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**GENERAL FOUNDATION PROGRAMME**

**PLACEMENT TEST  
SAMPLE QUESTION PAPER**

**ACADEMIC YEAR 2019 – 2020**

**MATHEMATICS A - Engineering**

**Introductory Remarks:**

- Try to answer all questions within the allocated time period of 90 minutes.
- Mark your answers on the answer booklet and show your work clearly.

1. The distance from the tee (T) to the flag (F) on a particular hole on a golf course is 494 yards. A golfer's tee shot travels 220 yards and lands at the point S, where  $\angle STF = 22^\circ$ . Calculate how far the ball is from the flag.
2. Jawaher bicycles 6 km/hr faster than Anfal. In the time it takes Anfal to bicycle 36 km, Jawaher can bicycle 54 km. How fast does Anfal travel?
3. There are two numbers whose sum is 72. One number is twice the other. What are the numbers?
4. Suppose \$10,000 is invested at 9% interest. How much money must be invested at 12% to produce a return of 11% on the entire amount invested?
5. A carpenter cuts a board into three pieces of equal length and then cuts off  $\frac{1}{4}$  of one of the pieces. If the smallest board he has is 1 foot in length, what was the length of the original board?
6. If the perimeter of a rectangle is 18 inches, and one side is one inch longer than the other, how long are the sides?
7. In  $\triangle PQR$ ,  $QR = \sqrt{3}$  cm,  $\angle PQR = 45^\circ$  and  $\angle QPR = 60^\circ$ . Find the length of the sides  $PR$  and  $PQ$ .
8. Find the value of  $x$ .
  - a.  $4^x = 13$
  - b.  $\log_2 x = 8 + 9 \log_x 2$
  - c.  $\log_2 x + \log_4 x = 2$
9. Solve the equation  $5^{2x} + 7(5^x) - 30 = 0$  (give your answer to 2 decimal places).
10. Show that  $(\sin \theta + \cos \theta)^2 = 1 + 2 \sin \theta \cos \theta$ .
11. Simplify the expression

$$\frac{\sin 2\theta}{\sqrt{1 - \sin^2 2\theta}}$$

12. Find **Mean**, **Median** and **Mode** for the following data:

22    11    22    15    16

13. In triangle  $ABC$ ,  $\angle ABC = 64^\circ$ , side  $AB = 4 \text{ cm}$ , and side  $AC = 12 \text{ cm}$ .

- Draw the diagram and mark the given values.
- Calculate the length of the third side of the triangle.

14. Find the value of  $\theta$ , in the interval  $0 < \theta < 360^\circ$ , that satisfy the equation

$$\sin \theta = 3 \cos \theta$$

15. Sketch the graph of the function defined by  $y = 3^x$ .

16. The area of a sector of a circle of radius 12 cm is  $100 \text{ cm}^2$ . Find the perimeter of the circle.

17. A sector of a circle of radius 28 cm has perimeter  $P \text{ cm}$  and area  $A \text{ cm}^2$ . Given that  $A=4P$ , find the value of  $P$ .

18. Sketch the graph of the  $\sin$  function and complete the table below with increments of  $\pi/2$  for the values of  $\theta$  till reach  $2\pi$ .

$\theta$	$0\pi$				
$\sin \theta$					

19. The score of students in a Math test is given in the table below.

Class Interval	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	6	8	12	10	5	4

- Calculate the *mean* for the above grouped data.
- Calculate the *median* for the given grouped data.
- Find the *Inter-Quartile Range* of the given grouped data.

-----END OF EXAMINATION-----