Code: 13R00101 **R13**

B.Pharm I Year (R13) Supplementary Examinations June 2018

REMEDIAL MATHEMATICS

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Find the middle term of the arithmetic progression 6, 13, 20, ---------, 216.

(b) Find the values of k for which the system of equations $kx - y = 2,\ 6x - 2y = 3$ has a unique solution.

(c) If $\sin A = \frac{3}{4}$, find $cosA$ and $tanA$.

(d) Prove that $(1 + tan^2\theta)(1 + sin\theta)(1 - sin\theta) = 1$.

(e) Find a point on the y-axis which is equidistant from A (6, 5) and B (-4, 3).

(f) Find the coordinates of the point which divides the line segment joining the points (-1, 3) and (4, -7) in the ratio 3:4 internally.

(g) Find $\lim_{x\to 0} \frac{\sqrt{1+x}-1}{x}$.

(h) If $f(x) = xe^x\ sinx$, then find $f'(x)$.

(i) Solve the differential equation $sec^2x\ tany\ dx + sec^2y\ tanx\ dy = 0$.

(j) Find the Laplace transform of $f(t) = (sint - cost)^2$.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) The sum of two numbers is 15. If the sum of their reciprocals is $\frac{3}{10}$, find the numbers.

(b) If twice the son's age in years is added to the father's age, the sum is 70. But if twice the father's age is added to the son's age, the sum is 95. Find the ages of father and son.

OR

3 (a) If $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & -3 \end{bmatrix}$, compute the product AB and BA and show that AB # BA.

(b) Resolve $\frac{x-4}{x^2-5x+6}$ into partial fractions.

UNIT – II

4 (a) If $sec\alpha = \frac{5}{4}$, evaluate $\frac{1-tan\alpha}{1+tan\alpha}$.

(b) If $sin\theta + sin^2\theta = 1$, prove that $cos^2\theta + cos^4\theta = 1$.

OR

5 (a) If $sec\theta + tan\theta = p$, then show that $\frac{p^2-1}{p^2+1} = sin\theta$.

(b) Prove that $\frac{sin\theta - 2sin^3\theta}{2cos^3\theta - cos\theta} = tan\theta$.

UNIT – III

6 (a) If the area of ΔABC formed by $A(x, y)$, $B(1, 2)$ and $C(2, 1)$ is 6 square units, then prove that $x + y = 15\ or\ x + y + 9 = 0$.

(b) Find the equation of straight line joining the points $(at_1^2, 2at_1)$ and $(at_2^2, 2at_2)$.

OR

7 (a) Find the angle between straight lines $2x + y + 4 = 0,\ y - 3x = 7$.

(b) Find the equation of straight line passing through (x_1, y_1) and perpendicular to $ax + by + c = 0$.

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UNIT – IV

8 (a) Prove that $\lim_{x\to 0}\frac{1}{x}$ does not exist.

(b) Find the derivative of $f(x)=\frac{x\ cosx}{\sqrt{1+x^2}}$.

OR

9 (a) Find the extreme values of $3x^4-4x^3+1$.

(b) Evaluate $\int_0^1 (c^x+5)dx$.

UNIT – V

10 (a) Obtain the differential equation of all circles of radius a and centre at (h, k).

(b) If the temperate of the air is 30℃ and the substance cools from 100℃ to 70℃ in 5 minutes, find when the temperature will be 40℃.

OR

11 (a) Find the Laplace transform of:

(i) $f(t)=e^{2t}[3t^5-cos4t]$. (ii) $f(t)-e^{-t}sin^2t$.

(b) Find the Laplace transform of f(t) defined as;

$$f(t)=1, if\ 0<t\le 1$$
$$=t, if\ 1<t\le 2$$
$$=0, if\ t>2$$

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