STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086
(For Candidates admitted during the academic year 2007-08)

SUBJECT CODE: CS/AC/BM13

B.C.A. DEGREE EXAMINATION – NOVEMBER 2007
FIRST SEMESTER

COURSE : ALLIED CORE
PAPER : BASIC MATHEMATICS
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A
ANSWER ALL QUESTIONS (10 x 2=20)

1. Which of the following is true?
   a) Paris is in France and $2+2=4$.
   b) Paris is in England or $2+2=4$.
2. Write down the (i) inverse (ii) contrapositive statement of
   If A is a triangle, then A is a polygon.
3. Define a symmetric matrix and give an example.
4. Find x, y, z if $\begin{bmatrix} x+3 & 8 \\ z & y-5 \end{bmatrix} = \begin{bmatrix} 5 & 8 \\ 0 & -7 \end{bmatrix}$
5. The n^{th} term of a series in A.P is $7n-3$. Find the common difference.
6. Find the 10^{th} term of the series 4, 12, 36, 108,…
7. State De Morgan's Laws.
8. If $A=\{1,2,3,4\}$, $B=\{7,8,9\}$. Find $A\times B$ & $B\times A$.
9. Differentiate $\frac{1}{x\sqrt{x}}$.
10. Integrate $e^{4x}+\frac{1}{x}$.

SECTION – B
ANSWER ANY EIGHT QUESTIONS (8 x 5=40)

11. Construct the truth table for $(p\to q)\wedge(q\to p)$.

12. Verify that the proposition $p\vee\neg(p\wedge q)$ is a tautology.

13. Prove that $A=\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}_{2\times 2}$ satisfies $A^2+I=0$, using this result, find the 8^{th} power of $\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$.

14. Find A satisfying $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} -2 & 4 \\ 3 & -1 \end{bmatrix}$

15. In how many different ways 5 Boys & 3 Girls may be seated in a row such that no two girls sit together.

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16. A farmer buys 3 cows, 2 pigs and 4 hens from a man who has 6 cows, 5 pigs and 8 hens. How many choices does the farmer have?

17. Find the 40^{th} term of an A.P whose 9^{th} term is 465 & 20^{th} term is 388.

18. If $U = \{1,2,3,4,5,6,7\}$, $A = \{1,2,3,4,5\}$, $B = \{1,3,5,7\}$, $C = \{2,5,6,7\}$
Find (i) $A \cap B$ (ii) $C - B$ (iii) $C' \cap A$.

19. The total cost function for the production of x units of an item is given by $T = 10 - 4x^3 + 3x^4$.
Find (i) the average cost.
(ii) the marginal cost
(iii) the marginal average cost

20. Integrate (i) $\int \cos^2 x \ dx$
(ii) $\int xe^x \ dx$

SECTION – C
ANSWER ANY FOUR QUESTIONS (4 x 10=40)

21. a) Check if $7(p \wedge q) \& 7\, p \vee \neg q$ are logically equivalent.
b) Determine the truth values of
(i) $4+2=5 \& 6+3=9$ (ii) $4+5=9 \& 1+2=4$
(iii) $3+2=5 \& 6+1=7$ (iv) $3+2=5 \& 4+7=11$

22. Solve: $x + y + z = 6$
$2x - y + 2z = 6$
$x - y + 3z = 8$ by Cramer's rule.

23. Find the inverse of $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$.

24. Find the sum to n terms of the series
(a) 5 + 55 + 555 + …
(b) Find the 3 numbers in G.P whose sum is 21 & product is 216.

25. In a city three daily newspapers A, B, C are published; 42% of the people in that city read A; 51% of the people read B; 68% read C; 30% read both A& B; 28% read both B & C; 36% read A & C; 8% do not read any of the 3 news papers. Find the percentage of persons who read all the 3 papers.

26. The demand function for a particular commodity is $y = 15e^{-x/3}$ for $0 \le x \le 8$ where y is the price per unit and x is the number of units demanded. Determine the price and quantity for which the revenue is maximum.

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