QB365 Question Bank Software Study Materials

Measurement Important 2,3 & 5 Marks Questions With Answers (Book Back and Creative)

9th Standard

Science

Total Marks : 75

2 Marks

10 x 2 = 20

1) Define measurement

Answer : Measurement is defined as the determination of the size or magnitude of something.

2) Define standard unit.

Answer : A standard unit is defined as a specific magnitude of a physical quantity that has been adopted by law or convention.

3) What is the full form of SI system?

Answer : Full form of SI system is "International system of units"

4) Define least count of any device.

Answer : Least count is least distance measured by a device. In Vernier Caliper the value of one smallest main scale division is divided with total number of vernier scale division.

5) What do you know about pitch of screw gauge?

Answer : The pitch of the screw is the distance moved by the tip of the screw for one complete rotation of the head. It is equal to 1 mm in typical screw gauges.

Pitch of the screw $= \frac{\text{Distance moved by the Pitch}}{\text{No. of rotations by Head scale}}$

6) Can you find the diameter of a thin wire of length 2 m using the ruler from your instrument box?

Answer : No. I cannot find the diameter of a thin wire by using the ruler.

7) Convert: 300 K into Celsius scale,

Answer : Celsius = K - 273 = 300 - 273 = 27°C.

8) In the digital world which measuring instruments are used in the lesson?

Answer : i) Digital vernier caliper
ii) Digital balance

9) Why mass is called as scalar quantity?

Answer : It has magnitude alone. So it is called as scalar quantity.

10) Why weight is called as vector quantity?

Answer : It has magnitude and direction. So it is called as vector quantity.

3 Marks

10 x 3 = 30

11) Write the rules that are followed in writing the symbols of units in SI system.

Answer : 1. The units named after scientists are not written with a capital intial letter.
Ex: newton, henry, ampere and watt
2. The symbols of units named after scientists should be written by the initial capital letter.
Ex: N for newton, H for henry, A for ampere and W for watt.
3. Small letters are used as symbols for units not derived from a proper noun.
Ex: m for metre, kg for kilogram
4. No full stop or other punctuation marks should be used within or at the end of the symbols.

Ex: 50 m and not as 50 m.

5. The symbols of the units are not expressed in plural form.

Ex: 10 kg not as 10 kgs.

6. Accepted symbols should only be used.

Ex: ampere should not be written as amp and second should not be written as sec.

12) Write the need of a standard unit.

Answer : i) Standard units give the correct and accurate measurement like length, mass, time etc...

ii) It is not varied from person to person, place to place and object to object. So we need standard unit.

13) Differentiate mass and weight.

Answer :

Mass	Weight
1. Fundamental quantity	Derived quantity
2. It is a scalar quantity	It is a vector quantity
3. The amount of matter contained in a body	Normal source exerted by the surface on the object against gravitational pull
4. It remains the same	Varies from place to place.
5. Its unit is kilogram	Its unit is newton.

14) How will you measure the least count of vernier caliper?

Answer : The value is one smallest main scale division is divided by total number of vernier scale division is called the least count of vernier caliper.

$$\text{Least count} = \frac{\text{The value of one smallest main scale division}}{\text{Total number of vernier scale division}}$$

$$\text{L.C} = \frac{1\,\text{mm}}{10} = 0.1\,\text{mm} = 0.01\,\text{cm}$$

15) What are the fundamental physical quantities and their units?

Answer :

Fundamental quantities	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K
Electric current	ampere	A
Luminous intensity	candela	cd
Amount of substance	mole	mol

16) While measuring the diameter of an iron nail using a screw gauge, the reading on the pitch scale is found to be 1.5 mm and the head scale reading is 20. If the least count is 0.01 mm and the zero error is + 0.05 mm, find the diameter of the iron nail.

Answer : Given: P.S.R = 1.5 mm, H.S.R = 20 ; L.C = 0.01 mm

Z.E = + 0.05 mm ; Zero correction = - 0.05 mm

Diameter of iron nail = P.S.R + (H.S.R + L.C) + Z.C

= 1.5 + (20 x 0.01) - 0.05

= 1.5 + 0.20 - 0.05 = 1.65 mm

Diameter of iron nail = 1.65 mm

17) What is the use of Parsec?

Answer : Parsec is the unit of distance used to measure astronomical objects outside the solar system.

1 Parsec = 3.26 light year.

18) What are the uses of jaws of vernier?

Answer : (i) The lower jaws are used to measure the external dimension of the object.

(ii) The upper jaws are used to measure the internal dimension of the object.

19) What are the standard reference masses used in physical balance?

Answer : The standard reference masses used in the physical balance are 10 mg, 20 mg, 50 mg, 100 mg, 200 mg, 500 mg, 1 g, 2 g, 5 g, 10 g, 20 g, 50 g, 100 g and 200 g.

20) What are the standard reference masses used in common balance?

Answer : The standard reference masses used in the common balance are 5 g, 10 g, 20 g, 50 g, 100 g and 200 g, 500 g, 1 kg, 2 kg, 5 kg.

<center>**5 Marks**</center>

5 x 5 = 25

21) Explain a method to find the thickness of a hollow tea cup.

Answer : Finding the outer diameter of the tea cup:

1. Place the tea cup between the outside jaws.

2. Note the reading of main scale and vernier coincidence. Tabulate the readings.

3. The outer diameter of the tea cup is calculated by MSR + (VC x LC).

4. Repeat the experiment and find the average diameter.

Finding the inner diameter of the tea cup:

1. Place the tea cup between the inside jaws.

2. Note the reading of main scale and vernier coincidence.

3. Tabulate the readings.

4. The inner diameter of the tea cup is calculated by MSR + (VC x LC).

5. Repeat the experiment and find the average diameter.

S.No		MSR	VSC	MSR + (VC x LC) ± ZC
1. 2. 3.	Outer diameter			
1. 2. 3.	Inner diameter			

The thickness of tea cup = outer reading - inner reading = _____ mm

22) How will you find the thickness of a one rupee coin?

Answer : The thickness of coin (one rupee) is finding with the help of screw gauge:

1. Determine the pitch, least count and the zero error of the screw gauge.

2. Place the coin between two studs.

3. Rotate the head until the coin is held firmly but no tightly with the help of the ratchat.

4. Note the reading of a pitch scale crossed by the head scale and the head scale (PSR) division that coincides with the pitch scale axis (HSC).

5. The thickness of the coin is given by PSR + (HSR + ZC) x LC. Repeat the experiment for the different position of the coin.

6. Tabulate the reading.

7. The average of the reading given the thickness of the coin.

S.No	PSR Cmm	HSC	HSC ± ZC	= PSR + (HSC x LC)
1	1	33	33	1 + (33 x 0.01) = 1.33
2	1	32	32	1 + (32 x 0.01) =1.32
3	1	34	34	1 + (34 x 0.01) = 1.34
				Average = 1.33

The thickness of one rupee coin is = 1.33 mm.

23) Calculate the positive and negative error from the given figure
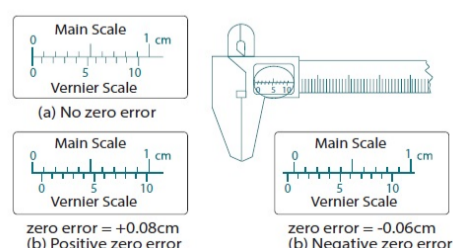
Answer : Case (a): Zero of the vernier scale and zero of the main scale are coinciding with each other. So there is no zero error.

Case (b): The zero of vernier scale is shifted to the right from the zero of the main scale. It is positive error. The 8th division of vernier scale coincides with one of the main scale divisions. So the positive error = (8×0.01cm) = 0.08 cm.

Case (c): The zero of vernier scale is shifted to the left from the zero of main scale. It is negative error. The 4th division of vernier scale (6th from backward) coincides with one of the main scale divisions. So the negative zero error = –(6×0.01cm)= –0.06 cm.

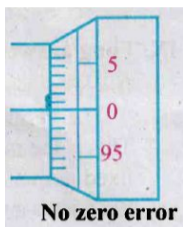24) Convert 200 K into celsius scale.

Answer : Celsius scale = K-273

= 200 -273

= -73°C

25) How will you calculate the zero error of screw gauge?

Answer : **Zero error:**

When the movable stud of the screw and the opposite fixed stud on the frame are brought into contact, if the zero of the head scale coincides with the pitch scale axis there is no zero error.
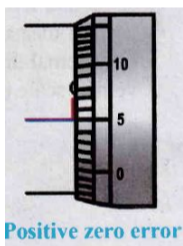

No zero error

Positive zero error:

When the movable stud of the screw and the opposite fixed stud on the frame are a brought into contact, if the zero of the head scale lies below the pitch scale axis the zero error is positive.

For an example the 5th division of the head scale coincides with the pitch scale axis then the zero eror is positive and is given by

Z.E = + (n x L.C)

Z.E = + (5 x 0.01) = 0.05 mm

Zero correction is -0.05 mm.

Positive zero error

Negative zero error:

When the plane surface of the screw and the opposite plane stud on the frame are brought into contact, if the zero of the head scale lies above the pitch scale axis the zero error is negative.

For an example the 95th division of the head scale coincides with the pitch scale axis. Then the zero error is negative and is given by

ZE = -(100 - n) x LC

= (100 - 95) x 0.01

= -(5 x 0.01)

= -0.05 mm

The zero correction is +0.05 mm.

Negative zero error