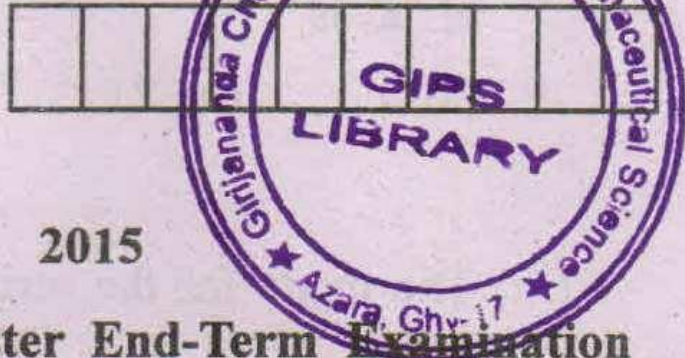


B.P. 1st Sem (ASTU) - 09/12/15

Total No. of printed pages = 6

PY 1321012

Roll No. of candidate



2015

B. Pharm 1st Semester End-Term Examination

### REMEDIAL MATHEMATICS

Full Marks - 100 Pass Marks - 35 Time - Three hours

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The figures in the margin indicate full marks for the questions.

1. For each of the following questions, four answers are provided of which one is correct. Choose the correct answer in each case.  $2 \times 6 = 12$

(i) The quadratic equation  $ax^2 + bx + c = 0$  has real and distinct roots if

(a)  $b^2 - 4ac = 0$

(b)  $b^2 - 4ac > 0$

(c)  $b^2 - 4ac < 0$

(d) None of these.

[Turn over

(ii) If the matrix  $\begin{pmatrix} a & 3 \\ a & 2 \end{pmatrix}$  is singular, then the value of 'a' is

- (a) 1 (b) 2 (c) 0 (d) -1

(iii) The mode for the series 4, 6, 9, 4, 2, 8, 10 is

- (a) 4 (b) 2 (c) 10 (d) None of these

(iv) The value of  $\sin 135^\circ$  is

- (a) 0 (b)  $\frac{1}{\sqrt{2}}$  (c)  $-\frac{1}{\sqrt{2}}$

(d) None of these

(v) Two lines are perpendicular if

(a)  $m_1 = m_2$

(b)  $m_1 m_2 = -1$

(c)  $m_1 + m_2 = 0$

(d) None of these

(vi) The derivative of  $\log(ax + b)$  w.r.t x is

(a)  $\frac{1}{ax + b}$

(b)  $\frac{a}{ax + b}$

(c)  $\frac{ax + b}{a}$

(d) None of these

2. Answer the following questions:  $3 \times 6 = 18$

(i) If one of the roots of the equation  $3x^2 - kx + 12 = 0$  is three times the other, then find the value of k.

(ii) What do you mean by empirical mode ?

(iii) Show that  $\frac{1 - \cos \theta}{\sin \theta} = \frac{\sin \theta}{1 + \cos \theta}$

(iv) If  $\log 2 = 0.3010$ , find  $\log 0.0005$ .

(v) Find the area of the triangle whose vertices are (1, 6), (3, 0) and (-3, -7).

(vi) Find  $\int \cos^2 x dx$ .

3. Answer any *five* of the following :  $4 \times 5 = 20$

(i) Solve :  $8\sqrt{\frac{x}{x+3}} - \sqrt{\frac{x+3}{x}} = 2$

(ii) Find the inverse of  $A = \begin{pmatrix} 3 & -5 \\ -4 & 2 \end{pmatrix}$

(iii) Prove that  $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}} = 2\cos \theta$

(iv) Find the equation of the line passing through  $(-4, -5)$  and perpendicular to the line joining  $(1, 2)$  and  $(5, 6)$ .

(v) Find  $\frac{d}{dx} \left( \frac{\sin x}{1 - \cos x} \right)$

(vi) Evaluate  $\int_{-1}^1 f(x) dx$  where  $f(x) = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$

4. Answer any *four* of the following :  $5 \times 4 = 20$

(i) Solve by Cramer's rule the following system of equations :

$$x - y + z = 4$$

$$2x + y - 3z = 0$$

$$x + y + z = 2$$

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(4)

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(ii) If  $2 \cos \theta = x + \frac{1}{x}$ , prove that

$$2 \cos 3\theta = x^3 + \frac{1}{x^3}$$

(iii) Reduce  $3x + 2y - 5 = 0$  to

(a) slope-intercept form and find its slope and y-intercept.

(b) intercept form and find its x and y-intercept.

(iv) If  $y = \sqrt{1+x^2}$ , show that  $y \frac{dy}{dx} - x = 0$ .

(v)  $\int \frac{1+x^3}{1+x} dx$

(vi)  $\int_0^\pi x \sin x dx$

5. Answer any *three* of the following :  $10 \times 3 = 30$

(i) Find the arithmetic mean and median for the following data :

Variable:	100-110	110-120	120-130	130-140
Frequency:	4	6	20	32
Variable:	140-150	150-160	160-170	
Frequency:	33	8	2	

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(5)

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(ii) In what ratio is the line joining (2, -3) and (5, 6) divided by the (a) X-axis, (b) Y-axis. Also find the points of division and show the points on a coordinate plane.\

(iii) Evaluate the following limits :

$$(a) \lim_{x \rightarrow 0} \frac{\sqrt{1+x+x^2} - 1}{x}$$

$$(b) \lim_{x \rightarrow \infty} (\sqrt{x+2} - \sqrt{x})$$

(iv) Differentiate the following with respect to x :

$$(a) \sqrt{\frac{1+x}{1-x}}$$

$$(b) u^2 \text{ where } u = \sin x + 4 \cos x - 6 \tan x$$

(v) Evaluate :

$$(a) \int \frac{dx}{x^2 - 4x + 8}$$

$$(b) \int_0^{\frac{\pi}{2}} \frac{\cos x}{\sin x + \cos x} dx$$

