Roll No ....

PY - 101(A)

B.Pharmacy I Semester

Examination, December 2014

Remedial Mathematics

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A. B. C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks. out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation. Design and Drawing etc.

Unit - I

1. a) A rectangular field measures 2250 sq. ft. If its breadth is shorter than its length by 5 feet, find its side and perimeter.

   b) What will be the value of the determinant when two rows of determinant are identical and evaluate rgpvonline.com

   $$\begin{vmatrix} a+b & b+c & c+a \\ c & a & b \\ 1 & 1 & 1 \end{vmatrix}$$

   c) If $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ verify that

   $(AB)' = B' A'$ where A' and B' are transposer of A and B respectively.

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   d) Three persons buy cough syrup of different brands A, B and C. The first person buy 12 bottles of A, 5 bottles of B and 3 bottles of C. The second person buys 4 bottles of A, 6 bottles of B and 10 bottles of C. The third person buys 6 bottles of A, 7 bottles of B and 9 bottles of C. Represent the information in the form of a matrix. If each bottles of brand A cost Rs. 4, each bottle of B cost Rs. 5 and each bottle of C cost Rs. 6 then using matrix operations find the total sum of money spend individually by 3 persons for the purchase of cough syrup.

   OR

   The monthly expenditure in an hospital for 3 months is given below according to the type of staff employed:

Month	No. of employees			Total monthly salary (Rs)
	Clerks	Typists	Persons	
April	4	2	3	4900
May	3	3	2	4500
June	4	3	4	5800

   Assuming that the salary in all the three months of different categories of staff did not vary. Calculate the salary for each type of staff by using the Cramer's rule.

Unit - II

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2. a) The arithmetic mean of a set of 40 values is 65. If each of the 40 values is increased by 5, what will be the mean of the set of new values.

   b) Specify the merits and demerits of mode and calculate the mode of the following distribution

Marks	Frequency
10-25	6
25-40	20
40-55	44
55-70	26
70-85	3
85-100	1

c) How many bricks, each measuring 25cm × 15cm × 8cm, will be required to build a wall 10m × 4dm × 5m when 1/10 of the volume is occupied by mortar.

d) A hemispherical bowl of internal radius 9 meter contains a liquid soap. This liquid soap is to be filled into cylindrical shaped small bottles of diameter 3 meter and height 4 meter. How many bottles are necessary to empty the bowl. rgpvonline.com

OR

A container for making dettol is in the form of a rectangular parallelepiped (cuboid). Its length is 20m. If 18 kl of alcohol absolute is removed from the reservoir, the alcohol level goes down by 15cm. Find the width of the cuboid.

Unit - III

3. a) Solve $\sin 75° + \cos 75° + \sin 15° + \cos 15°$.

b) Prove that $\cos 4x = 1 - 8 \sin^2x \cos^2x$

c) If $\log (mn) = \log m - \log n$, show that $n = 1$.

d) Calculate the pH of a buffer solution containing 0.1 mole of acetic acid and 0.01 mole potassium acetate per litre. The dissociation constant of acetic acid is 1.84×10^{-5}.

OR

The equilibrium constant for the reaction

$N_2(g) + 3H_2(g) = 2NH_3(g)$
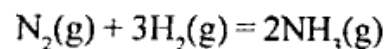
at 715 k is 6.0×1.0^{-2}. If in a particular reaction there are 0.25 mol L^{-1} of H_2 and 0.06 mol L^{-1} of NH_3 present. Calculate the concentration of N_2 at equilibrium.

Unit - IV

4. a) What do you mean by quadrants? Prove that points (a, a), $(-a, -a)$ and $(-a\sqrt{3}, a\sqrt{3})$ are the vertices of an equilateral triangle.

b) Deduce the formula for finding the equation of a line passing through two points.

c) Find the equation of the line through (2, 3) so that the segment of the line intercepted between the axis is bisected at this point.

d) Prove that the lines $lx + my + n = 0$, $mx + ny + l = 0$ and $nx + ly + m = 0$ concurrent if $l^3 + m^3 + n^3 = 3 \, lmn$.

OR

Find the equation to the line passing through the point of intersection of $x - y + 1 = 0$ and $2x - y + 1 = 0$ and perpendicular to $3x + 2y = 0$.

Unit - V

5. a) Evaluate $\lim_{x \to 0} \frac{1-\cos x}{\sin^2 x}$

b) Evaluate $\int \frac{\cot x}{\log(\sin x)} dx$

c) If $x^y y^x = 1$ then prove that

$$\frac{dy}{dx} = \frac{-y(y + x\log y)}{x(x + y\log x)}$$

d) If $y = \tan^{-1}x$ then prove that

$$(1+x^2)y_{n+2} + 2(n+1)x \, y_{n+1} + n(n+1) y_n = 0$$

OR

Evaluate $\int_1^2 \frac{dx}{(x+3)(x+4)}$ rgpvonline.com

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