

ARUNACHAL PRADESH PUBLIC SERVICE COMMISSION

Subject : ELEMENTARY MATHEMATICS

Time- 3 (Three) Hours

Full Marks- 100

*(Group-A is compulsory, Attempt any FOUR questions from Group-B)*

**Group-A**  
**(Compulsory Group)**

- Q. No. 1.** Attempt any 10 (ten) from the following: ( 10 × 2 = 20 )
- The seventh term in the sequence 132, 100, 84, 76, 72, 70, is .....
  - The sum of the consecutive integers from -50 to -21 is .....
  - The sum  $11+13+\dots\dots\dots+27+29+30+28+\dots\dots\dots+14+12$  equals .....
  - A positive integer when subtracted from its square gives 6. The integer is .....
  - The value of  $\sqrt{0.01} \times \sqrt{0.0004} \times 20^2$  is .....
  - The perimeter of a geometric square is 6 cm. The area of the square is .....
  - Simplifying  $\left(2 + \frac{2}{3}\right) \div \left(3 - \frac{3}{5}\right)$  yields .....
  - Addition of 10% of 10 and 20% of 20 results in .....
  - $(0.01)^{-2.5}$  evaluates to .....
  - If  $10x + y = 84$  and  $x = 2y$ , then the value of  $y$  is .....
  - A right angled triangle, with the length of the base 12 cm and the height 16 cm, has the length of the hypotenuse .....
  - The binary representation of a decimal number 15 is .....

**Group-B**  
**(Attempt any four)**

- Q. No. 2.** Attempt any 4 (four) from the following: ( 4 × 5 = 20 )
- The sum and the product of two numbers are 31 and 220 respectively. Find the sum of the squares of the two numbers.
  - A sum of money is distributed amongst three persons P, Q and R in the ratio 2:3:5. If the twice of Q's share and the thrice of R's share sum up to Rs. 231, then find the total amount of money originally distributed.
  - The selling price of an item has been fixed by keeping a profit margin of 10%. Afterwards, a rebate of 10% is announced on the selling price. Calculate the profit earned by selling the item.

- d. Find the smallest positive integer which when divided by 2 gives remainder 1, when divided by 3 gives remainder 2 and when divided by 4, the remainder is 3.
- e. A person drives 3 km from a location M towards east and then takes a turn to move 4 km to the north and reaches the location N. Find the shortest distance between M and N.

**Q. No. 3.** Attempt any 4 (four) from the following: ( 4 × 5 = 20 )

- a. Find the smallest of the numbers  $\sqrt{3}$ ,  $\sqrt[3]{4}$ ,  $\sqrt[4]{5}$ .
- b. In a class of 120 students, the average height of the girls and the boys are found to be 150 cm. and 165 cm. respectively. If the number of boys in the class is twice that of girls, find the average height of the class.
- c. Find the area of an equilateral triangle whose side is 6 cm.
- d. A person deposits Rs. 500 every month in a bank. The bank offers an interest rate of 2% per month on the deposits. Calculate the total amount of interest accrued when the person continues to deposit for 1 year.
- e. Find the volume of the cube whose numerical value of the total surface area is twice the volume of the cube.

**Q. No. 4.** Attempt any 4 (four) from the following: ( 4 × 5 = 20 )

- a. In a city, 65% of the people speak Hindi, 55% of them speak English and 5000 people speak both Hindi and English. Find the population of the city.
- b. The cost of a book and a pen is Rs. 120, the cost of a pen and a pencil box is Rs. 70 and the cost of a book and a pencil box is Rs. 150. Find the individual cost of a book, a pen and a pencil box.
- c. The diameter of a circle is increased by 15%. Find the percentage increase in the numerical values of the ratio of the area to the circumference of the circle.
- d. A cube of volume 1 cubic metre is cut into small cubes of 1 cubic centimetre. Find the number of small cubes so formed and the height of the column when all the small cubes are stacked into one column.
- e. Convert the recurring decimal number 3.141414..... into fraction.

**Q. No. 5.** Attempt any 4 (four) from the following: ( 4 × 5 = 20 )

- a. A 100 metre long train moving at the speed of 20 metre/sec crosses a railway bridge of length 1 kilometre. Calculate the time taken by the train to cross the bridge.
- b. A Principal amount is divided into 3 equal parts each to be invested in separate schemes in which the returns are 1%, 2% and 3% per month. At the end of 2 years the total amount earned through investment is Rs. 3,600. Find the original Principal amount.
- c. A certain number of officers joined an office as the first batch. The number of officers joined in second batch is half the number in the first batch, while in the third batch half the number in the second batch have joined. In the fourth batch, only one officer joins and this makes 100 numbers of officers in the office. How many officers joined in the second batch?

- d. A person walks a semicircular path after which he takes the route along the diameter of the circle so as to reach his starting point, covering a total distance of 108 metre. Find the radius of the circle associated with the semicircular path.
- e. A train moves from the station A to Station B at the speed of 60 km/hr and returns to station A at the speed of 100 km/hr. Find the average speed of the train during its entire journey.

**Q. No. 6.** Attempt *any 4 (four)* from the following: ( 4 × 5 = 20 )

- a. For two given positive integers, when their addition, the subtraction of the smaller from the larger, their product and the division of the larger by the smaller, are all added, results in 27. If one of the positive integers is 2, find the other integer.
- b. 10 labourers can complete a work in 21 days. The completion of the work is planned such that only 1 labourer is engaged on the 1<sup>st</sup> day, 2 labourers on the 2<sup>nd</sup> day, 3 labourers on the 3<sup>rd</sup> day and so on. Find the number of days required to complete the work according to the given plan.
- c. An annular area of outer radius 7 cm. and inner radius of 5 cm is cut-out from a circular disc with radius 10 cm. Calculate the percentage of the cut-out area from the disc.
- d. Find the value of  $k$  so that the quadratic equation  $(x - k)^2 + kx - 3 = 0$  has two identical roots.
- e. The typist A can complete typing a document in 2 hours, while typist B can complete the same document in 3 hours. Divide the work between A and B such that the time required for completing the typing work is the minimum.

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