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PO-479-480 Seat No._____

B. Sc. (Sem. VI) Examination

April / May – 2016

Mathematics

1. Elective : ES - Business Mathematics - III

2. Business Mathematics-IV

Time : Hours] [Total Marks : 50

Instructions : (1) There are two questions.
(2) Figures to the right side indicate marks of the corresponding question.

1. Elective : ES - Business Mathematics - III

1 Attempt any **five** : **25**

(a) If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$; then find $\frac{dx}{dy}$.

(b) If $y = x^{x^{x^{\cdot^{\cdot^{\cdot^{\infty}}}}}}$; then prove that $\frac{dy}{dx} = \frac{y^2}{x(1 - \log y)}$.

(c) If $x = a\cos\theta$; $y = b\sin\theta$; then find $\frac{d^2y}{dx^2}$.

(d) If $y = \cos\left(2\sin^{-1}x\right)$; then show that

$\left(1 - x^2\right)y_2 + 4y = xy_1$.

(e) If $y = \sin(5x)$; then prove that $\frac{d^2y}{dx^2} + 25y = 0$.

(f) If $x = \frac{1-t}{1+t}$; $y = \frac{2t}{1+t}$; then find out $\frac{d^2y}{dx^2}$.

2 Attempt any **five** : 25

(a) Evaluate $\int \frac{x^2}{x^4+1} dx$.

(b) Evaluate $\int \left(\frac{1}{2x^2 - x - 1} + \frac{1}{\sqrt{15 - 6x - x^2}} \right) dx$.

(c) Evaluate $\int \frac{1}{3\cos x + 4\sin x + 13} dx$.

(d) Find $\int \frac{dx}{4 + 5\sin^2 x}$.

(e) Find $\int \frac{x^3}{\left(x^2+1\right)^3} dx$.

(f) Find $\int \left(\sin^3 x - \sin 4x \cos 2x \right) dx$.

2. Business Mathematics-IV

Instructions : (1) Attempt all two questions.

(2) Figure to the right indicate marks of the corresponding questions.

1 Attempt any **five** : **25**

(1) Prove that $p \wedge (q \vee r) = (p \wedge q) \vee (p \wedge r)$.

(2) Prove that $\sim (p \vee q) = (\sim p) \wedge (\sim q)$

(3) Prove that $(A \cap B) \cup (A - B) = A$.

(4) Prove that $A \subset B \Rightarrow B' \subset A'$.

(5) If $A = \{1, 3, 5, 7, 9\}$ and $B = \{3, 7, 11\}$ then verify $A - (B - C) = (A - B) \cup (A \cap C)$.

(6) Prove that $(A \cap B)' = A' \cup B'$.

(7) If $n(A) = 20, n(B) = 30, n(U) = 100$, $n(A \cap B) = 10$ then find $n(A' \cap B')$.

(8) If $A \subset B$ then prove that $A - B = \phi$.

2 Attempt any **five** :

(1) How many four digit numbers can be formed using 1, 2, 3, 4, 5, 6, 7, 8 without repetition of any digit.

(2) How many three digit even numbers can be formed using digits 0, 1, 2,.....9 ? (No repetition of digits.)

(3) How many even numbers of three digits are there ? (No repetition of digits.)

(4) How many numbers are there between 199 and 1000 having last digit 5 ?

(5) Find r if ${}_5P_r = {}_6P_{r-1}$.

(6) Prove that ${}_nP_r = {}_{n-1}P_r + r\ ({}_{n-1}P_{r-1})$

(7) Find n if $(n+1)! = 12(n-1)!$.

(8) How many permutations of all alphabets of the word DAUGHTER is possible without repetition ? In how many of them vowels and consonants will be in their positions only ?