

WORKSHOP CALCULATION & SCIENCE

Time : 3 Hours

Marks : 50

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

1. Fill in the blanks :

- (i) The unit of resistance is
- (ii) Volume of Solid Sphere is equal to
- (iii) 1 Millimeter is equal to microns.
- (iv) $\sqrt{148.84}$ is equal to
- (v) Gears which connect the parallel shafts for transmission of power are called gears.
- (vi) $\sin \theta$ is equal to
- (vii) The decimal equivalent of $\frac{7}{8}$ fraction is
- (viii) 1 Acre is equal to square meters.
- (ix) 98.4° Fahrenheit is equal $^\circ$ centigrade.
- (x) If $\cos \theta = \frac{4}{5}$, then $\sin \theta$ is equal to

2. (a) Write short notes on :

- (i) Poisson's Ratio
- (ii) Ohm's Law
- (iii) Boyle's Law
- (iv) Ductility

(b) A 50 mm rod is turned on a lathe machine at 75 rpm. What is the cutting speed ?

3. (a) Using the logarithm tables, find the value of :

$$\frac{\sqrt{8.5 \times 7.1}}{\sqrt{6.8 \times 15.5}}$$

(b) Find the value of $\sin 70$ without the use of tables.

4. (a) Solve the following simultaneous equation :

$$5x + 3Y = 14$$

$$2x + 7Y = 23$$

- (b) Find the length of a crossed belt connecting two pulleys 20 cms and 50 cms in diameter and 250 cms between centres of the pulleys.
5. (a) Briefly explain Simpson's Rule and its practical application with an example.
- (b) Find the area of Eclipse, where the maximum length is 120 cms and maximum breadth is 60 cms.
6. (a) Prove : $\frac{\text{Sec } A - \text{Tan } A}{\text{Sec } A + \text{Tan } A} = 1 - 2 \text{ Sec } A \cdot \text{Tan } A + 2 \text{ Tan}^2 A$.
- (b) The angle of Elevation of a tower as seen from points A and B are 60° and 30° respectively. The distance AB being 100 metres and in line with the base tower. Find the height of the tower.
7. (a) What do you mean by simply supported beam ?
- (b) A residential apartment consists of three Bed Rooms in size $14' \times 16'$, $15' \times 18'$ and $12' \times 15'$ respectively. One hall in size $18' \times 20'$, one kitchen in size $12' \times 10'$, three toilets each in size $8' \times 6'$, one balcony $2' \times 3'$, and one foyer $8' \times 10'$. The rate quoted by the builder is Rs. 26,900 per sq. mtr. Calculate the cost of the residential apartment ?
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