



**TAMIL NADU OPEN UNIVERSITY**  
**Chennai-15.**  
**B.Sc Maths - Third Year**  
**SPOT ASSIGNMENT**

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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Real and Complex Analysis</b>	<b>BMS - 31</b>	<b>AY 2016-2017</b>

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**Time: 1 Hour**  
**Total Marks: 25**

Answer all questions.

1. Prove that  $\mathbf{R}$  is connected. 8 Marks
2. Prove that  $f \in \mathcal{R}$  on  $[a, b]$  if and only if for any  $\varepsilon > 0$  there exists a partition  $P$  such that  $U(P, f) - L(P, f) < \varepsilon$ . 9 Marks
3. State and prove Cauchy's integral theorem for rectangle. 8 Marks



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Linear Algebra and Boolean Algebra</b>	<b>BMS - 32</b>	<b>AY 2016-2017</b>

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**Time: 1 Hour**

**Total Marks: 25**

Answer all questions.

1. Prove that any two vector spaces of the same dimension over a field  $F$  are isomorphic. 9 Marks
2. Explain Gram-Schmidt orthogonalisation process. 8 Marks
3. Prove that every chain is a lattice, proving necessary results. 8 Marks



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COURSE	COURSE CODE	ADMISSION YEAR
Optimization Techniques	BMS – 33N	AY 2016-2017

**Time: 1 Hour**

**Total Marks: 25**

Answer all questions.

1. Determine an initial basic solution to the following transportation problem 9 Marks  
 using the north-west corner method:

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	
O <sub>1</sub>	6	4	1	5	14
O <sub>2</sub>	8	9	2	7	16
O <sub>3</sub>	4	3	6	2	5
	6	10	15	4	35

2. Solve the following  $2 \times 4$  game graphically: 9 Marks

		Player B			
		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>
Player A	A <sub>1</sub>	2	1	0	-2
	A <sub>2</sub>	1	0	3	2

3. A super market has two girls ringing up sales at the counters. If the service 7 Marks  
 time for each counter is exponential with mean 4 minutes, and if people  
 arrive in a Poisson fashion at the rate of 10 an hour,  
 (a) What is the probability of having to wait for service?  
 (b) What is the expected percentage of idle time for each girl?  
 (c) Find the average queue length as the average number of units in the  
 system.



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Programming in C and C++</b>	<b>BMS - 34</b>	<b>AY 2016-2017</b>

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**Time: 1 Hour**

**Total Marks: 25**

Answer all questions.

- 1 Explain the concept of Recursion and use this to find  $nC_r$ . 8 Marks
- 2 Write a program to find the roots of a quadratic equation using a function and use it in the main program to manipulate the roots. 9 Marks
- 3 Write a note on Operator overloading. 8 Marks



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Graph Theory</b>	<b>BMS - 35</b>	<b>AY 2016-2017</b>

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**Time: 1 Hour**  
**Total Marks: 25**

Answer all questions.

- 1 Define a tree and prove that if  $G$  is a tree, then  $q = p - 1$ . 8 Marks
- 2 State a necessary and sufficient conditions for connected graph to be eulerian. 9 Marks
- 3 Prove that every tournament has a directed Hamilton Path. 8 Marks