is nothing impossible to they who will try."

ISRO | BHEL | DRDO & OTHER PSUs

PRODUCTION

METROLOGY

MOST EXPECTED QUESTIONS

PART-1

Live@ 11:30Am

Gaurav sir

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GATE 2023 RESULT

GATE

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AIR 403 EC MOHAN KUMAR SINGH

AIR 567 EE SHANKAR JHA

AIR 571 ME VIJENDER MEENA

YouTube Classes Schedule

ENGINEERS

MECHANICAL ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
ALL PSUs	PRODUCTION	11:30 AM	GAURAV SIR
ALL PSUs	THERMODYNAMICS	3:00 PM	KANISTH SIR
GATE 2024-25	HMT	4:30 PM	YOGESH SIR
GATE 2024-25	SOM	9:00 PM	MUKESH SIR

FREE APP
CLASS SCHEDULE

MECHANICAL ENGINEERING

HMT	MONDAY Live @11AM	YOGESH SIR
PRODUCTION	TUESDAY Live @11AM	GAURAV SIR
SOM	WEDNESDAY Live @8PM	MUKESH SIR
THERMODYNAMICS	THURSDAY Live @11AM	KANISTH SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR

$D = 20^{+0.01}_{-0.02}\ mm$

Tolerances are specified

(a) To obtain desired fits

(b) because it is not possible to manufacture a size exactly

(c) to obtain higher accuracy

(d) to have proper allowances

$25.3^{\pm 0.05}$ mm

Expressing a dimension as $25.3^{\pm 0.05}$ mm is the case of

(a) Unilateral tolerance

(b) Bilateral tolerance

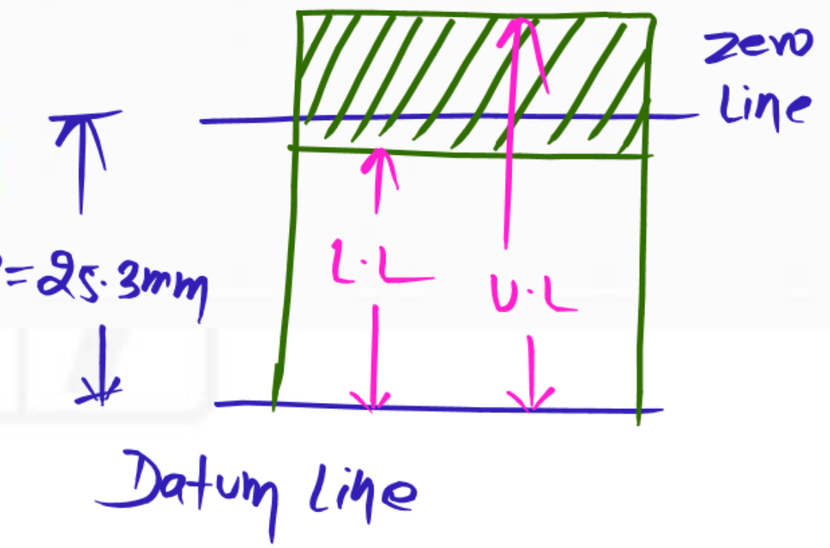
(c) Limiting dimensions

(d) All of the above

* UL = 25.3 + 0.05 = 25.35 mm

* LL = 25.3 − 0.05 = 25.25 mm

* BS = 25.3 mm



Shaft $\phi 35^{-0.009}_{-0.025}$ mm

* FD = ?
* Tolerance = ?

A shaft has a dimension, $\phi 35^{-0.009}_{-0.025}$ mm
The respective values of fundamental deviation and tolerance are

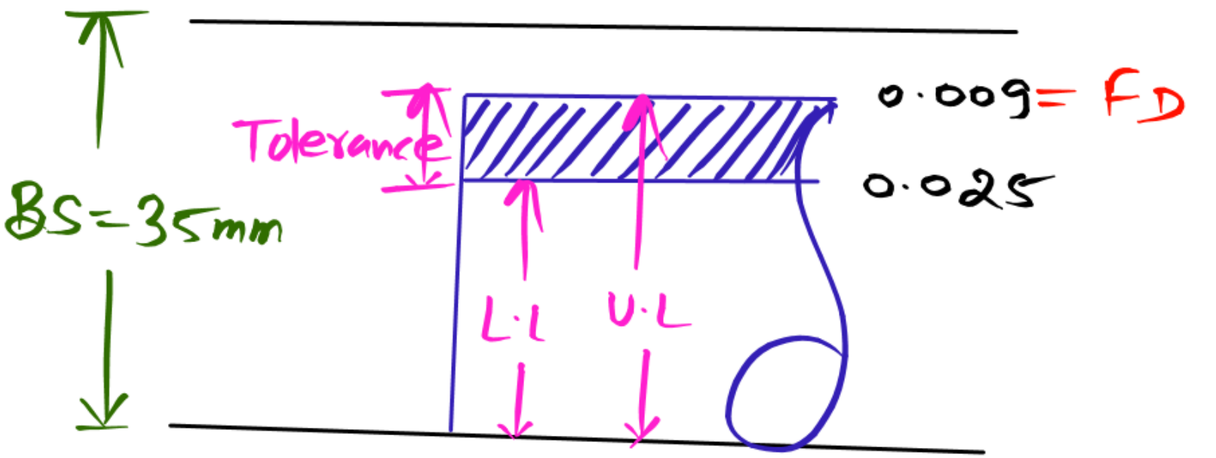
(a) $-0.025, \pm 0.008$
(b) $-0.025, 0.016$
(c) $-0.009, \pm 0.008$
(d) $-0.009, 0.016$

$$\phi 35 \begin{matrix} -0.009 \\ -0.025 \end{matrix} \text{ mm}$$

* BS = 35 mm

UL = 35 − 0.009 = 34.991 mm

LL = 35 − 0.025 = 34.975 mm



Tolerance = UL − LL = 34.991 − 34.975

* Tolerance = 0.016 mm

Unilateral Tolerance

FD → closest to "Zero line" → FD = UD = −0.009 mm

Shaft → $25^{+0.040}_{-0.010}$ mm

Hole → $25^{+0.020}_{-0.00}$ mm

In an interchangeable assembly, shafts of size $25.000^{+0.040}_{-0.0100}$ mm mate with holes of size $25.000^{+0.020}_{-0.000}$ mm.

The maximum possible clearance in the assembly will be

(a) 10 microns (b) 20 microns

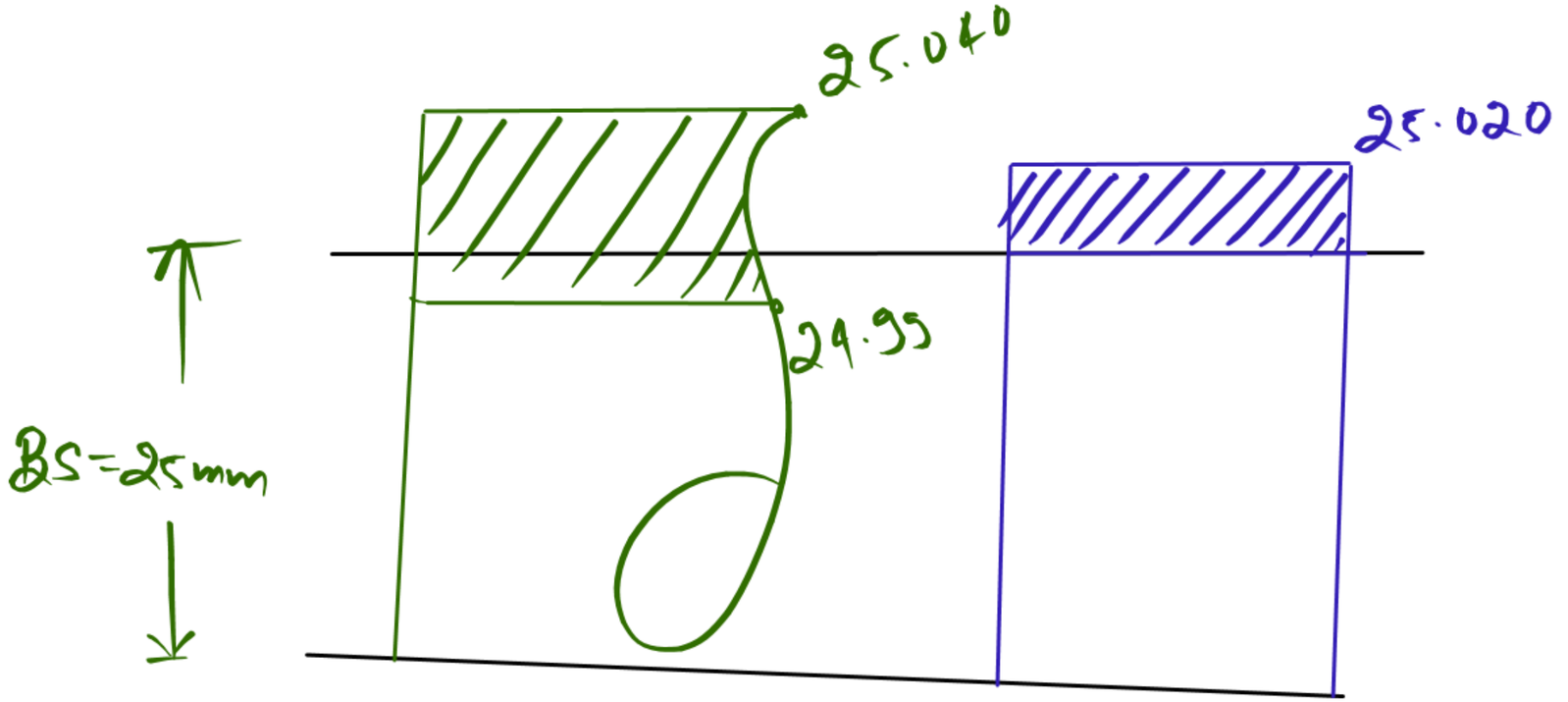
(c) 30 microns (d) 60 microns

Shaft $25^{+0.040}_{-0.010}$ mm

* UL = 25.040mm
* LL = 24.99 mm

Hole $25^{+0.020}_{-0.00}$ mm

* UL = 25.020mm
* LL = 25mm



* Max C = UL of Hole - LL of Shaft

= 25.020 − 24.990 = 0.030 mm = 30μm

In order to have interference fit, it is essential that the lower limit of the shaft should be

(a) Greater than the upper limit of the hole

(b) Lesser than the upper limit of the hole

(c) Greater than the lower limit of the hole

(d) Lesser than the lower limit of the hole

Interference fit joints are provided for:

(a) Assembling bush bearing in housing

(b) Mounting heavy duty gears on shafts

(c) Mounting pulley on shafts

(d) Assembly of flywheels on shafts

Hole $\phi 9^{+0.015}_{+0}$ mm

Shaft $\phi 9^{+0.010}_{+0.001}$ mm

* Hole → UL = 9.015 mm
  → LL = 9 mm

* Shaft → UL = 9.010 mm
  → LL = 9.001 mm

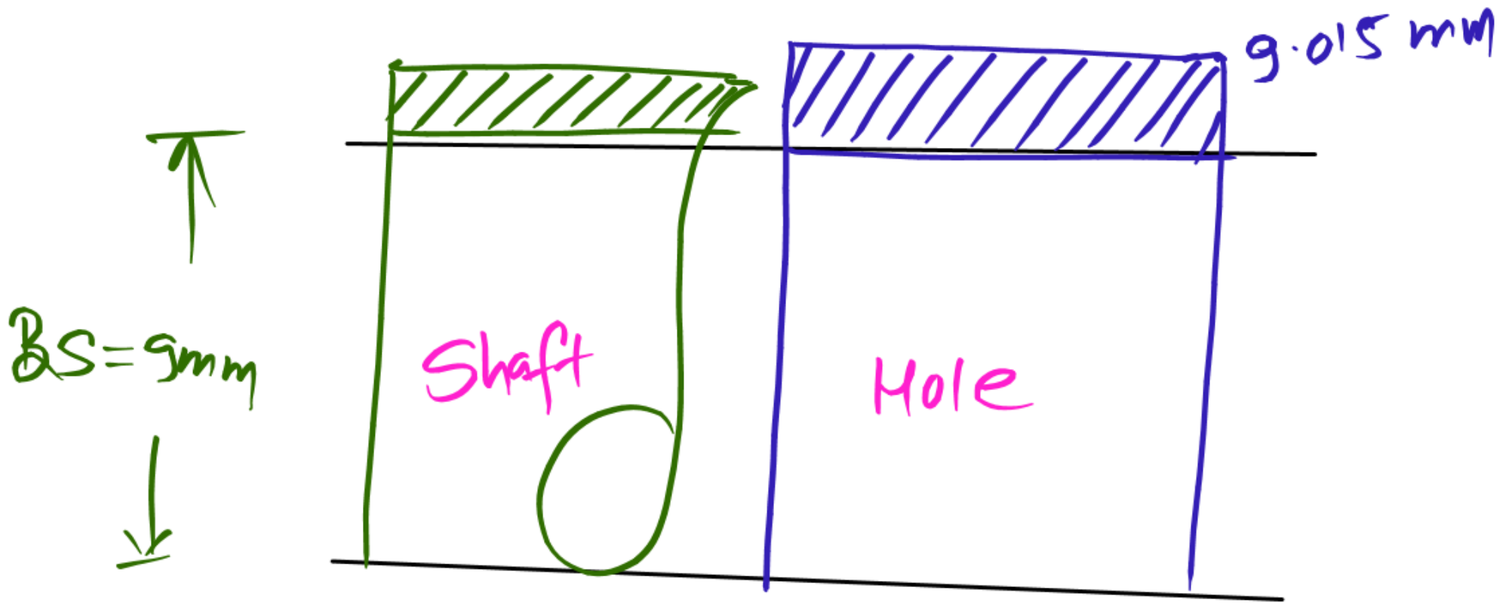
A hole is of dimension $\phi 9^{+0.015}_{+0}$ mm. The corresponding shaft is of dimension $\phi 9^{+0.010}_{+0.001}$ mm. The resulting assembly has

(a) loose running fit

(b) close running fit

(c) transition fit

(d) interference fit


9.015 mm
Shaft
Hole
BS=9mm

Shaft → $25^{+0.04}_{-0.01}$ mm

Hole → $25^{+0.03}_{+0.02}$ mm

In an interchangeable assembly, shafts of size $25^{+0.04}_{-0.01}$ mm mate with holes of size $25^{+0.03}_{+0.02}$ mm.

The maximum interference (in microns) in the assembly is

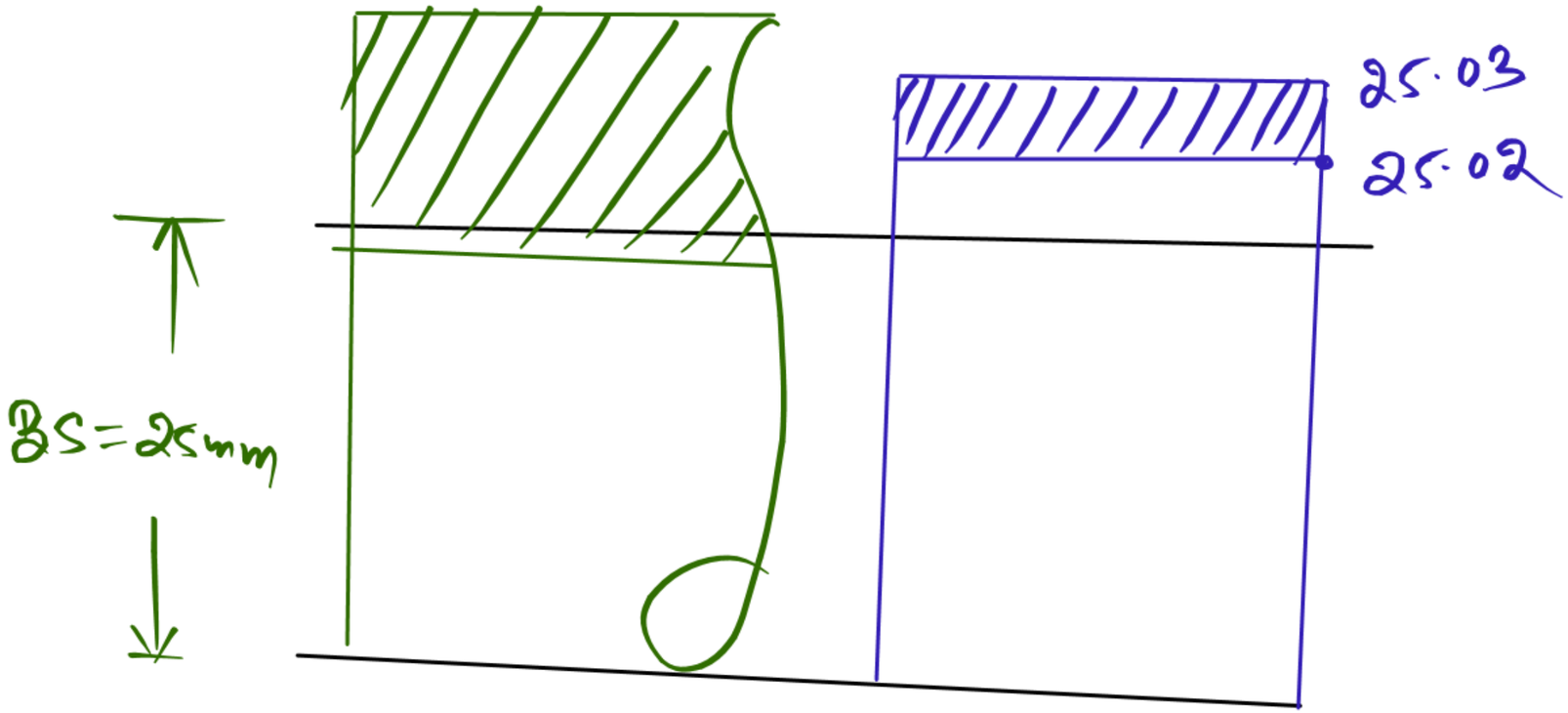
(a) 40 (b) 30 (c) 20 (d) 10

Shaft → $25^{+0.04}_{-0.01}$ mm

* UL = 25.04 mm
* LL = 24.99 mm

Hole → $25^{+0.03}_{+0.02}$ mm

* UL = 25.03 mm
* LL = 25.02 mm



MaxI = UL of Shaft - LL of Hole

$25.04 - 25.02 = 0.020\,mm = 20\,\mu m$

BS Hole Shaft

Tolerance = IT7 IT8 = Tolerance

BS = 50mm

Tolerance of Hole = IT7

Tolerance of Shaft = IT8

A shaft and hole pair is designated as 50H7d8. This assembly constitutes

(a) Interference fit

(b) Transition fit

(c) Clearance fit

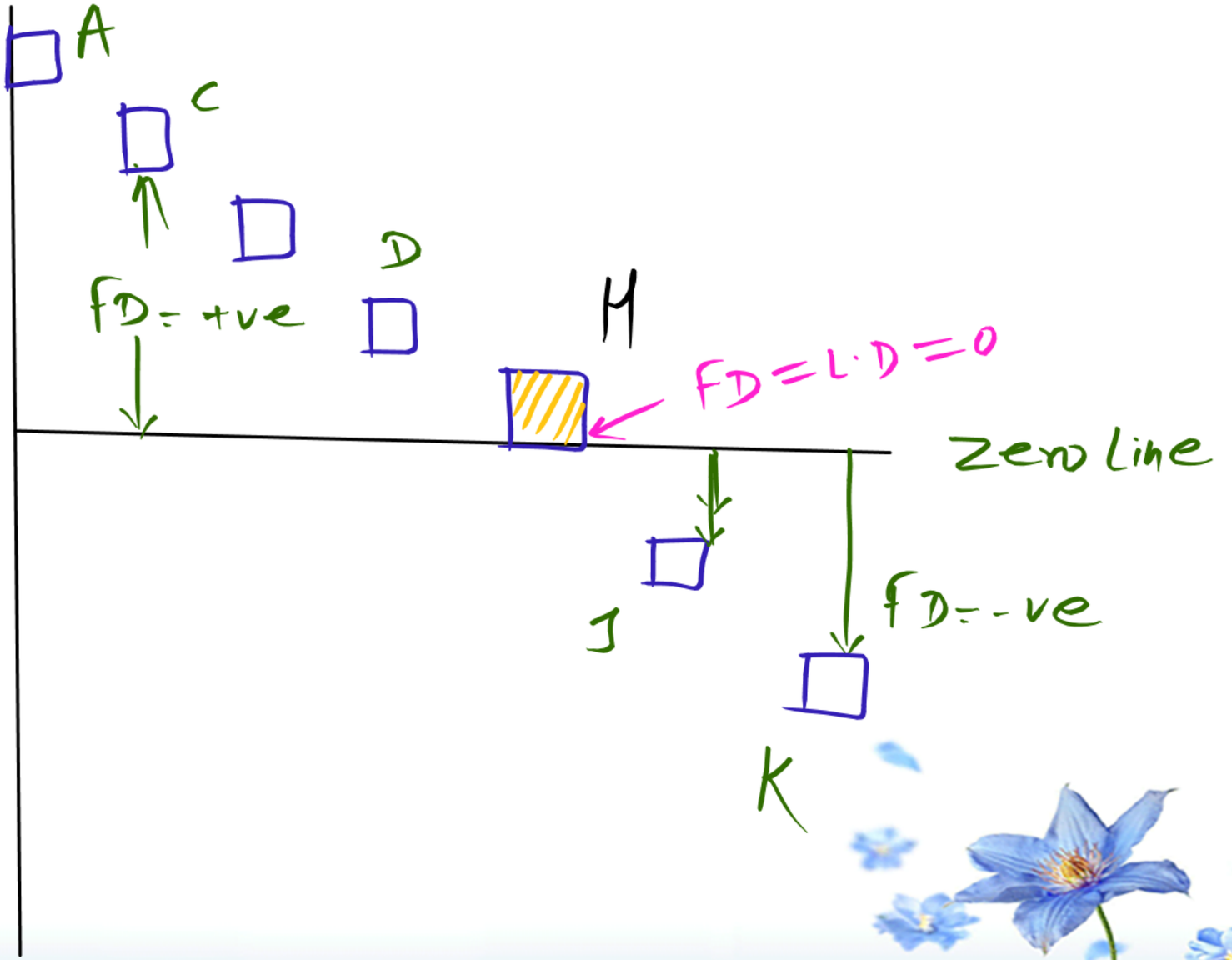
(d) None of the above

* A → Hole

Hole Basis system

⇓

* LD = FD = 0

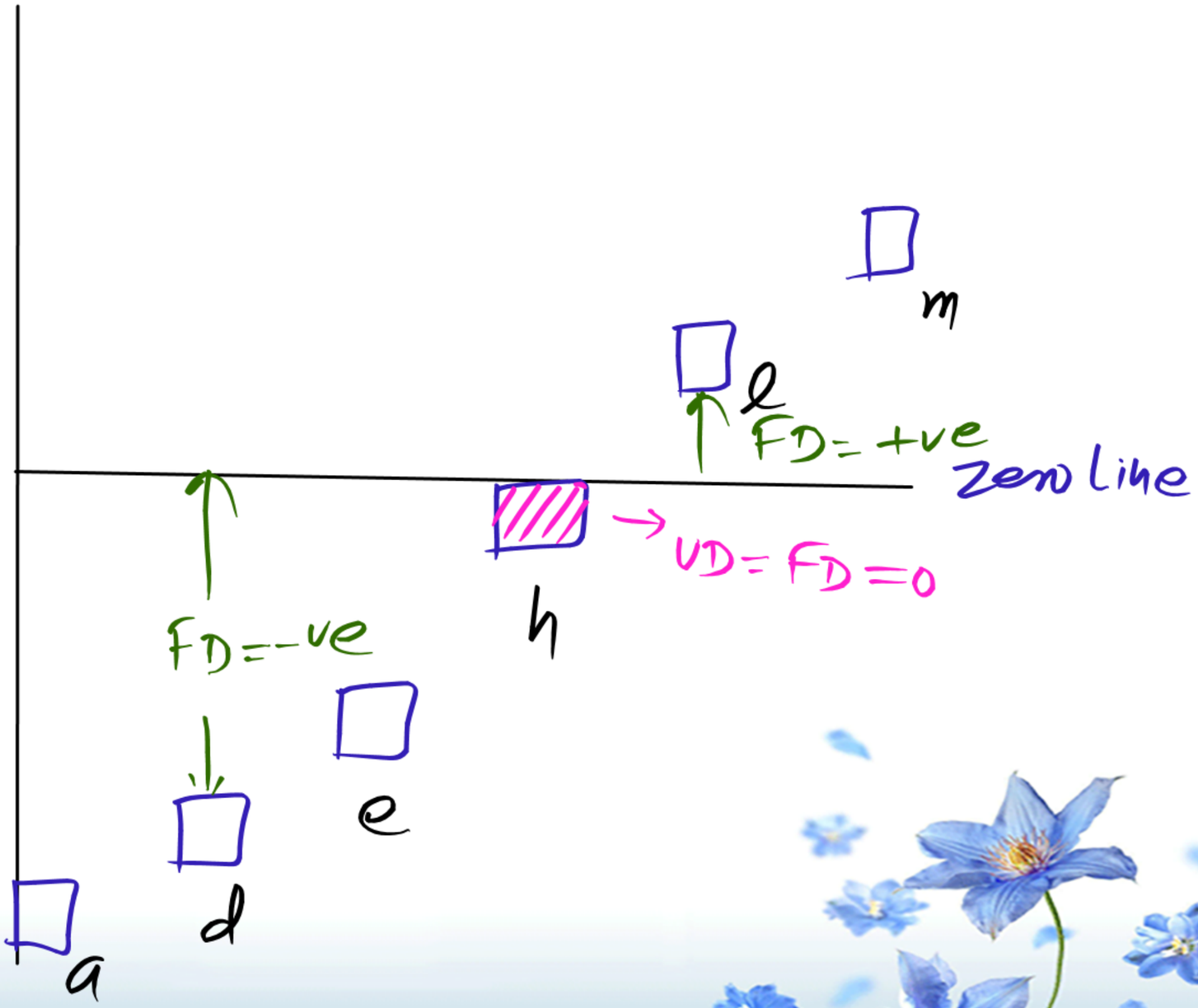


a, b → Shaft

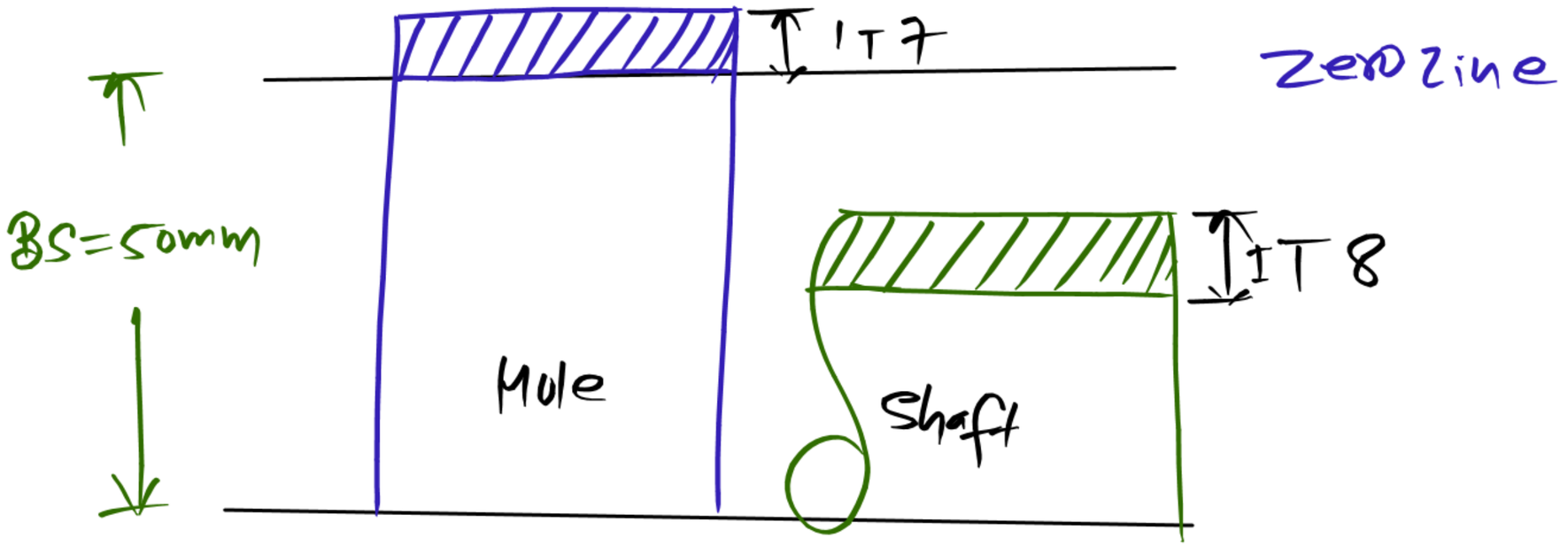
Shaft Basis system

⇓

UD = FD = 0



50 H7 d8



Which of the following is an interference fit?

(a) Push fit

(b) Running fit

(c) Sliding fit

(d) Shrink fit

* clearance fit → Slide fit, Loose fit
Loose Running fit

* Transition fit → Tight fit, Push fit

* Interference fit → Shrink fit, Heavy drive fit

Consider the following joints:

1. Railway carriage wheel and axle
2. IC engine cylinder and liner

Which of the above joints is/are the result(s) of interference fit?

(a) 1 only
(b) 2 only
(c) Neither 1 nor 2
(d) Both 1 and 2

Allowance = Min C

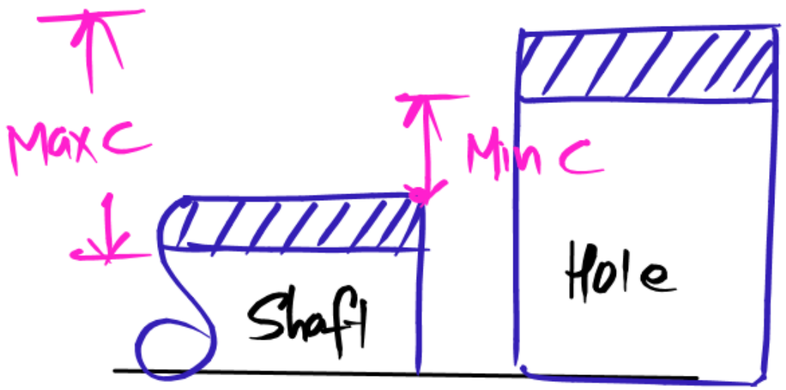
Allowance in limits and fits refers to

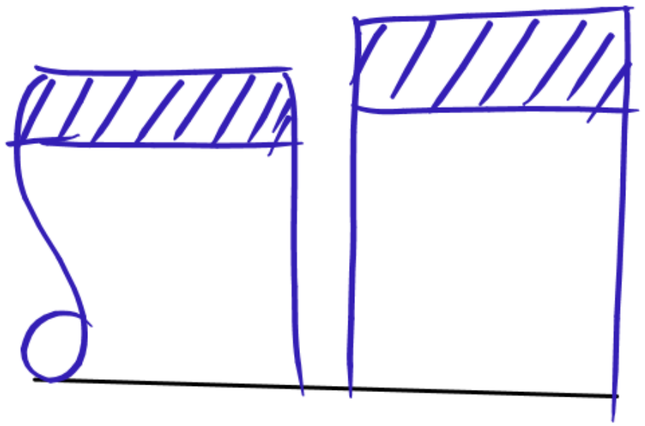
(a) Maximum clearance between shaft and hole

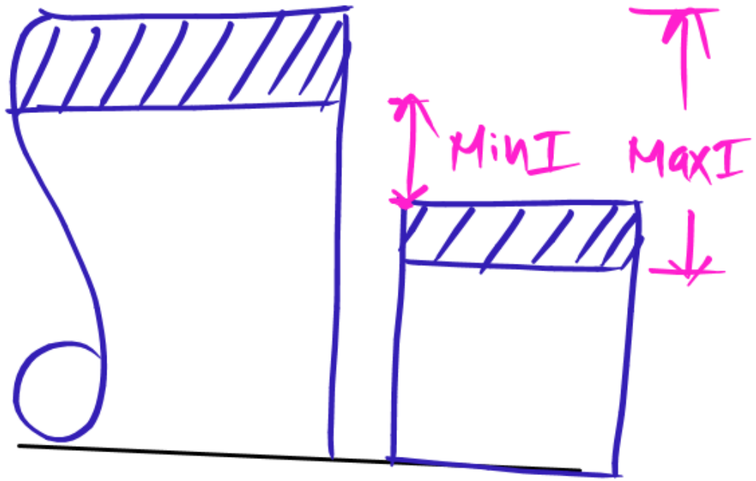
(b) Minimum clearance between shaft and hole

(c) Difference between maximum and minimum size of hole

(d) Difference between maximum and minimum size of shaft







* Clearance fit

* MaxC = UL of Hole − LL of shaft

* MinC = LL of Hole − UL of shaft

Transition fit

Interference fit

* MaxI = UL of shaft − LL of Hole

* MinI = LL of shaft − UL of Hole

* Minc → +ve → Minc
  → -ve → MaxI

* Minc = -MaxI

* Allowance = Minc

Dimension of the hole is $50^{+0.02}_{-0.00}$ mm

and shaft is $50^{+0.02}_{+0.00}$ mm.

The minimum clearance is

(a) 0.02 mm (b) 0.00 mm

(c) -0.02 mm (d) 0.01 mm

Hole Basis → H

* LD = FD = 0

Shaft Basis → h

* UD = FD = 0

Basic shaft and basic hole are those whose upper deviations and lower deviations respectively are

(a) +ve, -ve

(b) -ve, +ve

(c) Zero, Zero

(d) None of the above

Which one of the following is not correct in hole basis system of fits?

(a) The hole size is kept constant.

(b) The basic size of the hole is taken as the low limit of size of the hole.

(c) The actual size of a hole that is within the tolerance limits always less than the basic size.

(d) The high limit of the size of the hole and the two limits of size of the shaft are selected to give desired fit.

25 H7/g8

For the given assembly: 25 H7/g8, match Group A with Group B

Group A	Group B
P. H	I. Shaft Type
Q. IT8	II. Hole Type
R. IT_7	III. Hole Tolerance Grade
S. *g*	IV. Shaft Tolerance Grade

	P	Q	R	S
(a)	I	III	IV	II
(c)	II	III	IV	I

	P	Q	R	S
(b)	I	IV	III	II
(d)	II	IV	III	I

$\phi 50\ H8/p8$

* BS = 50mm
* Hole Tolerance = IT8
* Shaft Tolerance = IT8

Consider the following statements:

A nomenclature $\phi 50$ H8/p8 denotes that

1. Hole diameter is 50 mm.
2. It is a shaft base system. → h8
3. 8 indicates fundamental deviation.

Which of the statements given above is/are incorrect?

(a) 1, 2 and 3
(b) 1 and 2 only
(c) 1 and 3 only
(d) 3 only

25 D 6

* BS = 25 mm

* Tolerance of Hole = IT6

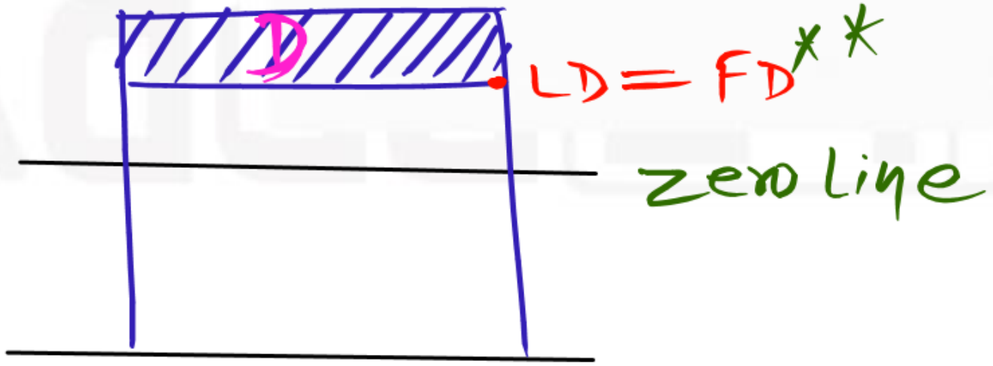
In the tolerance specification 25 D 6, the letter D represents

(a) Grade of tolerance

(b) Upper deviation

(c) Lower deviation

(d) Type of fit



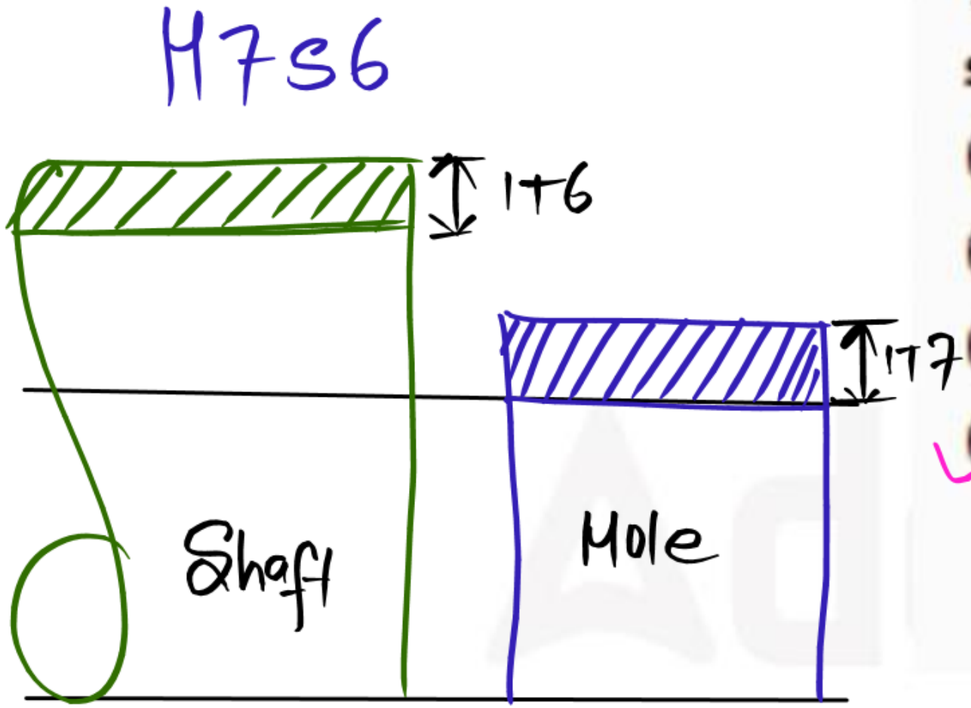
The dimensional limits on a shaft of 25h7 are

(a) 25.000, 25.021 mm

(b) 25.000, 24.979 mm

(c) 25.000, 25.007 mm

(d) 25.000, 24.993 mm



The fit on a hole-shaft system is specified as H7-s6. The type of fit is

(a) Clearance fit

(b) Running fit (sliding fit)

(c) Push fit (transition fit)

(d) Force fit (interference fit)

Gauge

⇓

For Inspection OR check

Plug gauges are used to

(a) Measure the diameter of the workpieces

(b) Measure the diameter of the holes in the workpieces

(c) Check the diameter of the holes in the workpieces

(d) Check the length of holes in the workpieces

* Plug Gauge → Inspection of Hole

* Ring, Gap, Snap Gauge → Inspection of Shaft

Which one of the following tolerances set on inner diameter and outer diameter respectively of headed jig bush for press fit is correct?

(a) G_7 h 6 (b) F_7 n6

(c) H $_7$h 6 (d) F_7j6

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