10.AIC

(J)

WORKSHOP CALCULATION AND SCIENCE

Time : 3 Hours *Marks : 50*

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

1. (a) Fill in the blanks :

   (i) 30 degree is equal to ..... radians.

   (ii) One micron is equal to ..... centimeters.

   (iii) Unit of power is .....

   (iv) Force = ... X acceleration.

   (v) LCM of 4, 5 and 20 is equal to .....

   (b) State whether 'TRUE' or 'FALSE'. In case of 'FALSE' correct the statement :

   (i) Lead = N X Pitch.

   (ii) Conduction is the method of heat propagation in fluids.

   (iii) Negative acceleration is known as retardation.

   (iv) Hooke's law is a relationship between stress and strain.

   (v) Copper is a ferrous metal.

2. (a) Simplify :

   $12 - [-21 - \{28 - (15 - 4)\}]$

   (b) Calculate the hypotenuse of a right angled triangle whose base is 6 cm and height is 12 cm.

3. The cost of 5 computers and 2 printers is Rs. 1,20,000. The cost of 3 computers and 1 printer is Rs. 70,000. Find the cost of each item.

4. (a) Prove that :

   $\sin 2A/(1 - \cos 2A) = \cot A$

   (b) Write some of the common uses of cast iron and mild steel.

5. (a) Define :

   (i) Mechanical advantage and

   (ii) Efficiency of a simple machine

   (b) A force of 20 N is applied at the end of a spanner at right angles. If the effective length of a spanner is 150 mm, what is the applied torque?

6. (a) Define Specific heat. What is the unit of Specific heat ?

   (b) A copper rod of 40 mm diameter is subjected to tensile load of 500 N. Calculate the stress.

7. Write short notes on any FOUR :

   (i) Specific gravity

   (ii) Modulus of Elasticity

   (iii) Coefficient of friction

   (iv) Longitudinal Stress in pipes

   (v) Ferrite

   (vi) Shear Force Diagram (SFD)