## THERMOMETRY

1. Temperature can be expressed as a derived quantity in terms of
1) Length and mass
2) mass and time
3 ) length, mass and time
3) none of these
2. A Celsius is a unit of
1) Current
2) Heat
3) Temperature
4) Quantity of matter
3. Mercury is used in liquid thermometers because it has
1) high specific heat and high conductivity
2) high specific heat and low conductivity

3 ) low specific heat and low conductivity
4) low specific heat and high conductivity
4. Very low temperatures are measured by

1) gas thermometers
2) Thermocouple thermometers
3) pyrometers
4) vapour pressure thermometers
5. The temperature of the sun is measured with
1) Platinum thermometer
2) gas thermometer
3) Pyrometer
4) vapour pressure thermometer
6. Of the following thermometers the one which is most useful for the measurement of a rapidly varying temperature is a
1) platinum resistance thermometer
2) gas thermometer
3) thermoelectric thermometer
4) saturation vapour pressure thermometer
7. Standardization of thermometers is obtained with
1) Jolly's thermometer
2) platinum resistance thermometer
3) thermocouple thermometer
4) gas thermometer
8. To measure temperature, most accurately one should use
1) thermocouple thermometer
2) resistance thermometer
3) constant volume gas thermometer
4) mercury thermometer
9. A temperature $\boldsymbol{T}$ is measured by a constant volume gas thermometer
1) $T$ is independent of the gas used at all pressures
2) $T$ is independent of the gas used only at high pressure
3) The ideal gas scale agrees with the absolute scale of temperature
4) The ideal gas scale does not agree with the absolute scale of temperature
10. A constant volume gas thermometer works on
1) Archimedes' principle
2) Pascal's law
3) Boyle's law
4) Charles' law
11. The value of temperature coefficient of resistance thermometer is
1) low and negative
2) low and positive
3) high and negative
4) high and positive
12. The temperature of a gas is measured with a
1) platinum resistance thermometer
2) gas thermometer
3) pyrometer
4) vapour pressure thermometer
13. For a constant volume gas thermometer, one should fill the gas at
1) high temperature and high pressure
2) high temperature and low pressure
3) low temperature and low pressure
4) low temperature and high pressure
14. The resistance $\boldsymbol{R}_{\boldsymbol{t}}$ of a conductor varies with temperature as shown in fig. If the variation is represented as $R_{t}=R_{0}\left(1+\alpha t+\beta t^{2}\right)$
1) $\alpha$ and $\beta$ are both negative
2) $\alpha$ is positive and $\beta$ is negative
3) $\alpha$ and $\beta$ are both positive
4) $\alpha$ is negative and $\beta$ is positive
15. On which of the following scales of temperature, the temperature is never negative
1) Celsius
2) Fahrenheit
3) Reaumur
4) Kelvin
16. We plot the graph having temperature in ${ }^{0} \mathrm{C}$ on x - axis and in ${ }^{0} \mathrm{~F}$ on y - axis. If the graph is straight line, then the correct statement is
1) the line intercepts the positive $x$ - axis
2) the line intercepts the positive $y$ - axis
3) the line passes through origin
4) the line intercepts the negative axis of both $x$ and $y$ - axes
17. A thermometric liquid which can be used to measure temperature between $-40^{0} \mathrm{C}$ to $+40^{\circ} \mathrm{C}$ is
1) water
2) alcohol
3) mercury
4) phenol
18. The study of physical phenomenon at low temperatures (below liquid nitrogen temperature) is called
1) refrigeration
2) radiation
3) cryogenics
4) pyrometer
19. The absolute zero is the temperature at which
1) water freezes
2) all substances exist in solid state
3) molecular motion ceases
4) none of the above
20. The reading of centigrade thermometer coincides with that of Fahrenheit thermometer in a liquid. The temperature of the liquid is
1) $-40^{0} \mathrm{C}$
2) $0^{0} \mathrm{C}$
3) $100^{0} \mathrm{C}$
4) $300^{0} \mathrm{C}$
21. A centigrade and a Fahrenheit thermometer are dipped in boiling water. The water temperature is lowered until the Fahrenheit thermometer registers $17 \mathbf{6}^{\mathbf{0}} \mathrm{F}$. What is the fall in temperature as registered by the Centigrade Thermometer?
1) $20^{\circ} \mathrm{C}$
2) $40^{\circ} \mathrm{C}$
3) $60^{0} \mathrm{C}$
4) $80^{0} \mathrm{C}$
22. A fixed mass of an ideal gas is maintained at constant volume the pressure of the gas at triple point of water is $p_{t r}$ then the thermodynamic temperature of the gas when the pressure is $\mathbf{P}$
1) $273.16\left(\frac{\mathrm{P}}{\mathrm{P}_{\mathrm{tr}}}\right) \mathrm{K}$
2) $273.16\left(\frac{\mathrm{P}-\mathrm{P}_{\text {tr }}}{\mathrm{P}_{\mathrm{tr}}}\right) \mathrm{K}$
3) $273.16\left(\frac{P_{\mathrm{tr}}}{\mathrm{P}}\right) \mathrm{K}$
4) $273.16\left(\frac{P+P_{t r}}{P}\right) K$
23. On the Celsius scale, the absolute zero of temperature is at
1) $0^{0} \mathrm{C}$
2) $-32^{0} \mathrm{C}$
3) $100^{0} \mathrm{C}$
4) $-273.15^{0} \mathrm{C}$
24. If a thermometer reads freezing point of water as $20^{0} \mathrm{C}$ and boiling point as $150^{\circ} \mathrm{C}$, how much thermometer read when the actual temperature is $60^{0} \mathrm{C}$
1) $98{ }^{0} \mathrm{C}$
2) $110^{0} \mathrm{C}$
3) $40^{\circ} \mathrm{C}$
4) $60^{0}$
25. The higher and lower fixed points on a thermometer are separated by 160 mm . When the length of the mercury thread above the lower temperature is $\mathbf{4 0} \mathbf{~ m m}$, the temperature reading would be
1) $40^{0} \mathrm{C}$
2) $120^{0} \mathrm{C}$
3) $32^{0} \mathrm{C}$
4) $25^{0} \mathrm{C}$

## KEY

1) 4
2) 3
3) 4
4) 4
5) 3
6) 3
7) 4
8) 3
9) 3
10) 4 11) 4
11) 3
12) 2
13) 3
14) 4
15) 2
16) 2 18) 3
17) 3 20) 1
18) 1
19) 1 23) 4 24) 1
20) 4

## HINTS

20. $\frac{C}{100}=\frac{F-32}{180} \quad$ Here $\mathrm{C}=\mathrm{F}=\mathrm{x}$

$$
\therefore \frac{x}{100}=\frac{x-32}{180}
$$

$9 x=5 x-160$
$\therefore x=-40$
21. $\frac{\Delta C}{100}=\frac{\Delta F}{180}$
$\Delta C=\frac{5}{9}(212-176)=20^{0} \mathrm{C}$
22. $\frac{\mathrm{P}_{1}}{\mathrm{~T}_{1}}=\frac{\mathrm{P}_{2}}{\mathrm{~T}_{2}}$
$\therefore \frac{\mathrm{P}_{\mathrm{tr}}}{273.16}=\frac{\mathrm{P}}{\mathrm{T}_{2}} \Rightarrow \mathrm{~T}_{2}=273.16\left(\frac{\mathrm{P}}{\mathrm{P}_{\mathrm{tr}}}\right)$
23. $\frac{\mathrm{C}}{100}=\frac{K-273}{100}$
$C=0-273$
$\therefore C=-273^{\circ} \mathrm{C}$
24. $\frac{C}{100}=\frac{Z-X}{Y-X}$
$\frac{60}{100}=\frac{Z-20}{150-20}$
$\therefore Z=\frac{490}{5}=98^{\circ} \mathrm{C}$
25. $160 \mathrm{~mm}=100^{\circ} \mathrm{C}$
$40 \mathrm{~mm}=$ ?

$$
\frac{40}{160} \times 100=25^{\circ} \mathrm{C}
$$

