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PG/IS/MTM-106/13(Pr.)

M.Sc. 1st Semester Examination, 2013

**APPLIED MATHEMATICS WITH OCEANOLOGY
AND COMPUTER PROGRAMMING**

(Lab. 1 : Computational Methods : Using MATLAB)

(Practical)

PAPER—MTM-106

Unit – 2

Full Marks : 25

Time : 2 hours

The figures in the right-hand margin indicate marks

GROUP – A

1. Answer *one* question on (Lottery basis) : 8 × 1

- (a)* Write a script file in MATLAB to draw a graph of $y = \sin(\pi x)$, $0 \leq x \leq 1$ mentioning title of the graph with green star marker.

(Turn Over)

(2)

- (b) Write a script file in MATLAB to draw a graph of $y = \sin^2 t + 2\cos t + 1.5$, $-1 \leq t \leq 1$, mentioning label of the graph with blue dotted line.
- (c) Write a script file in MATLAB to draw a graph of $y = x^2$, $10 \leq x \leq 100$, mentioning the name of the graph inside area of graph with red dashed line.
- (d) Write a script file in MATLAB to draw a graph of $y = e^x$, $0 \leq x \leq 10$ mentioning title of the graph with blue plus marker.
- (e) Write a script file in MATLAB to draw a histogram of the following average marks of four subjects in a class mentioning the name of the subject against each bar.

| Physics | Chemistry | Mathematics | Biology |
|---------|-----------|-------------|---------|
| 43 | 71 | 53 | 58 |

- (f) Write a script file in MATLAB to draw a Pie chart about the following expenditure for establishing a computer lab with label.

| Machine | Software | Furniture | Transport |
|----------|----------|-----------|-----------|
| 20 lakhs | 10 lakhs | 3 lakhs | 10 lakhs |

- (g) Write a script file in MATLAB to draw a graph of $y = \cos(\pi x)$, $0 \leq x \leq 1$ mentioning label of the graph green dotted line.
- (h) Write a script file in MATLAB to draw a graph of $y = \sin^2 t + t$, $0 \leq t \leq \pi$, mentioning title of the graph red dotted line.
- (i) Write a script file in MATLAB to draw a graph of $y = \sin t$ and $z = \cos t$ in the same figure with plot name in the figure, $0 \leq t \leq 2\pi$ with different line specification.

- (j) Write a script file in MATLAB to draw a histogram of the following average temperature of a year of 2012 in Midnapore mentioning the name of the month against each bar and title of the graph.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 17°C | 19°C | 24°C | 30°C | 40°C | 39°C | 33°C | 31°C | 28°C | 28°C | 25°C | 22°C |

- (k) Write a script file in MATLAB to draw a slice Pie chart about the following expenditure for establishing a computer lab.

| Machine | Software | Furniture | Transport |
|----------|----------|-----------|-----------|
| 20 lakhs | 10 lakhs | 3 lakhs | 10 lakhs |

- (l) Write a script file in MATLAB to draw a graph of $y = |x|$, $-1 \leq x \leq 1$, mentioning title of the graph blue dashed line.

(m) Write a script file in MATLAB to draw a graph of $y = \log x$, $1 \leq x \leq 10$, mentioning label of the graph green dashed line.

(n) Write a script that will plot the graphs of the functions $f(x) = e^x$ and $f(x) = \log x$ over the interval $1 \leq x \leq 10$ on the rectangular paper.

(o) Write a script that will plot the function $f(x) = \sin x - \cos x$ over the interval $-2\pi \leq x \leq 2\pi$ on the rectangular paper.

(p) Write a script that will plot the function $f(x) = |x| + x$ over the interval $0 \leq x \leq 10$ on the rectangular paper.

(6)

GROUP – B

2. Answer *one* question on (Lottery basis) : 12 × 1

(a) Write a script file in MATLAB to generate a PASCAL triangle.

(b) Write a script file in MATLAB to find the root of a quadratic equation.

(c) Write a script file in MATLAB to compute mean and variance.

(d) Write a script file in MATLAB to compute median and standard deviation.

(e) Write a script file in MATLAB to generate a Fibonacci sequence within a given range.

- (f) Write a script file in MATLAB to check a number is palindrome or not.

- (g) Write a script file in MATLAB to find the sum of all numbers which is divisible by another given number between two prescribe numbers.

- (h) Write a script file in MATLAB to find the prime factors of some given numbers.

- (i) Write a script file in MATLAB to find the correlation coefficient of x and y data series.

- (j) Write a script file in MATLAB to find k -th moments, $k = 1, 2, \dots, n$.

- (k) Write a script file in MATLAB to find the value of

$$\int_a^b f(x) dx$$

by trapezoidal rule.

- (l) Write a script file in MATLAB to find the value of

$$\int_a^b f(x) dx$$

by Simpson 1/3rd rule.

- (m) Write a script file in MATLAB to find the root of the equation $f(x) = 0$ by Newton-Raphson method.

- (n) Write a script file in MATLAB to find the root of the equation $f(x) = 0$ by Regular Falsi method.

- (o) Write a script file in MATLAB to find the root of the equation $f(x) = 0$ by Bisection method.
- (p) Write a script file in MATLAB to find the root of the equation $f(x) = 0$ by iteration method.

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