Unit 6 - Week4: Probabilistic Method

Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-26, 23:59 IST.

1) The Ramsey number $R(3,3)$ is equal to *1 point*

- 6
- 5
- 7
- 8

No, the answer is incorrect.
Score: 0
Accepted Answers:
6

2) Which of the following statements are true regarding the diagonal Ramsey numbers $R(k,k)$? *1 point*

- $R(k,k)$ is infinite for some k.
- $R(100,100) < 2^{40}$
- $R(100,100) > 2^{50}$
- $R(100,100) < 2^{50}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$R(100,100) > 2^{50}$

3) Which of the following subsets are not sum free subsets? *1 point*

- $\{1,4,16,64\}$
- $\{1,3,9,27,81\}$
- $\{1,4,16,64,3,9,27\}$
- $\{1,10,100,100\}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\{1,4,16,64,3,9,27\}$

4) Which of the following codes are prefix codes? *1 point*

- $\{10,01,111,000,1\}$
- $\{10,01,00,10,1001\}$
- $\{10,01,00,11\}$
- $\{1,01,001,0001,00001,000001\}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\{10,01,00,11\}$
$\{1,01,001,0001,00001,000001\}$

5) Let $E_1, E_2, \cdots, E_{100}$ be events such that their dependency graph is a $9-$regular graph(Every vertex has degree 9). We want to show that none of the E_is occur using Lovasz Local Lemma(LLL). Let the probability of each of the above mentioned events be less that p. What conditions would guarantee that we can apply LLL? *1 point*

- $p > 1/2$
- $p > 1/27$
- $p \leq 1/28$
- $p \leq 1/20$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$p \leq 1/28$

6) Which of the following statements are true? *1 point*

- Any connected graph on 1000 vertices has a cut of size at least 500
- There exist a connected graph on 1000 vertices in which the maxcut is of size 499
- Any graph of with 1000 edges has a cut of size at least 500.
- There exist a connected graph with 1000 edges in which the the maximum cut is of size 499

No, the answer is incorrect.
Score: 0
Accepted Answers:
Any connected graph on 1000 vertices has a cut of size at least 500
Any graph of with 1000 edges has a cut of size at least 500.

7) Consider 100 events $E_1, E_2, \cdot, E_{100}$ such that the probability of every event is $1/99$. Which of the following methods would be the best to guarantee that none of these events occur? *1 point*

- Union Bound
- Lovasz Local Lemma
- Independence of the E_i's
- None of the other choices.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Independence of the E_i's

8) Let G be a graph where the degree of every vertex is 7. Assume n to be suitably large. Which of the following statements are true? *1 point*

- Every dominating set of G is of size at least $2n/5$
- Every dominating set of G is of size at least $n/2$
- There is a dominating set of size less that $n/3$
- Every dominating set of G is of size at least $2n/3$

No, the answer is incorrect.
Score: 0
Accepted Answers:
There is a dominating set of size less that $n/3$