29/11/16

Total No. of printed pages = 6

PY 1321012

Roll No. of candidate | | | | | | | | | | |

2016

B. Pharm 1st Semester End-Term Examination

REMEDIAL MATHEMATICS

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

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

1. Answer the following : 2×6=12

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

(b) If the matrix $\begin{pmatrix} 2 & -3 \\ -1 & x \end{pmatrix}$ is singular, find the value of x.

(c) Find the value of cos 15°.

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(d) Find the equation of the line making intercepts –4 and 5 on the axes.

(e) Find the median of the series 4, 6, 9, 4, 2, 8, 10.

(f) Find $\int_0^{\frac{\pi}{2}} \cos x \, dx$

2. Answer any *six* : $3\times6=18$

(a) If α and β are the roots of the equation $x^2 - px + q = 0$, form the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$.

(b) If $A = \begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix}$, find $A^2 - 5A + 6I$

(c) If $cosec\theta + cot\theta = x$, prove that

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

(d) Find the equation of the straight line passing through (2, 3) and parallel to the x-axis.

(e) Evaluate $\lim_{x \to 0} \frac{\sqrt{2-x} - \sqrt{2+x}}{x}$

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

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

3. Answer any *five* : 4×5=20

(a) Solve the following simultaneous equations :

$x + y = 20$

$xy = 64$

(b) Solve by using Cramer's rule :

$2x + 3y + 4z = 8$

$3x + y - z = -2$

$4x - y - 5z = -9$

(c) Find the value of λ so that the system of equations :

$x - y + 3z = 0$

$x + \lambda y - 3z = 0$

$5x - 3y + 3z = 0$, has a non-trivial solution.

(d) Show that $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ = \frac{\sqrt{3}}{16}$.

(e) Reduce $5x - y - 15 = 0$ to

(i) Normal form

(ii) Intercept form

(f) Evaluate $\int x \log x \, dx$

4. Answer any *four* : 5×4=20

(a) Find the mode for the following frequency distribution :

x	10	11	12	13	14	15	16	17	18
f	2	4	6	8	10	9	6	2	1

(b) Show that $\frac{\sin x}{1+\cos x} = \tan\frac{x}{2}$.

(c) Find the equation of the straight line which passes through (4, 5) and making angle 45° with the straight line $2x + y + 1 = 0$.

(d) Differentiate the following function w.r.t. x

$$\tan^{-1}\sqrt{\frac{1+\sin x}{1-\sin x}}$$

(e) Evaluate $\int \frac{x}{(x-1)(x^2+1)} dx$

5. Answer any *three* : 10×3=30

(a) If $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$, find A^{-1} and hence prove that $A^2 - 4A - 5I = 0$.

(b) Calculate the mean and median for the following data :

Class Interval	10-20	10-30	10-40	10-50
Frequency	4	6	56	97

Class Interval	10-60	10-70	10-80	10-90
Frequency	124	137	146	150

(c) Differentiate the following functions w.r.t x

(i) $x^{\log x}$

(ii) $x^{\sin^{-1} x}$

(d) Evaluate :

(i) $\int_0^{\frac{\pi}{4}} x^2 \sin x \, dx$

(ii) $\int_0^3 \sqrt{9 - x^2} \, dx$