Roll No. _____

END SEMESTER EXAMINATION
SEMESTER- I

COURSE CODE : AS-101 | **DURATION : 3 (THREE)HRS**
COURSE TITLE : BASIC SCIENCE-I | **MAXIMUM MARKS : 75**
SESSION : JULY-DEC.' 2021 | **PASS MARKS : 35 %**

NOTE: *1. Attempt any 5 (five) questions .*
2. Mark for each question is shown against it.
3. Assume suitable logical data wherever necessary.

1. **(a)** Which term of the series $4, 9, 14, \ldots\ldots\ldots$ is 254? **(5)**

(b) Write the polar form of $\frac{1+2i}{1-3i}$ **(5)**

(c) If A= $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 0 & 1 \\ 1 & 1 & -1 \end{bmatrix}$, find A^{-1}. **(5)**

2. **(a)** Expand $(3x^2+y)^6$ by using binomial expansion. **(5)**

(b) Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^6$. **(5)**

(c) The fifth term of a $G.P$ is 81 and the second term is 24. Find the series. **(5)**

3. **(a)** Define Momentum. Derive the relationship between Momentum and Impulse. **(1+3)**
(b) Explain Newton's laws of motion. **(6)**
(c) Differentiate between Mass and Weight. For an object of mass 10 kg, what is its weight? **(3+2)**

4. **(a)** What is work? Explain the three types of work in detail. **(2+6)**
(b) Write down four characteristics of universal gravitational constant 'G'. **(4)**
(c) A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of 3.0 ms^{-2} for 8.0 s. How far does the boat travel during this time? **(3)**

5. **(a)** Define inertia. Explain with an example. **(4)**
(b) Define power and energy. **(4)**
(c) Differentiate between Kinetic Energy and Potential Energy. **(4)**
(d) State the law of conservation of energy. **(3)**

6. **(a)** Define Hard and Soft water. ? Explain the causes of hardness of water. **(2+4)**
(b) Write a note on Scale and sludge formation. **(3)**
(c) Discuss the following properties of refractories **(3+3)**
(i) Refractoriness (ii) Porosity

7. **(a)** Discuss the various processes involved in the water treatment. **(10)**
(b) Compare the properties of suspension, colloids and true solution. **(5)**

8. **(a)** Define radioactivity. Write five characteristics of catalyst. **(1+5)**
(b) Define radioactivity. Compare the properties of alpha, beta and gamma particles. **(2+7)**

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