Assignment 9

The due date for submitting this assignment has passed.

Due on 2021-03-24, 23:59 IST.

As per our records you have not submitted this assignment.

1) Let A be an n × n matrix with {0,1} entries. We define a bipartite graph G_A with 2n vertices $\{u_1, u_2, \ldots, u_n\}$ and $\{v_1, v_2, \ldots, v_n\}$ such that there is an edge between u_i and v_j if and only if A[i,j] is 1. Which of the following two statements is/are true? *2 points*

1. If G_A has a perfect matching then permanent of A is nonzero.
2. If G_A has a perfect matching then determinant of A is nonzero.

- Only 1
- Only 2
- Both 1 and 2
- Neither 1 nor 2

No, the answer is incorrect.
Score: 0
Accepted Answers:
Only 1

2) Let kIP be a deterministic interactive protocol that has k rounds of interactions, for some k>1. Which of the following is known to be true? *2 points*

- kIP is a strict subset of dIP
- kIP is equals to dIP
- kIP is equals to P
- kIP is not equals to dIP

No, the answer is incorrect.
Score: 0
Accepted Answers:
kIP is equals to dIP

3) Let A be an n × n matrix. Which of the following two statements is/are true? *2 points*
1. If determinant of A is nonzero then permanent of A is also nonzero.
2. If permanent of A is nonzero then determinant of A is also nonzero.

- Only 1
- Only 2
- Both 1 and 2
- Neither 1 nor 2

No, the answer is incorrect.
Score: 0
Accepted Answers:
Neither 1 nor 2

4) Consider the following two languages, *3 points*
BPM = { <G> | G is an undirected, bipartite graph and G has a perfect matching} ,
CYCOV = { <G> | G is a directed graph and G has a cycle cover} .
Which of the following is known to be true?

- BPM is logspace reducible to CYCOV but CYCOV is not logspace reducible to BPM.
- CYCOV is logspace reducible to BPM but BPM is not logspace reducible to CYCOV.
- Both are logspace reducible to each other.
- Neither of them logsapce reducible to other.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both are logspace reducible to each other.

5) Consider the following language, *3 points*
PerParity ={ A | A is a matrix and the permanent of A is divisible by 2 }.
Which is the smallest known complexity class among following for PerParity?

- #P
- ⊕P
- P
- NC

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

6) We define a class EIP which is same as IP except that the prover in this class is only as powerful as class EXP. Which of the following is known to be true? *2 points*

- IP is a strict subset of EIP
- IP is equals to EIP
- EIP is a strict subset of IP
- EIP is not equals to IP

No, the answer is incorrect.
Score: 0
Accepted Answers:
IP is equals to EIP

7) Which of the following is known to be true? *3 points*

- IP[1] is a strict subset of BPP
- IP[1] is equals to BPP
- IP[k] = NP, where k > 0 is a constant
- IP[k] = BPP, where k > 1 is a constant

No, the answer is incorrect.
Score: 0
Accepted Answers:
IP[1] is equals to BPP

8) Assume that there is a polynomial time algorithm to compute permanent of a matrix. What can we conclude from this? *1 point*

- P = NP
- NP = coNP
- IP = P
- IP = NP

No, the answer is incorrect.
Score: 0
Accepted Answers:
P = NP
NP = coNP