[Total No. of Questions - 18] [Total No. of Printed Pages - 3] (2125)

15437

B. Pharmacy 1st Semester Examination

Remedial Mathematics (NS)

BP-116

Time : 3 Hours **Max. Marks : 70**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Attempt any two questions from Section-A.

(ii) Attempt any eight questions from Section-B.

(iii) Attempt all questions from Section-C.

SECTION - A

1. (a) Prove that $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$. (5)

(b) Compute the inverse of matrix $\begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$. (5)

2. (a) Differentiate the following function with respect to x:

$x^y + y^x = 1$ (5)

(b) Evaluate the limit $\lim\limits_{x \to 1} \dfrac{x^2 - \sqrt{x}}{\sqrt{x} - 1}$. (5)

[P.T.O.]

3. (a) Evaluate the integral $\int (x+1)\sqrt{2x^2+3}\, dx$. (5)

(b) In any triangle ΔABC, prove that the sines of the angles are proportional to the lengths of the opposite sides. (5)

SECTION - B

4. For what value of m, will the following equation has real and equal roots?

$x^2 - 2x(1+3m) + 7(3+2m) = 0$ (5)

5. Evaluate the following limit

$\lim\limits_{x \to \frac{\pi}{2}} \dfrac{e^{\cos x} - 1}{\cos x}$ (5)

6. Solve the following system of linear equations by matrix method

$x + 2y = 5$

$3x + 6y = 15$ (5)

7. If 2 tan α = 3 tan β, show that $\tan(\alpha - \beta) = \dfrac{\sin 2\beta}{5 - \cos 2\beta}$ (5)

8. Verify the identity $(AB)^{-1} = B^{-1} A^{-1}$ for the matrices

$A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 6 & 2 \end{bmatrix}$ (5)

9. Evaluate the integral $\int \dfrac{1 - \cos x}{1 + \cos x}\, dx$. (5)

10. If α and β are the root of the equation $2x^2 + 6x + b = 0$ (b<0), then prove that

$\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha} < -2$ (5)

11. Find the domain and range of the following function

$$f(x) = \frac{1}{(2x-3)(x+1)}$$ (5)

12. If A + B + C = 180° then prove that sin2A + sin2B + sin2C = 4sin Asin BsinC (5)

13. Resolve $\frac{3x+2}{(x-1)(x-2)(x-3)}$ into partial fractions. (5)

SECTION - C

14. Evaluate the integral $\int \frac{e^x}{\sqrt{1-e^{2x}}} dx$. (2)

15. Define diagonal, scalar and unit matrices. Also give the example of each. (2)

16. Discuss the types of discontinuity in a function. (2)

17. Define many-one function. Also give the example of many-one function. (2)

18. If $2^X + 2^y = 2^{x+y}$, then find the value of $\frac{dy}{dx}$ at $x = y = 1$. (2)