Worksheet: Thermal Properties of Matter

Rajasthan State Board · Class 11 · Physics · 10 questions · 31 marks

Name: _____ Date: _____ Score: _____ / 31

Q1. Convert a temperature of 350 K to Celsius and Fahrenheit. *[2 marks]*

Q2. Why does the anomalous expansion of water between 0C and 4C allow fish to survive in a frozen pond? *[2 marks]*

Q3. State Kirchhoff's law of radiation and use it to explain why a shiny metal teapot stays hotter for longer than a matte black one at the same starting temperature. *[2 marks]*

Q4. A steel rod is 2.000 m long at 20C. Find its length at 120C. Coefficient of linear expansion of steel = 1.2 x 10^-5 K^-1. *[3 marks]*

Q5. 200 g of water at 80C is mixed with 300 g of water at 20C. Find the final temperature, assuming no heat loss. *[3 marks]*

Q6. Find the heat required to convert 50 g of ice at 0C completely into water at 0C. Latent heat of fusion of ice = 335 J/g. *[3 marks]*

Q7. A metal rod of length 2.0 m and cross-sectional area 4.0 cm^2 conducts heat at a rate of 20 W when its ends are kept at 100C and 0C. Find its thermal conductivity. *[3 marks]*

Q8. A body cools from 90C to 60C in 10 minutes when the surroundings are at 20C. Find its temperature after a further 10 minutes. *[3 marks]*

Q9. A brass rod and a steel rod, each 1.0 m long at 20C, are clamped rigidly end to end between two fixed rigid supports, with a total gap of exactly 2.0 m between the supports at 20C. Find the compressive stress in each rod when the temperature rises to 100C, given both rods have the same cross-sectional area, alpha_brass = 2.0e-5/K, alpha_steel = 1.2e-5/K, Y_brass = 0.91e11 Pa, Y_steel = 2.0e11 Pa. *[5 marks]*

Q10. 10 g of steam at 100C is passed into 100 g of water at 24C until the temperature of the water rises to 40C. Find the mass of steam condensed. Latent heat of steam = 2256 J/g, specific heat of water = 4.186 J/gC. *[5 marks]*