Assignment 6

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

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

1) Recall the definition of expander. A graph $G(V,E)$ is called a $(n,d,p)$-edge expander if $G$ is a $n$-vertex, $d$-regular graph such that for 1 point all subsets $S$ of $V$ with at most $n/2$ many vertices, and $E(S,T)$ is at least $pd|S|$ where $T$ is the complement set of $S$ in $V$ and $E(S,T)$ denotes the set of edges such that for $(s,t)$ in $E(S,T)$, $s$ is in $S$ and $t$ is in $T$. If $a$ is the second largest eigen value, then what is the relation between $a$ and $p$?

- $a$ is at most $2p$
- $1- a$ is at most $2p$
- $p$ is at most $(1-a)/2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
1 - $a$ is at most $2p$

2) Let $G$ be a 3-regular graph with $n$ vertices. Then, which of the following statements must be true. 1 point

- there exists a partition of $V(G)$, as $V$ and $V'$ so that the number of edges in $G$ with one endpoint in $V$ and one endpoint in $V'$ is at least $n$.
- there exists a partition of $V(G)$, as $V$ and $V'$ so that the number of edges in $G$ with one endpoint in $V$ and one endpoint in $V'$ is at most $n$.
- there exists a partition of $V(G)$, as $V$ and $V'$ so that the number of edges in $G$ with one endpoint in $V$ and one endpoint in $V'$ is at most $n+1$.
- there exists a partition of $V(G)$, as $V$ and $V'$ so that the number of edges in $G$ with one endpoint in $V$ and one endpoint in $V'$ is at least $n+1$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
there exists a partition of $V(G)$, as $V$ and $V'$ so that the number of edges in $G$ with one endpoint in $V$ and one endpoint in $V'$ is at least $n$.

3) Suppose $A$ is an invertible square matrix. What can be said about the eigenvalues of $A$? 1 point

- Sum of the eigenvalues is zero
- Product of eigenvalues is non zero
- One of the eigenvalues is zero
- Sum of the eigenvalues is at least the dimension of $A$

No, the answer is incorrect.
Score: 0

Accepted Answers:
Product of eigenvalues is non zero

4) Recall the binary entropy function $H(p) = -p \log p - (1-p) \log (1-p)$, for $p$ in $(0,1)$. For what value of $p$, does $H(p)$ gets the minimum value? 1 point

- $p=0$
- $p=1/2$
- $p=1$
- both (1) and (3)

No, the answer is incorrect.
Score: 0

Accepted Answers:
both (1) and (3)