We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

- a. External micrometer
- b. Internal micrometer
- c. Depth micrometer
- d. Gauge blocks
- e. None of the above is correct

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is di
divisions, then the accuracy of the device is

c. Clinometer

d. Mechanical comparator

Clear my choice

Question 11

Not yet answered

Marked out of 2.00

Flag question

RTDs are more sensitive than thermistors

Select one:

a. True

b. False

Clear my choice

Question 12

Not yet answered

Marked out of 2.00

Flag question

The prominent part of a thread, whether internal or external is called ----------

Select one:

a. The major diameter

b. The crest of the thread

c. The root of the thread

Type here to search

c. Line standard measuring devices

d. None of the above

RTD stands for

Select one:

a. Relative Thermal Devices

b. Radioactive Thermonuclear Dipoles

c. Resistance Temperature Detectors

d. Resistive Temperature Devices

Clear my choice

The external micrometer is one of the indirect meas

Select one:

a. True

b. False

c. Thermistors have either a NTC or a PTC , but

Clear my choice

The firm joint calipers are examples of

Select one:

a. Direct measuring devices

b. Indirect measuring devices

c. Line standard measuring devices

d. None of the above

The bottom of the groove between the two flanking surf

Select one:

a. The major diameter

b. The crest of the thread

c. The root of the thread

d. The minor diameter

The bottom of the groove between the two flanking surfaces of the thread whether internal or external

Select one:

- a. The major diameter
- b. The crest of the thread
- c. The root of the thread
- d. The minor diameter

Clear my choice

d. Both A and B are correct

Clear my choice

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder was 20.9344, the micrometer reading over the thread was 21.1342 mm, then the major diameter of the thread is equal to ----------

Select one:

- a. 19.8002 mm
- b. 20.1998 mm
- c. 22.0686 mm
- d. None of the above is correct

Clear my choice

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is divided into 10 divisions, then the accuracy of the device is

Select one:

Q2

A) is a component of surface texture.

B) measurment of the more widely spaced component of surface texture

C)

Question 1

Not yet answered

Marked out of 2.00

Flag question

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is divided into 10 divisions, then the accuracy of the device is

Select one:

- a. 0.01 mm
- b. 0.1 mm
- c. 0.05 mm
- d. 1 mm

Clear my choice

Question 2

Not yet answered

Marked out of 2.00

Flag question

The accuracy of the vernier bevel protractor is

Select one:

- a. 1 min
- b. 2.5 min
- c. 5 min
- d. 1 degree

Quiz navigation

Finish attempt ...

Time left **0:32:45**

1.005 | 25.000 | 10.500 | 1.170

C. Using the following set of gauge blocks, what is the minimum number of blocks to be wrung together to produce an overall dimension of 37.675 mm
Show your calculations.

Metric 103 pieces	
	Increment
1 piece (1.005) mm	
49 pieces (1.01-1.49) mm	0.01 mm
49 pieces (0.5- 24.5) mm	0.5 mm
4 pieces (25-100) mm	25 mm

D. Compare between line standards and end standards; give an example on each type

line standard: → the measurement may be subdivided as 1.5, 2.1, 3.8 as example

end standards → the point that used to measure found at the end face not subdivided

i.e. 1, 2, 3, 4 → as a vernier

14 points

Question 2:

A surface was tested for straightness using an autocollimator and a reflector; the readings are shown in the following table, if one second of arc increase in angle observed corresponds to a rise of 0.25 micron of the front end of the reflector relative to its rear end.

A. Construct a profile graph of the surface relative to the initial points (0- 50) (4 points)

the maximum deviation of the profile from the straight line using the end points

d. Mechanical comparator

Clear my choice

The prominent part of a thread, whether internal or external is called ----------

Select one:

a. The major diameter

b. The crest of the thread

c. The root of the thread

d. The minor diameter

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is

re to search

Question 1 :-

A. $\sin\theta = \frac{h}{L} \rightarrow h = \sin(4.5°) \cdot 5$

$h = .392"$

$L = 5$ inches

$\theta = 4° 30' = 4.5°$

B. 1.654 cm → 1.64 cm

C. 7.14 mm

D. 47.765
- 1.005
46.760
- 1.26
45.50
- 20.5
25.0
- 25

using the following gauge blocks :-

1.005
1.26
20.5
25.0

} 4 gauges blocks

A. 15.584 mm

B. 28° 15'

Which of the following is correct

Select one:

- a. All thermistors are classified as a PTC devices
- b. All thermistors are classified as a NTC devices
- c. Thermistors have either a NTC or a PTC , but the first is more common.

Clear my choice

Which of the following is considered as manufacturing configuration of the RTD

Question 2:-

A. 3.34 cm .01 cm → vernier caliper

B. 9.5
+ .48

9.98 mm

.01 mm → micrometer

C. 50° 20' 5' (5 minute)

Question 17

Not yet answered

Marked out of 2.00

Flag question

The pitch diameter of the thread is another name for the effective diameter

Select one:

- a. True
- b. False

Clear my choice

Question 18

Not yet answered

Marked out of 2.00

Flag question

The block gauges are examples of end standard

Select one:

- a. True
- b. False

Clear my choice

Question 19

We can use ---------- to measure wires, spheres, shafts and blocks

Q4

السؤال الرابع

$$\varepsilon = \frac{1}{2.05} * (-0.069 * 10^{-3})$$

$$\varepsilon = -3.36 \times 10^{-5}$$

Q4

$$\sigma = \varepsilon * E$$

$$= -3.36 \times 10^{-5} * 210000$$

$$\sigma = -7.056 \text{ Mpa}$$

20

Clear my choice

1

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder was 20.9344, the micrometer reading over the thread was 21.1342 mm, then the major diameter of the thread is equal to -------

Select one:

- a. 19.8002 mm
- b. 20.1998 mm
- c. 22.0686 mm
- d. None of the above is correct

Clear my choice

Finish attempt ...

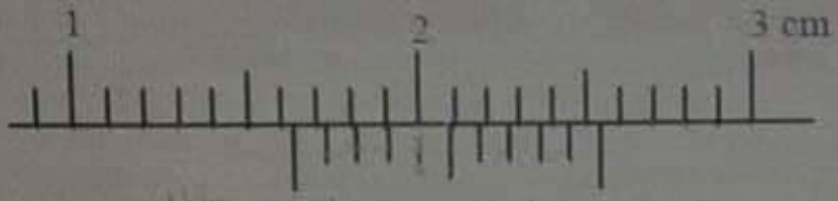
Question 1: **10 points**

A. What size is the gauge block build-up used with a 5 inches sine bar to set the workpiece at an angle of 4° 30'? show your calculations (3 points)

$\theta = 4.5^\circ$ Bar $L = 5$ inche $= 12.7$ cm

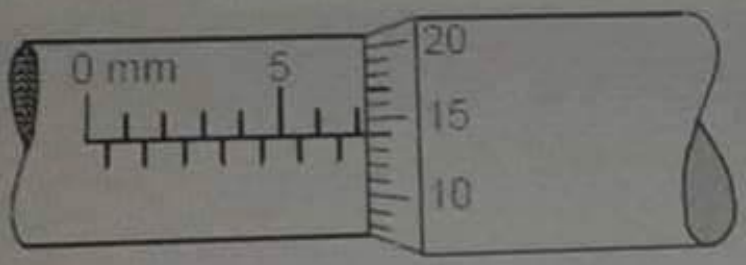
$\sin\theta = \frac{h}{L} = h = \sin 4.5^\circ * 12.7 = 0.9996$ cm $=$ ..393 inch

B. A student used a vernier caliper to measure the diameter of a cylinder. The diagram shows an enlargement of the caliper scales. What reading was recorded? (2 points)



11 m + 0.1 × 4 = 11.4 mm

C. What is the reading of the following micrometer? (2 points)



7 mm + 0.14 mm =

7.14 mm

D. Using the following set of gauge blocks, what is the minimum number of blocks to be wrung together to produce an overall dimension of 47.765 mm

Show your calculations (3 points)

Metric 103 pieces	
	Increment
1 piece (1.005) mm	
49 pieces (1.01-1.49) mm	0.01 mm
49 pieces (0.5- 24.5) mm	0.5 mm
4 pieces (25-100) mm	25 mm

25 we need 5 block gauge

47.765
① 1.005
46.760
② 1.26
45.50
③ 0.5
45.0
④ 25.00
20.00
⑤ 20.00
0.00

The bottom of the groove between the two flanking surfaces of the thread whether internal or external

Select one:

- a. The major diameter
- b. The crest of the thread
- c. The root of the thread
- d. The minor diameter

Clear my choice

Question 3

Not yet answered

Marked out of 2.00

Flag question

Which of the following is not an angular measuring device / instrument

Select one:

- a. Vernier bevel protractor
- b. Sine bar
- c. Clinometer
- d. Mechanical comparator

Clear my choice

4

The spring joint caliper is one of the direct measuring devices

Select one:

- a. True
- b. False

a. Heating

b. Cooling

c. Bending

d. Both A and B are correct

Clear my choice

The spring joint caliper is one of the direct measuring devices

Select one:

a. True

b. False

Clear my choice

A bench micrometer was used to measure the major diameter of an exter
the standard cylinder is 20.0000 mm, the micrometer reading over the sta
micrometer reading over the thread was 21.1342 mm, then the major diam

Select one:

c. Both A and B are correct

Clear my choice

Question 7

Not yet answered

Marked out of 2.00

Flag question

We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

a. External micrometer

b. Internal micrometer

c. Depth micrometer

d. Gauge blocks

e. None of the above is correct

Clear my choice

Question 8

Not yet answered

The block gauges are examples of end standard

Select one:

Type here to search

In order to measure the effective diameter of the external thread using a bench micrometer, it is required to measure the major diameter and the minor diameter of the thread.

Select one:

- a. True
- b. False

We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

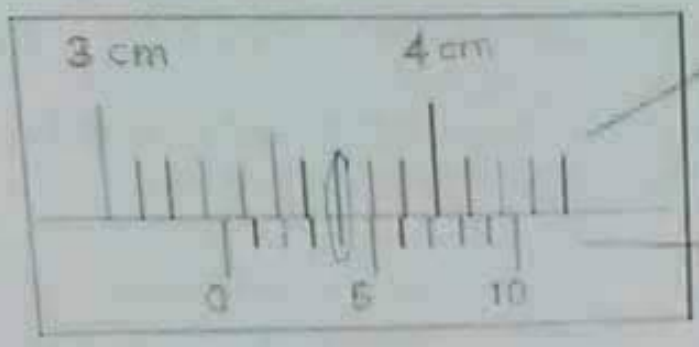
- a. External micrometer
- b. Internal micrometer
- c. Depth micrometer
- d. Gauge blocks
- e. None of the above is correct

search

Question 2: (12 points)

Fill in the space:

A. The reading of the following vernier caliper is 3.34 cm, and the accuracy is 0.05 mm

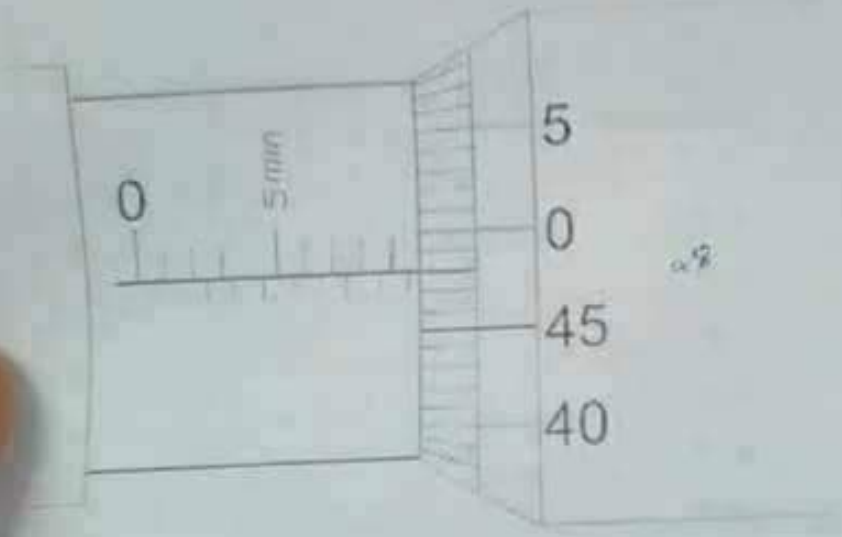


main scale

vernier scale

3.3
0.04
3.34

B. The reading of the following micrometer is 9.28 mm and the accuracy is 0.1 mm



C. The reading of the following vernier bevel protractor is 49° 20', and the accuracy is 0.05

Question 13

Not yet answered

Marked out of 2.00

Flag question

In order to measure the effective diameter of the external thread using a bench micrometer, it is required to measure the major diameter and the minor diameter of the thread.

Select one:

- a. True
- b. False

Clear my choice

Question 14

Not yet answered

Marked out of 4.00

Flag question

A bench micrometer was used to measure the minor diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder using a prism was 30.3218 mm, the micrometer reading over the thread using a prism was 25.7424 mm, then the minor diameter of the thread is equal to ----------

Select one:

- a. 15.4206 mm
- b. 24.5794 mm
- c. 36.0642 mm
- d. None of the above is correct

Clear my choice

Q3 (السؤال 1 حل)

$D_{Major} = D + (R_{th} - R_c)$

$= 30 + (9.6320 - 9.7216)$

$D_{Major} = 29.9104$ mm

$D_{minor} = 30 + (11.9356 - 15.5464)$

$D_{minor} = 26.3892$ mm

$T = 30 + (10.0766 - 13.2838)$

$T = 26.7928$ mm

$D_{eff} = 26.7928 + \frac{3.5}{2} * \frac{1}{\tan(30)} - \left(\frac{1}{\sin(30)} - 1\right) *$

20207

$D_{eff} = 27.805$ mm

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is divided into 10 divisions, then the accuracy of the device is

Select one:

- a. 0.01 mm
- b. 0.1 mm
- c. 0.05 mm
- d. 1 mm

Clear my choice

15

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder was 20.9344, the micrometer reading over the thread was 21.1342 mm, then the major diameter of the thread is equal to -------

Select one:

Question 2: (14 points)

A. Describe with a simple sketch the working principle of the autocollimator. (6 points)

B. Describe the working principle of the clinometers (4 points)

C. Does the external micrometer obeys to the Abbe's Principe? Explain (4 points)

Question 3: (4 points)

A. Using the following set of gauge blocks, list the minimum number of blocks to produce an overall dimension of 76.575 mm. (show your calculations)

Metric (103) pieces	
	Increment
1 piece (1.005) mm	
49 pieces (1.01 to 1.49) mm	0.01
49 pieces (0.5 to 24.5) mm	0.5
4 pieces (25- 100) mm	25

B. Write two applications of block gauges

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eExam

Clear my choice

Question 11

Not yet answered

Marked out of 1.00

Flag question

RTDs are more sensitive than thermistors

Select one:

a. True

b. False

Clear my choice

Question 12

Not yet answered

Marked out of 1.00

Flag question

The sliding joint caliper is one of the direct measuring devices

Select one:

a. True

b. False

Question 13

Question 2:

Describe the working principle of the Clinometer **6 points** 6

Clinometer : It's device using for angular measurement • show to face aligned from each other , put the clinometer on one face check the reading of Bubbles equel zero if not you have to move knope and rerotal until the Bubbles give zero reading clionmeter consist of two scale main scale in degree , veriveer scale in minute you can get the reading in second by reverse work piece after that add all reading to get the measure of aligned measure of angle

Question 3: **14 points**

A surface was tested for straightness using an autocollimator and a reflector, the readings are shown in the following table. if one second of arc increase in angle observed corresponds to a rise of 0.25 micron of the front end of the reflector relative to its rear end

A. Construct a profile graph of the surface relative to the initial points (0-50). (4 points)

B. Calculate the maximum deviation of the profile from the straight line using the least square method. (10 points)

Position	Autocollimator reading	Difference from first reading	Rise or fall over 50 mm	Cumulative rise or fall	x	error	x_m $(x-\bar{x})$	y_m $(y-\bar{y})$	$x_m y_m$	y/s
Mm	Sec	sec	micron	micron						
0	0	0	0	0	0		-250	-3.7	925	-0.37
0-50	22	0	0	0	1	1	-200	-3.7	740	-1.22
50-100	20	-2	-0.5	-0.5	2	1.5	-150	-4.2	630	-3.07
100-150	18	-4	-1	-1.5	3	1.5	-100	-5.2	520	-2.92
150-200	12	-10	-2.5	-4	4	0	-50	-7.7	385	-3.77
200-250	16	-6	-1.5	-5.5	5	-0.5	0	-9.2	0	-4.62
250-300	26	4	1	-4.5	6	1.5	50	-8.2	-410	-5.47
300-350	24	2	0.5	-4	7	-3	100	-7.7	-770	-6.32
350-400	20	-2	-0.5	-4.5	8	1.5	150	-8.2	-1230	-7.17
400-450	12	-10	-2.5	-7	9	-2	200	-10.7	-2140	-8.2
450-500	10	-12	-3	-10	10	0	250	-13.7	-3425	

250 $\bar{y}$ (-3.77)

error → 4.18, -4.07, -2.98, -3.13, -4.78, -5.93, -3.58, -2.23, -1.88, -3.5

$m = \frac{\sum y_m x_m}{x_m^2} = \frac{-4747.5}{275000} = -0.017$

$y = -0.017x + 0.48$

$c = \bar{y} - m\bar{x}$

$c = -3.77 - (-0.017 \times 250)$

$c = 0.48$

Straightness = -1.88 - -5.5 = 1.62 µm

zero peak - value

Clear my choice

Question **14**

Not yet answered

Marked out of 4.00

Flag question

A bench micrometer was used to measure the minor diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder using a prism was 30.3218 mm, the micrometer reading over the thread using a prism was 25.7424 mm, then the minor diameter of the thread is equal to ----------

Select one:

- a. 15.4206 mm
- b. 24.5794 mm
- c. 36.0642 mm
- d. None of the above is correct

Clear my choice

9- the most common thermometers in real life Applications:
ALL "Thermocouples , RTDs , Thermistors"

10- which of the following are manufactured using sensing element: RTDs

11- which of the following are more common: ما يوجد تفاصيل الخيارات
RTDs - Thermistor - Thermometer - Thermocouple

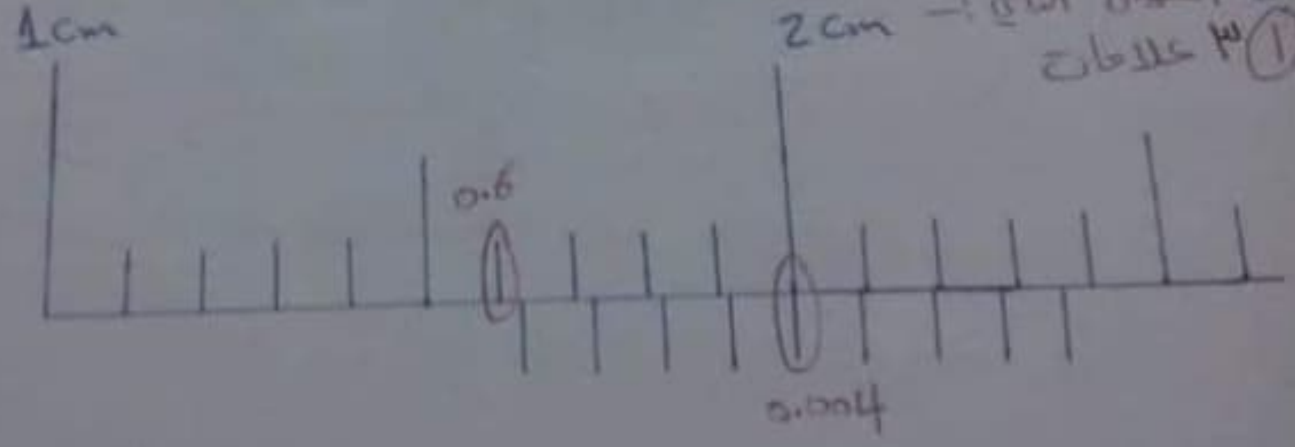
12- Specification of Applications in thermometers: بس هيك متذكر من السؤال

13- In thermocouple a small open-Circuit voltage are produce which the Voltage value equal: الله أعلم بالسؤال ، بالخيارات

14- !!strain gage لل Sensor ال عن أشي!!

٣ أخيرة

فرع السؤال الثاني :- ① ٣ علامات



⇒ 1.64 cm

2

Question **16**

Not yet answered

Marked out of 2.00

Flag question

The strain gauge resistance varies with:

Select one:

- a. Heating
- b. Cooling
- c. Bending
- d. Both A and B are correct

Question **17**

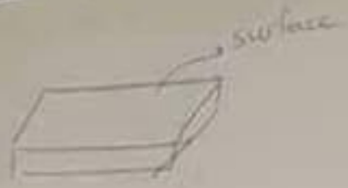
Not yet answered

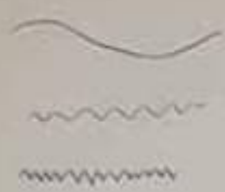
Marked out of

Both the vernier caliper and the inside micrometer can be used to measure

Select one:

- a. True





Error of the form.

Secondary texture

primary texture

As f increases, the roughness increases.

Note: it doesn't matter where we choose the reference line "Peak to valley"

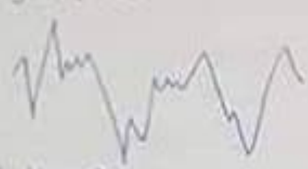
① Peak to valley

$$R_a = \frac{Y_1 - Y_2}{VMF}$$

~~Disadvantages~~ Drawback: we only considered two points to calculate roughness → inaccurate.

② 10 points height of irregularities:-

5 peaks and 5 valleys



peaks ○ فردي

valleys ○ زوجي

$$R_{10\,points} = \frac{(Y_1 + Y_3 + Y_5 + Y_7 + Y_9) - (Y_2 + Y_4 + Y_6 + Y_8 + Y_{10})}{5 \times VMF}$$

③ h_{RMS} (Root Mean Square) value:-

Area above CL = Area below it

$$\sqrt{\frac{\sum h^2}{n}} \times \frac{1}{VMF}$$

n → عدد التجزيئات

④ CLA method.

Finish attempt ...

Time left 0:21:52

Question 2

Not yet answered

Marked out of 2.00

Flag question

The prominent part of a thread, whether internal or external is called ----------

Select one:

- a. The major diameter
- b. The crest of the thread
- c. The root of the thread
- d. The minor diameter

Clear my choice

Question 3

Not yet answered

Marked out of 2.00

Flag question

Which of the following is considered as manufacturing configuration of the RTD

Select one:

- a. Wire-wound RTD
- b. thin-film RTD
- c. Both A and B are correct

Clear my choice

Question 1

Not yet answered

Marked out of 2.00

Flag question

In order to measure the effective diameter of the external thread using a bench micrometer, it is required to measure the and the minor diameter of the thread.

Select one:

- a. True
- b. False

Clear my choice

Question 2

Not yet answered

Marked out of 2.00

Flag question

RTD stands for

Select one:

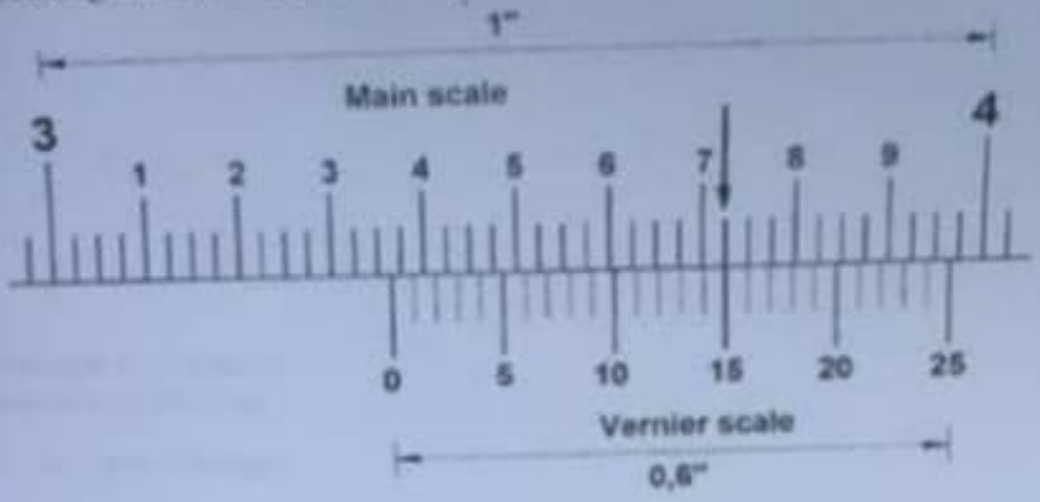
- a. Relative Thermal Devices
- b. Radioactive Thermonuclear Dipoles
- c. Resistance Temperature Detectors
- d. Resistive Temperature Devices

Clear my choice

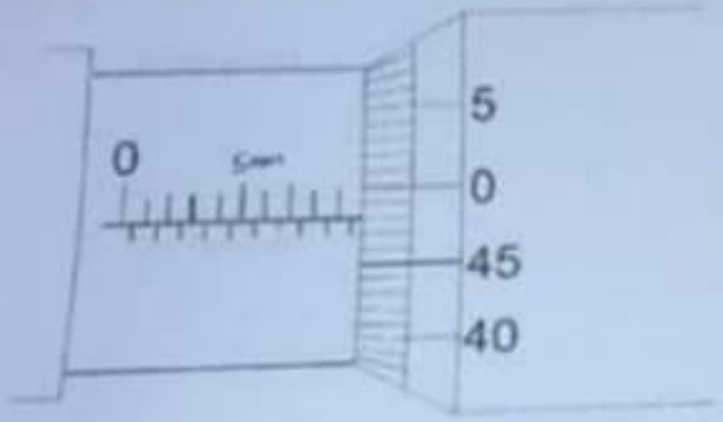
Question 2: (12 points)

Fill in the space:

A. The reading of the following vernier caliper is ----------, and the accuracy is ----------



B. The reading of the following micrometer is ----------, and the accuracy is ----------



C. The reading of the following vernier bevel protractor is ----------, and the accuracy is ----------

The block gauges can be used to check the accuracy of the micrometer

Select one:

- a. True
- b. False

Clear my choice

4

In order to measure the effective diameter of the external thread using a bench micrometer, it is required to measure the major diame and the minor diameter of the thread.

Select one:

- a. True
- b. False

Clear my choice

5

The strain gauge resistance varies with:

Select one:

uestion 4

ot yet
nswered

larked out of
.00

Flag question

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder was 20.9344, the micrometer reading over the thread was 21.1342 mm, then the major diameter of the thread is equal to ----------

Select one:

- a. 19.8002 mm
- b. 20.1998 mm
- c. 22.0686 mm
- d. None of the above is correct

on 6

et

ered

ed out of

ag question

The prominent part of a thread, whether internal or external is called ----------

Select one:

- a. The major diameter
- b. The crest of the thread
- c. The root of the thread
- d. The minor diameter

Clear my choice

The pitch diameter of the thread is another name for the effective diameter

Select one:

- a. True
- b. False

Question 3: (4 points)

Using the following set of gauge blocks, list the minimum number of blocks to produce an overall dimension of 100.995 mm. (show your calculations)

Metric (103) pieces	
	Inerement
1 piece (1.005) mm	
49 pieces (1.01 to 1.49) mm	0.01
49 pieces (0.5 to 24.5) mm	0.5
4 pieces (25- 100) mm	25

100.995
1 .005
99.99
1.49
98.5
24.5
74.00
24.00
50.00
60.00
0

3/4

B. Why do we always choose the minimum number of blocks combinaton?

because accuracy Reading
and standard measurments & calibrabion

6/6

Question 4: (6 points)

Describe the working principle of the clinometer

Colominitor its device using for angular measurments two face aligned for each other put the colominar on face check the reading of Bubble equal zero if not you have more tneap and reverstal until the Babble gives zero reading colominator consist of two Scale main scale in degree vernier Scale The reading in second by reverse werR pices after that add all resar to set the moremerb of all aligned measure angle

14 points

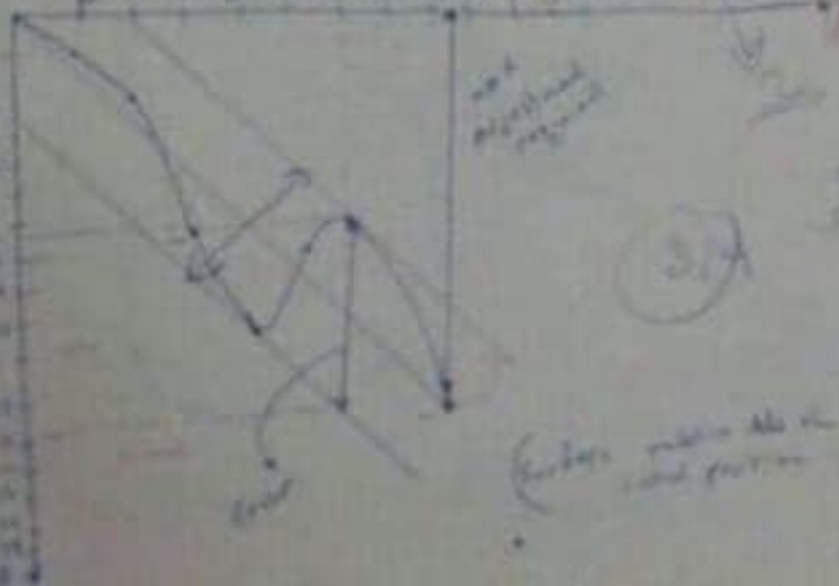
Question 2:

A surface was tested for straightness using an autocollimator and a reflector, the readings are shown in the following table, if one second of arc increase in angle observed corresponds to a rise of 0.2 microns of the front end of the reflector relative to its rear end.

A. Construct a profile graph of the surface relative to the initial points. (4 points)

B. Calculate the maximum deviation of the profile from the straight line using the end points method. (10 points)

Position	Autocollimator reading	Difference from first reading	Rise or fall over 50 mm Microns	Cumulative rise or fall microns	Adjustment required	Angle						
mm	Sec	sec										
0		0										
0-50	40	0	0	0								
50-100	34	-6	-1	-1								
100-150	32	-8	-4	-5								
150-200	28	-12	-6	-11								
200-250	28	-12	-6	-17								
250-300	48	8	2	-15								
300-350	44	4	1	-14								
350-400	36	-4	-1	-15								
400-450	28	-12	-3	-18								
450-500	16	-24	-6	-24								



Question 1

Not yet answered

Marked out of 2.00

Flag question

The spring joint caliper is one of the direct measuring devices

Select one:

- a. True
- b. False

Clear my choice

Question 2

Not yet answered

Marked out of 4.00

Flag question

A bench micrometer was used to measure the minor diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm, the micrometer reading over the standard cylinder using a prism was 30.3218 mm, the micrometer reading over the thread using a prism was 25.7424 mm, then the minor diameter of the thread is equal to ----------

Select one:

- a. 15.4206 mm
- b. 24.5794 mm
- c. 36.0642 mm
- d. None of the above is correct

Clear my choice

Question 3

Not yet answered

Marked out of 2.00

The block gauges can be used to check the accuracy of the micrometer

Select one:

- a. True

21

In order to measure the effective diameter of the external thread using a bench micrometer, it is required to measure the major diameter and the minor diameter of the thread.

Select one:

- a. True
- b. False

Finish attempt ...

Jump to...

Question 10

Not yet answered

Marked out of 2.00

Flag question

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is divided into 10 divisions, then the accuracy of the device is

Select one:

- a. 0.01 mm
- b. 0.1 mm
- c. 0.05 mm
- d. 1 mm

Clear my choice

Question 11

Not yet answered

Marked out of 2.00

Flag question

The accuracy of the vernier bevel protractor is

Select one:

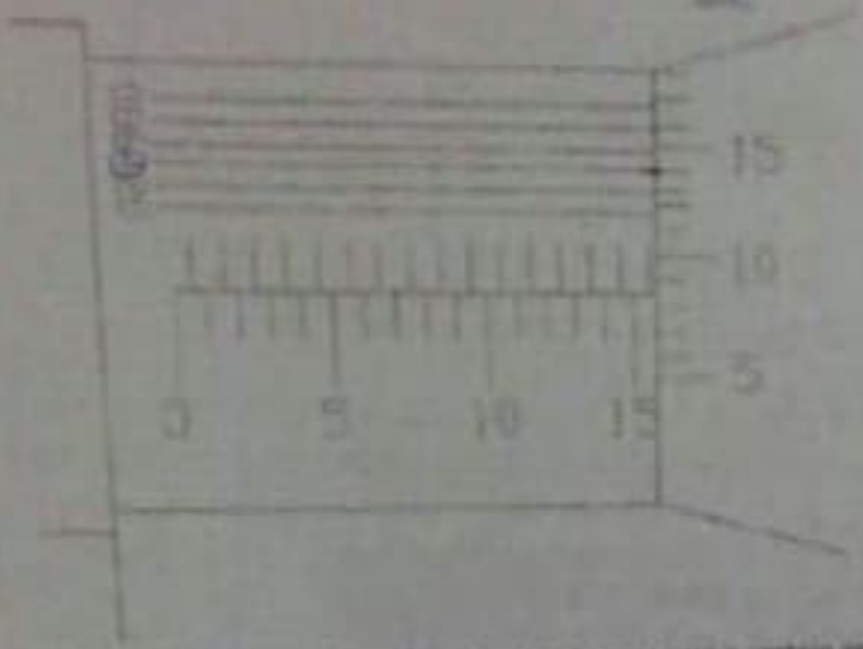
- a. 1 min
- b. 2.5 min
- c. 5 min
- d. 1 degree

Clear my choice

15 Points

A student used a vernier micrometer to measure a certain dimension. The diagram shows an enlargement of the micrometer scales. What reading was recorded?

Note: the dimensions on the sleeve are in mm.



16.34 mm ≠ 1634 mm

15.50 +
0.80
0.04
16.34

3. A student used a vernier bevel protractor to measure a certain angle. The diagram below shows the reading of the angle. What reading was recorded?

28° 15'

The reading of the angle is

METROLOGY & ENG.MEASURMENTS

Question 1

Not yet answered

Marked out of 2.00

Flag question

The prominent part of a thread, whether internal or external is called ----------

Select one:

- a. The major diameter
- b. The crest of the thread
- c. The root of the thread
- d. The minor diameter

Clear my choice

Question 2

Not yet answered

Marked out of 2.00

Which of the following is correct

Select one:

a. All thermistors are classif

Clear my choice

Question 19

Not yet answered

Marked out of 2.00

Flag question

We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

- a. External micrometer
- b. Internal micrometer
- c. Depth micrometer
- d. Gauge blocks
- e. None of the above is correct

Clear my choice

Question 20

Not yet answered

Marked out of 2.00

Flag question

Both the vernier caliper and the inside micrometer can be used to measure the depth of a specimen

Select one:

- a. True
- b. False

Clear my choice

Type here to search

Question 2: (14 points)

A. Describe with a simple sketch the working principle of the autocollimator. (4 points)

B) Describe the working principle of the clinometer (4 points)

C. Does the external micrometer obeys to the Abbe's Principle? Explain. (4 points)

Question 3: (4 points)

A. Using the following set of gauge blocks, list the minimum number of blocks to produce an overall dimension of 76.271 mm. (show your calculations)

Metric (103) pieces	
	Increment
1 piece (1.001) mm	0.001
49 pieces (1.01 to 1.49) mm	0.01
49 pieces (0.5 to 24.5) mm	0.5
4 pieces (25- 100) mm	25

B. Write two applications of block gauges.

i)

ii)

The accuracy of the vernier bevel protractor is

Select one:

- a. 1 min
- b. 2.5 min
- c. 5 min
- d. 1 degree

Which of the following is not an angular measuring device / instrument

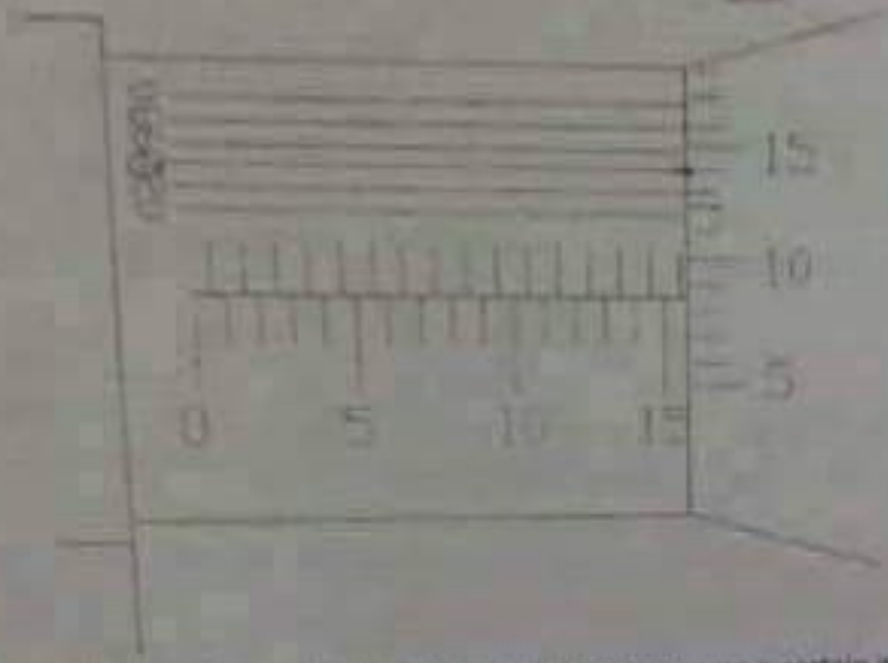
Select one:

- a. Vernier bevel protractor
- b. Sine bar
- c. Clinometer

16 Points

A student used a vernier micrometer to measure a certain dimension. The diagram shows an enlargement of the micrometer scales. What reading was recorded?

Note: the dimensions on the sleeve are in mm.



16.34 mm = 1634 mm

2

15.50 +
0.80
0.04
16.34

B. A student used a vernier bevel protractor to measure a certain angle. The diagram below shows the reading of the angle. What reading was recorded?

28° 15'

4

The reading of the angle is

Marked out of 2.00

Flag question

Select one:

a. All thermistors are classified as a PTC devices

b. All thermistors are classified as a NTC devices

c. Thermistors have either a NTC or a PTC , but the first is more common.

Question 21

Not yet answered

Marked out of 2.00

Flag question

The block gauges can be used to check the accuracy of the micrometer

Select one:

a. True

b. False

Clear my choice

Student name:----------**Student number:**---------- **section** ------

Question 1: (8 points)

A surface was tested for straightness using an autocollimator and reflector; the readings are shown in the following table, if one second of arc increase in angle observed corresponds to a rise of 0.5 micron of the front end of the reflector relative to its rear end.

1. Construct a profile graph of the surface relative to the initial points (0-100 mm). (5 points)
2. Using the end points method to calculate the max deviation of the profile from the straight line. (3 points)

position	Autocollimator reading	Difference from first reading	Rise or fall over 100 mm	Cumulative rise or fall	Adjustment required	error
mm	Sec	Sec	micrometer	Micrometer		
0						
0 -100	30					
100-200	38					
200-300	70					
300-400	86					
400-500	94					
500-600	54					
600-700	38					
700-800	62					
800-900	70					
900-1000	78					

Flag question

b. False

Clear my choice

Search | Copy | Send to My Flow

Question 13

Not yet answered

Marked out of 2.00

Flag question

Which of the following is considered as manufacturing configuration of the RTD

Select one:

a. Wire-wound RTD

b. thin-film RTD

c. Both A and B are correct

Question 14

Not yet answered

Which of the following is not an angular measuring device / instrument

Select one:

a. Heating

b. Cooling

c. Bending

d. Both A and B are correct

Clear my choice

The spring joint caliper is one of the direct measuring devices

Select one:

a. True

b. False

Clear my choice

A bench micrometer was used to measure the major diameter of an exter
the standard cylinder is 20.0000 mm, the micrometer reading over the sta
micrometer reading over the thread was 21.1342 mm, then the major diam

Select one:

Q4

السؤال الرابع

$$\varepsilon = \frac{1}{2.05} * (-0.069 * 10^{-3})$$

$$\varepsilon = -3.36 \times 10^{-5}$$

Question 6

Not yet answered

Marked out of 2.00

Flag question

Which of the following is not an angular measuring device / instrument

Select one:

- a. Vernier bevel protractor
- b. Sine bar
- c. Clinometer
- d. Mechanical comparator

Clear my choice

Question 7

Not yet answered

Marked out of 2.00

Flag question

The block gauges can be used to check the accuracy of the micrometer

Select one:

- a. True
- b. False

Clear my choice

Question 8

The spring joint caliper is one of the direct measuring devices

c. The root of the thread

d. The minor diameter

Clear my choice

10

Which of the following is considered as manufacturing confi

Select one:

a. Wire-wound RTD

b. thin-film RTD

c. Both A and B are correct

11

The firm joint calipers are examples of

ype here to search

new estimate Centre

area above

$= \frac{1}{2} \cdot [1.2 \cdot 4 + 1.4 \cdot 3.5 + 2.2 \cdot 7 + 1.8 \cdot 6 + 1.4 \cdot 4.5 + 1.1 \cdot 4]$

$= 23.3 \text{ cm}^2$

Area below

$= \frac{1}{2} [1.8 \cdot 5.5 + 0.9 \cdot 2.5 + 1.1 \cdot 4 + 0.7 \cdot 2 + 1.7 \cdot 5 + 0.7 \cdot 2$

$= 14.1 \text{ cm}^2$

$$\frac{\text{area above} - \text{area below}}{\text{length}} = \frac{23.3 - 14.1}{16} = 0.577 \text{cm}$$

the new line should be at (0.577 cm) above the estimated one.

area above

$= \frac{1}{2} [0.9 \cdot 3.4 + 1.2 \cdot 2.9 + 1.7 \cdot 6.4 + 1.6 \cdot 5.4 + 1.2 \cdot 3.9 + 0.7 \cdot 1.4]$

$= 17.54 \text{ cm}^2$

area below:

$= \frac{1}{2} [2 \cdot 6.1 + 1.1 \cdot 8.1 + 1.4 \cdot 4.6 + 0.9 \cdot 2.6 + 1.9 \cdot 5.6 + 1 \cdot 2.1]$

$= 17.21 \text{ cm}^2$

$$h_{CLA} = \frac{\text{area above} + \text{area below}}{\text{length}}$$

$$= \frac{[17.54 + 17.21] \cdot 100 \cdot 1000}{8} \cdot \frac{100\,000}{20} \text{ um}$$

$= 0.2178 \text{ um}$

8

d

out of

question

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier scale is divided into 10 divisions, then the accuracy of the device is

Select one:

- a. 0.01 mm
- b. 0.1 mm
- c. 0.05 mm
- d. 1 mm

Clear my choice

Question 2:
Describe the working principle of the Clinometer **6 points** 6

Clinometer is a device using for angular measurement & how to face weight from each other, put the clinometer on one face check the reading of Bubbles equal zero if not you have to move knife and reverse with the bubbles the zero reading clinometer consist of two scale main scale in degree, vernier scale in minute get a sum set the reading in second to reverse work piece after that hold all reading to get

Question 3: **14 points**
A surface was tested for straightness using an autocollimator and a reflector, the readings are shown in the following table, if one second of arc increase in angle observed corresponds to a rise of 0.25 micron of the front end of the reflector relative to its rear end

A. Construct a profile graph of the surface relative to the initial points (0-50). (4 points)
B. Calculate the maximum deviation of the profile from the straight line using the least square method. (10 points)

	Position	Autocollimator reading	Difference from first reading	Rise of fall over 50 mm	Cumulative rise or fall					
	Mm	Sec	sec	micron	micron					
	0	0	0	0	0					
1	0-50	22	0	0	0	1	1	-250	-3.7	925
2	50-100	20	-2	-0.5	-0.5	2	1.5	-150	-4.2	630
3	100-150	18	-4	-1	-1.5	3	1.5	-100	-5.2	520
4	150-200	12	-10	-2.5	-4	4	0	-50	-7.7	-385
5	200-250	16	-6	-1.5	-5.5	5	-1.5	0	-9.2	0
6	250-300	26	4	1	-4.5	6	1.5	50	-8.2	-410
7	300-350	24	2	0.5	-4	7	-2	100	-7.7	-770
8	350-400	20	-2	-0.5	-4.5	8	2.5	150	-8.2	-1230
9	400-450	12	-10	-2.5	-7	9	-2	200	-10.7	-2140
10	450-500	10	-12	-3	-10	10	0	250	-11.2	-2800

250

$\bar{y} = -3.77$

$m = \frac{\sum ym \, xm}{\sum m^2} = \frac{-4975}{275000} = -0.017$

$c = \bar{y} - m\bar{x}$

$c = -3.77 - (-0.017 \times 250)$

$c = 0.48$

$y = -0.017x + 0.48$

Shaft zero = $\frac{-1.28 - -5.5}{\text{peak - value}} = 2.62$ mm

-4.18
-4.07
-3.98
-3.13
-4.78
-5.43
-3.58
-2.21
-1.88
-3.5
-

The spring joint caliper is one of the direct measuring devices

Select one:

- a. True
- b. False

Question 1

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nswered

larked out of
.00

Flag question

The block gauges are examples of end standard

Select one:

- a. True
- b. False

Clear my choice

uestion 2

ot yet
nswered

if the smallest division of the main scale of the vernier caliper is 1 mm, and its vernier sca
divisions, then the accuracy of the device is

Question 3

Not yet answered

Marked out of 2.00

Flag question

The external micrometer is one of the indirect measuring instruments

Select one:

a. True

b. False

Question 4

Not yet answered

Marked out of 2.00

Flag question

We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

a. External micrometer

b. Internal micrometer

Clear my choice

15

Which of the following is considered as manufacturing configuration of the RTD

Select one:

a. Wire-wound RTD

b. thin-film RTD

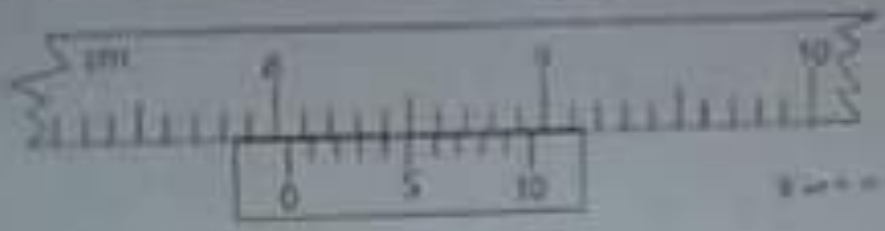
c. Both A and B are correct

Clear my choice

16

Question 1: (12 points)

A. The reading of the following vernier caliper is _____ and the accuracy is _____



B. The reading of the following micrometer is _____ and the accuracy is _____

C. The reading of the following vernier bevel protractor is _____ and the accuracy is _____

Clear my choice

5

ed

out of

question

Both the vernier caliper and the inside micrometer can be used to measure the depth of a specimen

Select one:

a. True

b. False

Clear my choice

6

ed

out of

question

A bench micrometer was used to measure the major diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm. the micrometer reading over the standard cylinder was 20.9344, the micrometer reading over the thread was 21.1342 mm, then the major diameter of the thread is equal to -------

Select one:

The external micrometer is one of the indirect measuring instruments

Select one:

- a. True
- b. False

emitted beam and the reflected beam because the Auto collimator uses light to measure angles so it never comes into contact with the test surface.

السؤال الرابع :- ١٣ علامة

* Study the profile in the figure then answer the following questions:

a. Find the center line

b. Calculate the surface roughness using:

1. Maximum peak to valley height method
2. ten points height method
3. Root mean square method

where the actual length of the specimen is equal to 10 mm and the vertical magnification is equal to 500 000.

نفس الرسمة إلي أخدتها باللاب
بتكون موجودة بالسؤال

We can use ---------- to measure wires, spheres, shafts, and blocks.

Select one:

- a. External micrometer
- b. Internal micrometer
- c. Depth micrometer
- d. Gauge blocks
- e. None of the above is correct

9. In the RTD experiment , the relationship between the Resistance and temperature is linear:
A. True
B. False

10. Thermi stors are
A. Less sensitive than RTDs
B. More sensitive than RTDs

11. With all co mmon types of RTD, the resistance increases as Temperature increases.
A. True
B. False

12. RTDs t ypically have much higher nominal resistance values than thermistors.
A. True
B. False

13. - ---------- refers to the predominant direction of the surface texture.
A. Form
B. Lay
C. Profile
D. Center line

14. The inside micrometer is one of the indirect measuring instruments
A. True
B. False

Question 2:
Define the following Terminology from the Surface Texture Experiment. **9 Points**

A. Roughness

B. Waviness

C. Lay

D. Profile

E. Center line

F. Form

c. Resistance Temperature Detectors

d. Resistive Temperature Devices

Clear my choice

Question **10**

Not yet answered

Marked out of 2.00

Flag question

Which of the following is not an angular measuring device / instrument

Select one:

a. Vernier bevel protractor

b. Sine bar

c. Clinometer

d. Mechanical comparator

Clear my choice

Question **11**

Not yet answered

Marked out of

RTDs are more sensitive than thermistors

Select one:

a. True

Type here to search

Final exam
Measurement lab (0906442)

Eng. Lamees Al-Durgham
may, 8,2018

Student name: ---------- Student no: ---------- Section :---------

Question 1: **15 Points**

Select the best answer for each of the following paragraph:

1. What device is similar to an RTD but has a negative temperature coefficient?
A. Strain gauge
B. Thermistor
C. Negative-type RTD
D. Thermocouple

2. Temperature sensing can be achieved by the use of
A. Thermocouples
B. RTDs
C. Thermistors
D. All of the above

3. The output voltage of a typical thermocouple is
A. less than 100 mV
B. greater than 1 V
C. Thermocouples vary resistance, not voltage
D. None of the above

4. The connections to a thermocouple:
A. can produce an unwanted thermocouple effect, which must be compensated for
B. produce an extra desirable thermocouple effect
C. must be protected, since high voltages are present
D. both B and C are correct

5. The purpose of compensation for a thermocouple is:
A. to cancel unwanted voltage output of a thermocouple
B. to decrease temperature sensitivity
C. to increase voltage output
D. used for high-temperature circuits

6. The strain gauge resistance varies with:
A. Vibration
B. Heat
C. Weight
D. Bending

7. RTD stands for
A. Relative Thermal Devices
B. Radioactive Thermonuclear Dipoles
C. Resistance Temperature Detectors
D. Resistive Temperature Devices

8. The decrease of resistance with the temperature increase is a property of:
A. Thermocouple
B. bimetallic thermometer
C. Thermistor
D. RTD

RTD stands for

Select one:

- a. Relative Thermal Devices
- b. Radioactive Thermonuclear Dipoles
- c. Resistance Temperature Detectors
- d. Resistive Temperature Devices

Clear my choice

9- the most common thermometers in real life Applications:
All " Thermocouples, RTDs, Thermistors "

10- Which of the following are manufactured using sensing element: RTDs

11- which of the following are more common: ⟸ ما بعرف مش متأكد انا
RTDs - Thermistor - Thermometers - Themocouple

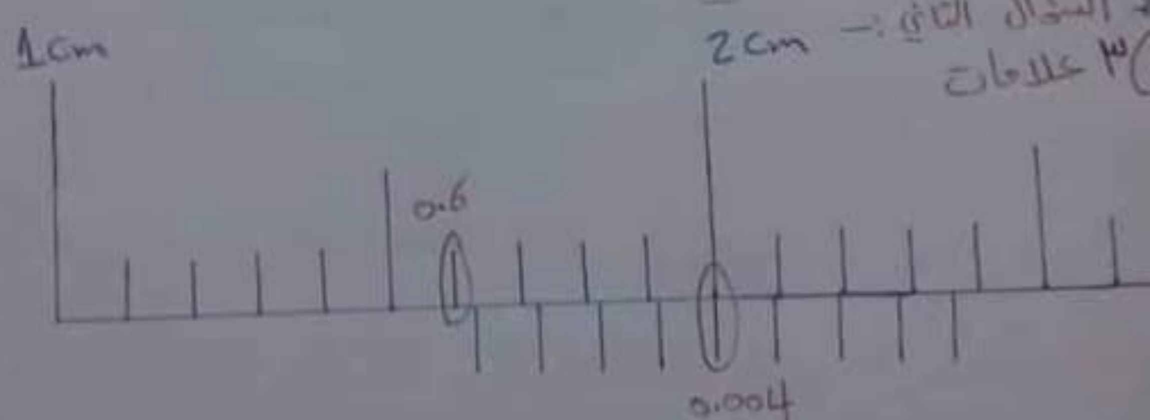
12- Specification of Applications in thermometers: بس هاد متذكر من السؤال

13- In thermocouple a small open-circuit Voltage are produce which the ~~the~~ Voltage value equal: الله أعلم بالسؤال والاجابات:

14- !!strain gage الـ sensor الـ عن اشي!!

١٣ أخرى

السؤال الثاني :- ٣ علامات



⟹ 1.64 cm

2

Clear my choice

bench micrometer was used to measure the minor diameter of an external thread, given that the diameter of the standard cylinder is 20.0000 mm, the micrometer reading over the standard cylinder using a prism was 30.3218 mm, the micrometer reading over the thread using a prism was 25.7424 mm, then the minor diameter of the thread is equal to ----------

Select one:

a. 15.4206 mm

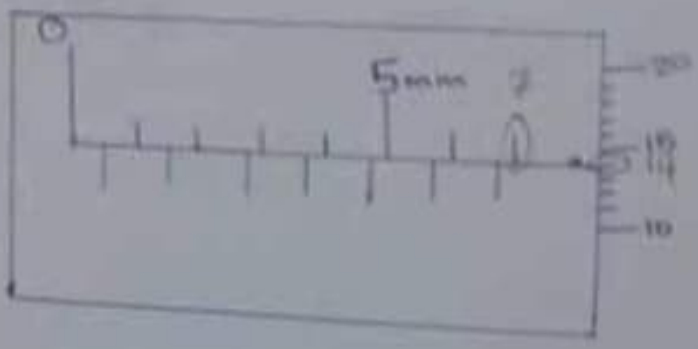
b. 24.5794 mm

c. 36.0642 mm

d. None of the above is correct

Clear my choice

21 Which of the following is considered as manufacturing configuration of the RTO



$\Rightarrow$ 7.14 mm

What size is the gauge block build-up used with a 10 inches sine bar to set the work piece at an angle of 4° 30′? Show your calculations

$\sin\theta = \frac{h}{L} \Rightarrow \boxed{h = \sin\theta * L}$

Describe the working principle of the Auto Collimator?

The Auto Collimator is an optical device used to measure small angles with very high sensitivity. The Auto Collimator projects a beam of collimated light. An external reflector reflects all or part of the beam back into the instrument where the beam is focused and detected by a photodetector [3]

the Auto Collimator measures the deviation between the

The strain gauge resistance varies with:

Select one:

- a. Heating
- b. Cooling
- c. Bending
- d. Both A and B are correct

Clear my choice

RTDs are more sensitive than thermistors

Select one:

- a. True
- b. False

Clear my choice