TAMIL NADU OPEN UNIVERSITY
Chennai - 15
School of Sciences

HOME / SPOT ASSIGNMENT

Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS-41 Integral Transforms and Calculus of Variations
Batch	: CY- 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Answer any two of the following three questions **Max: 30 Marks**

1. Find the inverse Laplace of $\dfrac{5s^2-15s-11}{(s+1)(s-2)^3}$.

2. Find the Fourier transform of $f(t)$ defined by

$$f(x)=\begin{cases}1, & |t|<a\\ 0, & |t|>a\end{cases}$$

and hence evaluate $\displaystyle\int_0^\infty \frac{\sin s}{s}ds$ and $\displaystyle\int_{-\infty}^\infty \frac{\sin as\cos st}{s}ds$

3. Derive Euler-Lagrange's equation.

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ASSIGNMENT – 2

Answer any two of the following three questions **Max: 30 Marks**

1. Prove that (i) $L\left[J_1(t)\right]=1-\frac{p}{\sqrt{p^2+1}}$.

   (ii) $L\left[tJ_1(t)\right]=\frac{1}{\left(p^2+1\right)^{3/2}}$

2. Solve $\frac{d^2y}{dt^2}-\frac{dy}{dt}-2y=0$, given that $y(0)=-2;\ y'(0)=5.$
3. Discuss Brachistochrone problem.

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HOME / SPOT ASSIGNMENT

Programme Code No : 131
Programme Name : M. Sc Mathematics
Course Code & Name : MMSS – 42 Probability and Random Processes
Batch : CY 2022
No. of Assignment : One Assignment for Each 2 Credits
Maximum CIA marks : 30 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Answer any two of the following three questions **Max: 30 Marks**

1. Find the mean, variance and moment generating function of Binomial distribution.
2. Verify that $f(x) = \frac{1}{\sigma\sqrt{2\pi}} \; e^{\left[-\frac{(x-m)^2}{2\sigma^2}\right]} \;\; where\ \sigma > 0$, is a density for normal distribution.
3. Calculate the rank correlation coefficient from the following data

Statistics Rank	1	2	3	4	5	6	7	8	9	10
Mathematics Rank	2	4	1	5	3	9	7	10	6	8

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Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Answer any two of the following three questions **Max: 30 Marks**

1. Find mean, variance and moment generating function of the Weibull distribution.
2. Let X be a continuous random variable with probability density function $f_X(x)$. Let $y = g(x)$ be strictly monotonic (increasing or decreasing) function of x. Assume that $g(x)$ is differentiable for all x. Then probability density function of the random variable Y is given by $h_Y(y) = f_X(x)\left|\frac{dx}{dy}\right|$, where x is expressed in terms of y.
3. If $\{N(t), t \geq 0\}$ is a non stationary Poisson process with intensity function $\lambda(t), t \geq 0$, then $N(t+s) - N(s)$ is a Poisson random variable with mean , then prove that $m(t+s) - m(s) = \int_s^{t+s} \lambda(y)dy$..

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Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS – 43 Continuum Mechanics
Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Answer any two of the following three questions **Max: 30 Marks**

1. Discuss Principal values and Principal directions of Real symmetric tensors.
2. Discuss compatibility conditions for infinitesimal Strain components.
3. Discuss Plane-Poiseuille flow.

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Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS – 43 Continuum Mechanics
Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Answer any two of the following three questions **Max: 30 Marks**

1. Given the velocity field: $v_1 = kx_2; \quad v_2 = v_3 = 0$.
   (a) Find the rate of deformation and spin tensor.
   (b) Determine the rate of extension of the material elements:
   $$dx^{(1)} = (ds_1)e_1, \ dx^{(2)} = (ds_2)e_2, \ \textit{and} \ \ dx = \frac{ds}{\sqrt{5}}(e_1 + 2e_2)$$
   (c) Find the maximum and minimum rates of extension.
2. Discuss the components of stress tensor.
3. Discuss Hagen-Poiseuille flow.

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Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS – 44 Mathematical Methods
Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Answer any two of the following three questions **Max: 30 Marks**

1. Solve the Fredholm integral equation of the second kind

$$g(s) = f(s) + \lambda \int_0^1 \left(st^2 + s^2 t\right) g(t)\, dt$$

2. Derive Freedom's first series.
3. Form an integral equation corresponding to the differential equation

$y'' + sy' + y = 0$ with the initial conditions $y(0) = 1,\ y'(0) = 0.$

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Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS – 44 Mathematical Methods
Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Answer any two of the following three questions **Max: 30 Marks**

1. Solve the integral equation by approximation method.

$$g(s)=e^{s}-s-\int_{0}^{1}s\left(e^{st}-1\right)g(t)\,dt$$

2. Find the resolvent kernel and solution of

$$g(s)=f(s)+\lambda\int_{0}^{1}(s+t)g(t)\,dt$$

3. Find the solution of Abel integral equation.

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Programme Code No	: 131
Programme Name	: M. Sc Mathematics
Course Code & Name	: MMSS-EL6 Optimization Techniques
Batch	: CY 2022
No. of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 30 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Answer any two of the following three questions **Max: 30 Marks**

1. Solve following transportation problem.

	1	2	3	4	5	6	**Supply**
I	9	12	9	6	9	10	**5**
II	7	3	7	7	5	5	**6**
III	6	5	9	11	3	11	**2**
IV	6	8	11	2	2	10	**9**
Demand	**4**	**4**	**6**	2	4	2	

2. Write Dijkstra's Algorithm.

3. Find the optimum integer solution to the following linear programming problem.

$Max. Z = 5x_1 + 8x_2$

Subject to:

$x_1 + 2x_2 \leq 8$

$4x_1 + x_2 \leq 10$

$x_1, \ x_{2,} \ \geq 0$ and are integers.

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HOME / SPOT ASSIGNMENT

Programme Code No : 131

Programme Name : M. Sc Mathematics

Course Code & Name : MMSS-EL6 Optimization Techniques

Batch : CY 2022

No. of Assignment : One Assignment for Each 2 Credits

Maximum CIA marks : 30 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Answer any two of the following three questions **Max: 30 Marks**

1. Solve the following assignment problem.

2	9	2	7	1
6	8	7	6	1
4	6	5	3	1
4	2	7	3	1
5	3	9	5	1

2. Write Maximal flow problem algorithm.
3. Solve the following 0-1 programming problem by additive algorithm.

Maximize $w = 3y_1 + 2y_2 - 5y_3 - 2y_4 + 3y_5$

Subject to

$$y_1 + y_2 + y_3 + 2y_4 + y_5 \le 4$$

$$7y_1 + 3y_3 - y_4 + 3y_5 \le 8$$

$$11y_1 - 6y_2 + 3y_4 - 3y_5 \ge 3$$

$$y_1, y_2, y_3, y_4, y_5 = \{0,1\}$$