

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
MAKEUP EXAMINATION – 2016  
B. TECH. (II SEM)

Course Code: 10B11MA211

Max Marks: 25

Course Name: DISCRETE MATHEMATICS

Course Credits: 4

Max Time: 1Hr 30 Min

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. Define Big-O notation. If  $f(x) = 5x^4 - 3x^3 + 10x^2 + 4x$  then show that  $f(x)$  is  $O(x^4)$ . Is  $f(x)$  is  $O(x^3)$ ? Justify your answer. (5)
2. Define a fallacy (or contradiction) and test the validity of following argument: (5)  
If I go to the movies then I won't finish my homework.  
If I don't finish my homework then I don't do well in the examination tomorrow.  
.....  
∴ If I go to the movies then I won't do well in the examination tomorrow.
3. State Dirac's theorem and using  $Q_3$  graph show that Dirac's theorem is not necessary for the existence of a Hamilton circuit. (5)
4. (a) Draw the graph represented by the following incidence matrix: (2.5)  

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$
- (b) Using graph theory discuss the solution to Konigsberg bridge problem. (2.5)
5. Write negation of the following:
  - (i)  $\forall x \forall y \exists z, x^2 + y^2 = 4z$  (2.5)
  - (ii)  $\forall x \exists y \exists z [p(x, y, z) \rightarrow q(x, y, z)]$  (2.5)