Royal College of Arts, Science and Commerce

S.Y.B.Sc Computer Science

Semester III 2020-2021

Combinatorics and Graph Theory (Course code: - USCS305)

Sample Questions

1. How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated?

a) 5

b) 10

c) 20

d) 15

2. A box contains 2 white balls, 3 black balls and 4 red balls. In how many ways can 3 balls be drawn from the box, if at least one black ball is to be included in the draw?

a) 32

b) 64

c) 48

d) 96

3. There are 30 people in a group. If all shake hands with one another , how many handshakes are possible?

a. 870

b. 435

c. 30!

d. 29! + 1

4. For any integer m>=3, the series 2+4+6+...+(4m) can be equivalent to
_____
a) m^2+3
b) m+1
c) m^m
d) $3m^2+4$

5. Which of the following is the base case for $4^{n+1} > (n+1)^2$ where n = 2?
a) 64 > 9
b) 16 > 2
c) 27 < 91
d) 54 > 8

6.   Which of the following statements for a simple graph is correct?
a) Every path is a trail
b) Every trail is a path
c) Every trail is a path as well as every path is a trail
d) Path and trail have no relation

7. A graph with no edges is known as empty graph. Empty graph is also known as... ?

A) Trivial graph

B Regular graph

C Bipartite graph

D Directed graph

8. Circle has _____

A No vertices

B Only 1 vertex

C 8 vertices

D 3 vertices

9. Which algorithm is used to solve a maximum flow problem?
a) Prim's algorithm
b) Kruskal's algorithm
c) Dijkstra's algorithm
d) Ford-Fulkerson algorithm

10. The first step in the naïve greedy algorithm is?
a) analysing the zero flow
b) calculating the maximum flow using trial and error
c) adding flows with higher values
d) reversing flow if required

11. A simple acyclic path between source and sink which pass through only positive weighted edges is called?
a) augmenting path
b) critical path
c) residual path
d) maximum path

12. How many constraints does flow have?
a) one
b) three
c) two
d) four

13. _____ is a partition of the vertices of a graph in two disjoint subsets that are joined by atleast one edge.
a) Minimum cut
b) Maximum flow

c) Maximum cut
d) Graph cut

14. _____ separates a particular pair of vertices in a graph.
a) line
b) arc
c) cut
d) flow

15. Which one of the following is not an application of max-flow min-cut algorithm?
a) network reliability
b) closest pair
c) network connectivity
d) bipartite matching