Date : 19-06-2015   **Full Marks : 50**   Time: 12·30 p.m – 02·00 p.m

[Use a separate Answer Book for each group]

Group – A

1. Write in brief (around 300 words) what steps would you take for the economic development of the country if you are selected as the Prime Minister of the country. [20]

Group – B

2. Find the value of $\int_{-1}^{1} \frac{|x+2|}{x+2} \, dx$. [5]

3. Let $f(x) = x^2 e^x$.
   a) Find the regions where f is increasing and where f is decreasing. [3]
   b) Find the local maxima and minima of f. [2]

4. Show that $\lim\limits_{x \to 1} \dfrac{x + x^2 + x^3 + \ldots + x^n - n}{x - 1}$ is $\dfrac{n(n+1)}{2}$. [5]

5. Show that $f(x) = x\left(\dfrac{a^x - 1}{a^x + 1}\right)$ is an even function, $a > 0$. [5]

6. The Harmonic mean of two numbers is 4. Their arithmetic mean is A and geometric mean is G. It has also been found that $2A + G^2 = 27$. Find the two numbers. [5]

7. How many 6-letter words can be formed with A, B and C so that each letter appears at least once in each word? [5]

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