MAR IVANIOS COLLEGE (AUTONOMOUS)
THIRUVANANTHAPURAM

Reg. No. :…… **Name : ……**

Third Semester B.A. Degree Examination, November 2016
First Degree Programme under CBCSS
Complementary Course: Mathematics – III (for Economics)
AUMM331.1a: Mathematics for Economics – III

(*for 2014 Admissions – **Improvement** Only*)

Time: **3** Hours Max. Marks: **80**

SECTION – A

*Answer **ALL** questions / problems in one or two sentences.*

1. If $f'(x) = 2/x$ find $f(x)$.
2. Find the antiderivative of e^{3x}.
3. Evaluate $\int_1^2 \sqrt{x}dx$.
4. If $\int_1^2 f(x)\,dx = 11$ and $\int_2^4 f(x)\,dx = 36$ find $\int_1^4 f(x)dx$.
5. Evaluate $\int_2^1 \frac{1}{(2x+3)dx}$.
6. Find the total cost function given the marginal cost of an output is $5x + 4$ and initial cost is Rs.15.
7. Find the sum of the series $1+ 5x + 10x^2 + 10x^3 +5x^4+ x^5$ when $x = 2$.
8. Determine whether the series $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+...$ is convergent or divergent.
9. Find the sum to infinity of the series whose sum to n terms is $\frac{n(n+1)(2n+1)}{6}$.
10. Write the Taylor's formula.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

*Answer any **EIGHT** questions / problems, not exceeding a paragraph.*

11. Sketch the region whose area is represented by the integral $\int_2^8 5x+7dx$ and hence evaluate it.
12. Evaluate $\int_0^9 2x\sqrt{x}dx$.
13. Evaluate $\int(\sqrt{x}+\frac{1}{\sqrt{x}})^2 dx$.
14. Integrate with respect to x i). $\frac{2x+5}{x^2+5x-7}$ ii). $\frac{(\log x)^2}{x}$
15. If the marginal cost function is $f'(q) = 2q + 3q^2 + 5$, find the total cost function when $f(1) = 21$.
16. Prove that the capitalization is given by Y/r where Y is the constant stream of yield, r is the rate of interest.
17. Find the sum to infinity: i). $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+...$ ii). $5+\sqrt{5}+1+\frac{1}{\sqrt{5}}+\frac{1}{5}+...$
18. Expand tan (x) about $x = 0$.
19. Sum to infinity $\sum_1^\infty \frac{n+1}{(n+1)!}$.
20. Prove that $\log(1 + 2n) = \log 2 + \log n + \frac{1}{2n} + \frac{1}{2}\ \frac{1}{4n^2} + \frac{1}{3}.\ \frac{1}{8n^3} + \ldots$
21. Find the sum to infinity of the series whose sum of the n terms is $\frac{n}{n+1}$.

(8 × 2 = 16 Marks)

SECTION – C

*Short essay type problems : Answer any **SIX** questions.*

22. Evaluate $1+\frac{3}{4}+\frac{3.5}{4.8}+\frac{3.5.7}{4.8.12}+...$
23. Evaluate the integral i). $\int xe^x dx$ ii). $\int \frac{1}{(1+\sin x)}\ dx$.
24. Evaluate the integrals i). $\int \frac{3x^5}{(1+x^{12})}dx$. ii.) $\int \frac{e^{\log x}}{x}dx$.

25. Find the demand curve, if the elasticity of demand curve is $x = 5 - 3p$, p is the price.

26. If the marginal revenue is $\frac{ab}{(x+b)^2} - c$, then find the revenue function.

27. Find the sum to infinity of the series $\frac{1.2}{1!} + \frac{2.3}{2!} + \frac{3.4}{3!} \ldots$

28. Write the expansion of $\log(1-x)$. Find the sum to infinity
$\frac{x-1}{x+1} + \frac{1}{2} \cdot \frac{x^2-1}{(x+1)^2} + \frac{1}{3} \cdot \frac{x^3-1}{(x+1)^3} + \ldots$

29. Find the Maclaurian series expansion of $\log(1 + \sin x)$.

30. By expressing $0.353535\ldots$ as an infinite geometric series find the fraction corresponding to the repeating decimal.

31. If the marginal revenue is $2x^2 + 5x - 10$, find the total revenue at 20 units of output of the firm.

(6 × 4 = 24 Marks)

SECTION – D

*Long essay type problems : Answer any **TWO** questions.*

32. Explain Domar's model of public department and national income. Prove with usual notations that the ratio of department to income approaches a / r.

33. Evaluate $\int_0^1 \frac{dx}{1+x}$ using trapezoidal rule.

34. The marginal Cost of a firm is $MC = \frac{5}{(2x+3)^3}$, the total cost in terms of x if the cost of zero output is Rs.23/-

35. Find the sum of the series $\frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} + \frac{1.3.5.7}{4.8.12.16} + \ldots$

(2 × 15 = 30 Marks)

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