WORKSHOP CALCULATION AND SCIENCE-UNIT 6: HEAT AND TEMPERATURE

SEMESTER – 1

1. Which refers the temperature
   a) It is a form of energy b) it tells the state of heat
   c) It tells specific heat of substance d) it is measured by calorie meter
   Ans: it tells the state of heat

2. What is the SI unit of heat?
   a) Calorie b) joule c) centigrade heat unit d) British thermal unit
   Ans: Joule

3. Which instrument is used to measure heat?
   a) Calorie meter b) thermometer c) pyrometer d) barometer
   Ans: calorie meter

4. What is the quantity of heat required to raise the temperature of 1 gram of water through 1°C is called?
   a) Joule b) calorie c) British thermal unit d) centigrade heat unit
   Ans: calorie

5. What is the value for specific heat of water?
   A) 4 b) 3 c) 2 d) 1
   Ans: 1

6. Which type of heat is the heat absorbed or given off by a substance without changing its physical state?
   a) Latent heat b) sensible heat c) specific heat d) latent heat of steam
   Ans: Sensible heat

7. What is the boiling point of water in Fahrenheit scale?
   A) 212 ° F b) 180 ° F c) 112 ° F d) 100 ° F
   Ans: 212 ° F

8. What is the freezing point of water in Kelvin scale (K)?
   a) 373 ° K b) 313 ° K c) 303 ° K d) 273 ° K
   Ans: 273 ° K

9. Convert 45° C (Centigrade) into ° F (Fahrenheit)?
   a) 110 ° F b) 111 ° F c) 112 ° F d) 113 ° F
   Ans: 113° F

10. At what temperature will Fahrenheit and centigrade thermometers give the same reading?
    A) -38°C b) -39 °C c) -40 °C d) -41°C

Ans: -40 °C

11. Convert -273°C (Centigrade) into Kelvin scale?
    a) 0 ° K b) 1 ° K c) 2 ° K d) 3 ° K
    Ans: 0 ° K

12. What is the value in degree centigrade for 20 ° F?
    a) -6.37°C b) -6.47 °C c) -6.57 °C d) -6.67°C
    Ans: -6.67°C

13. What is the maximum temperature that can be measured by mercury thermometer?
    a) 400°C b) 300 °C c) 200 °C d) 100°C
    Ans: 300 °C

14. What is the name of temperature measuring instrument?
    a) Vapour pressure thermometer b) bimetallic thermometer
    c) Radiation thermometer d) thermoelectric thermometer

    Ans: bimetallic thermometer

15. Which instrument is used to measure temperatures of red hot metals up to 3000°C?
    a) Radiation pyrometer b) thermoelectric pyrometer
    c) Bimetal thermometer d) alcohol thermometer
    Ans: radiation thermometer

16. Which type of heat transmission takes place through physical contact?
    A) Conduction b) convection c) radiation d) reflection
    Ans: conduction

17. Which kind of heat transmission takes place by up ward flow?
    a) Conduction b) convection c) radiation d) reflection
    Ans: convection

18. Which one is the radiation method of heat transmission?
    a) An iron rod is heated with one of its end and heat transmitted to other end
    b) Cold water goes to the bottom from top while on heating the water
    c) On heating gases heat transmitted to surroundings

d) The heat from sun travels through the space

Ans: The heat from sun travels through the space

19. What is called if the length of the solid expands when heated?

a) Linear expansion b) superficial expansion c) cubical expansion d) area expansion

Ans: linear expansion

20. What is the change in length per unit original length per degree rise in temperature is called?

a) Co efficient of friction b) co efficient of linear expansion

c) Co efficient of superficial expansion d) co efficient of cubical expansion

Ans: co efficient of linear expansion

21. What is the unit of co efficient of linear expansion?

a) Number/°C b) number/°C/ meter length c) number/°C/ mm length

d) number/°C/ cm length

Ans: Number/°C

22. What is the term used for 2 x linear expansion?

a) Co efficient of friction b) co efficient of linear expansion

c) co efficient of superficial expansion d) co efficient of cubical expansion

Ans: co efficient of superficial expansion

23. What is term called for 3 x linear expansion?

a) Co efficient of friction b) co efficient of linear expansion

c) co efficient of superficial expansion d) co efficient of cubical expansion

Ans: co efficient of cubical expansion

24. What is the co efficient of linear expansion of a rod if it is found to be 100m long at 20°C and 100.14m long at 100°C?

a) 1.75×10^{-4}/°C b) 1.75×10^{-5}/°C c) 1.75×10^{-6}/°C d) 1.75×10^{-7}/°C

Ans: Co Efficient of Linear Expansion Alpha (α) =L2 − L1 / L1(t2-t1)

Given : L1 = 100 M : L2 = 100 .14 M : t2 = 100 : t1 = 20

α = 100.14 - 100 / 100 (100 - 20)

= 0.0000175= **1.75×10^{-5}/°C**

25. What is called for the amount of heat required to raise the temperature of unit mass of a substance through 1°C?

a) Sensible heat b) latent heat c) specific heat d) mixing of heat

Ans: specific heat

26. How much quantity of heat is required? M = 120 litres, t_1 = 20°C, t_2 = 85°C, S = 4.2, Q = ... KJ?

a) 32750 KJ b) 32760 KJ c) 32770 KJ d) 32780 KJ

Ans: Q = MST ; T = $t_2 - t_1$ = 85 – 20 = 65 °C

(ASSUME 1LITRE IS EQUAL TO 1KILOGRAM)

Q= 120 X 4.2 X 65 = **32760 KJ**

27. Calculate the amount of heat required to raise the temperature of 85.5 gm of sand from 20°C to 35°C specific heat of sand = 0.1?
    a) 128.25 Joules b) 125.28 Joules c) 128.26 Joules d) 126.28 Joules
    Ans: Q = MST = 85.5 X 0.1 X (35 − 20) = 85.5 X 0.1 X 15 = **128.25 JOULES**

28. What is the specific heat of the material if we require 510 calories to raise the temperature of 170 gm of material from 50°C to 80 °C?
    a) 0.1 b) 0.01 c) 1.1 d) 1.11
    Ans: Q= MST

$$S = \frac{Q}{MT} = \frac{510}{170X30} = \mathbf{0.1}$$

29. How much quantity of heat is required to raise the temperature of 300 grams of copper (sp.heat 0.092 cal/gram) from 25°C to 75°C in Kcal?
    a) 138 Kcal b) 1.38 Kcal c) 207 Kcal d) 2.07 Kcal
    Ans: Q = M S T = 300 x 0.092 x (75 – 25) = 1380 Cal = **1.38 Kcal**

30. How much heat is absorbed by a copper ingot weighing 400 kg is heated from 40°C to 72°C for the purpose of forging?
    a) 1521 Kcal b) 1251 Kcal c) 1152 Kcal d) 1215 Kcal
    Ans: Q = m s t = 400 x 0.09 x 32 = **1152 kcal**

31. What is called for the materials that restricts heat flow by radiation conduction and convection?
    a) Conductors b) insulators c) ferrous d) non ferrous
    Ans: insulators

32. Which one is heat insulator?
    a) Thermocole b) copper c) brass d) aluminium
    Ans: thermocole

33. Which one has the highest thermal conductivity?
    a) Solid ice b) melting ice c) water d) steam
    Ans: solid ice

34. Which one of the following is not a property of heat insulating material?
    a) Low conductivity b) resistance to fire c) less moisture absorption d) ductility
    Ans: ductility

35. Which insulating material is most widely used in refrigerators?
    a) Thermocole b) polylurethane c) glass wool d) cork sheet
    Ans: polyurethane

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36. Which one is a poor heat insulator?
    a) Glass b) cork c) rubber d) saw dust
    Ans: glass

37. What is known for the temperature at which any solid melts into liquid?
    a) Boiling point b) melting point c) latent heat of fusion d) latent heat of vaporisation
    Ans: melting point

38. What is the melting point of aluminium?
    a) 660°C b) 680 °C c) 670 °C d) 620 °C
    Ans: 660°C

39. What is the boiling point of alulminium?
    a) 1897 °C b) 2519 °C c) 2469 °C d) 660 °C
    Ans: 2519°C

40. What is the boiling point of water?
    a) 0°C b) 32°C c) 100°C d) 212 °C
    Ans: 100°C

41. What is the melting point of mercury?
    a) -357°C b) -209°C c) -7.1 °C d) -38.72 °C
    Ans: -38.72 °C

42. What is the boiling point of mercury?
    a) 357 °C b) 280 °C c) 759 °C d) 767 °C
    Ans: 357 °C

43. What is the ratio of force or thrust per unit area?
    a) Work b) power c) pressure d) energy
    Ans: pressure

44. What is the equivalent pascal value for 1 bar?
    a) 10^5 pascal b) 10^7 pascal c) 10^3 pascal d) 10^9 pascal
    Ans: 10^5 pascal

45. What is the SI unit of pressure?
    a) Joule b) pascal c) bar d) newton
    Ans : pascal