WORKSHOP CALCULATION AND SCIENCE

Time : 3 Hrs. *Marks : 50*

Note : Attempt FIVE questions in all. Q. No. **1** is COMPULSORY. All questions carry EQUAL marks.

1. (i) Fill in the blanks :
   (a) Capacity to do work is called .....
   (b) Brass is an alloy of .....
   (c) 110° F = ...°C.
   (d) Square root of 90.25 = ...
   (e) Cos 90° = ...

   (ii) State TRUE or FALSE. In case of false correct the statement :
   (a) Area of a circle of radius R is $4 \pi R^2$.
   (b) Energy possessed by a body due to its motion is called kinetic energy.
   (c) Air holds less moisture when it is hot.
   (d) Rate of doing work is called power.
   (e) Stress = $\frac{\text{Load}}{\text{Area}}$

2. (a) What is meant by coefficient of linear expansion ?
   (b) Find the change in length of metallic rod 100 cm. long when its temperature is increased from 25° C to 40° C and the coefficient of linear expansion is 10×10^{-6}/°C

3. Write short notes on any FOUR of the following :
   (a) Boyle's law
   (b) Insulator
   (c) Hydrometer
   (d) Elasticity
   (e) Heat treatment

4. (a) Using log find the value of $\frac{\sqrt{89.43} \times 24.79 \times 0.298}{\sqrt[3]{18.19} \times 0.013}$

   (b) Find the value of X and Y if :

   $X^2 + Y^2 = 41$

   $X - Y = 1$

5. (a) A 100 mm. dia round bar is milled to a square bar. Calculate the side of largest square that can be obtained.
   (b) State Newton's first law of motion.

6. (a) State the law of conservation of energy.
   (b) Explain mechanical advantage, velocity ratio and efficiency of a machine.

7. Differentiate between :
   (i) Conduction and radiation
   (ii) Acceleration and retardation
   (iii) Latent heat and specific heat
   (iv) Potential energy and kinetic energy