



**TAMIL NADU OPEN UNIVERSITY**  
**Chennai-15.**  
**M.Sc Maths – Second Year**  
**SPOT ASSIGNMENT**

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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Topology and Functional Analysis</b>	<b>MMS- 25</b>	<b>AY 2017 - 18</b>

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

Answer all questions.

- 1 Prove that the product of finitely many compact spaces is compact. 5 Marks
  
- 2 State and prove Urysohn Metrization theorem. 10 Marks
  
- 3 State and prove the open mapping theorem. 10 Marks



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Operations Research</b>	<b>MMS- 26</b>	<b>AY 2017 - 18</b>

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

Answer all questions.

- 1      Use dual simplex method to solve the L.P.P. 10 Marks  
Minimize  $Z = x_1 + 2x_2 + 3x_3$   
subject to constraints:  
 $x_1 \leq x_2 + x_3 \geq 4$   
 $x_1 + x_2 + 2x_3 \leq 8$   
 $x_2 \leq x_3 \geq 2$   
 $x_1, x_2, x_3 \geq 0.$
  
- 2      Solve the following  $3 \times 3$  game by linear programming. 10 Marks  

*player B*

Player A  $\begin{bmatrix} 1 & -1 & -1 \\ -1 & -1 & 3 \\ -1 & 2 & -1 \end{bmatrix}$
  
- 3      Explain pure birth and death model. 5 Marks



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Graph Theory and Algorithms</b>	<b>MMS- 27</b>	<b>AY 2017 - 18</b>

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**Time: 1 Hour**

**Total Marks: 25**

Answer all questions.

- 1 Prove that when the breadth-first search algorithm halts, each vertex reachable from (given vertex)  $v$  is labeled with its distance from  $v$ . 10 Marks
- 2 State and prove Vizing's theorem for simple graphs. 10 Marks
- 3 Write a note on  $\delta$ -Degree sets. 5 Marks



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<b>COURSE</b>	<b>COURSE CODE</b>	<b>ADMISSION YEAR</b>
<b>Differential Equations</b>	<b>MMS- 28</b>	<b>AY 2017 - 18</b>

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**Time: 1 Hour**

**Total Marks: 25**

Answer all questions.

- 1 Solve:  $y'' + y = 0$ ,  $y(0) = 1$ ,  $y\left(\frac{\pi}{2}\right) = 2$ . 9 Marks
  
- 2 Reduce the equation  $\frac{\partial^2 z}{\partial x^2} + 2\frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = 0$  into its canonical form. 8 Marks
  
- 3 State and prove Kelvin's inversion theorem. 8 Marks