PAPER - I : MODEL PAPER - 07

(JULY 2018**)**

MATHEMATICS & STATISTICS

COMMERCE

TIME : 1 HR 30 MIN   **MARKS : 40**

NOTES :   1.   All questions are compulsory

2.   Answers to section I and section II must be written in separate ans. Books

3.   Graph paper is compulsory for L.P.P.

4.   Logarithm table will be provided on demand

5.   Figures to the right indicate full marks

6.   Answers to every question must be written on new page

ALL THE BEST

Q1.   (A)   Attempt any six of the following   **(12)**

01.   if p : It's a day time   q :   It is warm

Give the verbal statements for the following symbolic statements

a) $p \wedge \sim q$ b) $p \rightarrow q$

02.   Express the truth of each of the following statements using Venn Diagram

a) No circles are polygons   b) Some quadratic equations have equal roots

03. $2 \begin{pmatrix} x & 5 \\ 7 & y-3 \end{pmatrix} + \begin{pmatrix} 3 & -4 \\ 1 & 2 \end{pmatrix} = \begin{pmatrix} 7 & 6 \\ 15 & 14 \end{pmatrix}$ Find x and y

04.   Find dy/dx   if $x = \sin^3\theta$, $y = \cos^3\theta$

05.   Find dy/dx   if $y = \cos^{-1}\left(2x\sqrt{1-x^2}\right)$

06.   Evaluate $\int x.\log x \, dx$

07.   The cost C of producing x articles is given as $C = x^3 - 16x^2 + 47x$. For what values of x the average cost is decreasing

08.   Evaluate $\int_{0}^{\pi/4} \frac{1}{1+x^2} dx$

Q2. **(A)** **Attempt any TWO of the following** **(06)**

01. Solve the following equations by REDUCTION METHOD

$x + y + z = 6$, $3x - y + 3z = 10$, $5x + 5y - 4z = 3$

02. $\int \dfrac{2x + 1}{(x + 1)(x - 2)} \, dx$

03. $\int_{0}^{1} x(1 - x)^{3/2} \, dx$

(B) **Attempt any TWO of the following** **(08)**

01. Using rules of negations , write the negation of the following

a) $p \wedge (q \to r)$ 　　　b) $\sim p \vee \sim q$

02. a manufacturing company produces x items at the total cost of $(180 + 4x)$. The demand function of this product is $p = 240 - x$. Find x for which the profit is increasing

03. if the function given below is continuous at $x = 2$ and $x = 4$ then find a & b

$$f(x) = x^2 + ax + b \quad ; \quad x < 2$$
$$= 3x + 2 \quad\quad ; \quad 2 \leq x \leq 4$$
$$= 2ax + 5b \quad ; \quad 4 < x$$

Q3. **(A)** **Attempt any TWO of the following** **(06)**

01. if $A = \begin{bmatrix} 7 & 1 \\ 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$; Verify : $|AB| = |A| \cdot |B|$

02. $\int \dfrac{1}{x\left[(\log x)^2 + 4\right]} \, dx$

03. Find the volume of the solid generated by rotating the area bounded by $x^2 + y^2 = 36$ and the lines $x = 0$, $x = 3$ about the x – axis

(B) **Attempt any TWO of the following** **(08)**

01. if f is continuous at $x = 0$, then find $f(0)$ where $f(x) = \dfrac{(3^{\sin x} - 1)^2}{x \cdot \log(1 + x)}$; $x \neq 0$

02. the processing cost of x bags is $\dfrac{2x^3}{3} - 48x^2$, packing & dispatching cost is $(1289x + 3750)$

Find the number of bags to be manufactured so as to minimize the marginal cost . Also find the marginal cost for that number of bags

03. $x = \dfrac{4t}{1 + t^2}$; $y = 3\dfrac{1 - t^2}{1 + t^2}$ 　　Show that $\dfrac{dy}{dx} = \dfrac{-9x}{4y}$

DO NOT STOP

GET READY FOR NEXT