Unit 11 - Week 9

Assignment 9

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

Due on 2020-04-01, 23:59 IST.

Pick the correct options from each question. There is no negative marking

1) Let X_1, X_2 be two shift spaces over the alphabets A_1 and A_2 respectively. $X = X_1 \times X_2$ and a sequence (x, y) is defined as $(\ldots(x_{-1}, y_{-1}), (x_0, y_0), (x_1, y_1)\ldots)$. If X is taken as a subset of $(A_1 \times A_2)^{\mathbb{Z}}$, then; *1 point*

- X is also a shift space over $A_1 \times A_2$
- X need not to be a shift space over $A_1 \times A_2$
- If X_1 and X_2 are subshifts of finite type then X is also a subshift of finite type
- If X_1 and X_2 are subshifts of finite type then X need not to be a subshift of finite type

No, the answer is incorrect.
Score: 0
Accepted Answers:
X is also a shift space over $A_1 \times A_2$
If X_1 and X_2 are subshifts of finite type then X is also a subshift of finite type

2) Which of the following is/are true; *1 point*

- There will always be a finite collection $\mathcal{F}_0$ over the alphabet $\mathcal{A}$ such that $X_{\mathcal{F}_0} = \emptyset$
- There need not to be a finite collection $\mathcal{F}_0$ over the alphabet $\mathcal{A}$ such that $X_{\mathcal{F}_0} = \emptyset$
- There will never be a finite collection $\mathcal{F}_0$ over the alphabet $\mathcal{A}$ such that $X_{\mathcal{F}_0} = \emptyset$
- For every finite collection $\mathcal{F}_0$ over the alphabet $\mathcal{A}$, we have $X_{\mathcal{F}_0} \neq \emptyset$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
There will always be a finite collection $\mathcal{F}_0$ over the alphabet $\mathcal{A}$ such that $X_{\mathcal{F}_0} = \emptyset$

3) Which of the following statements is/are true; *1 point*

- For a finite graph G, the edge shift X_G is a subshift of finite type
- Every subshift of finite type is sofic
- Every subshift of infinite type is sofic
- Factor of a subshift of finite type is sofic

No, the answer is incorrect.
Score: 0
Accepted Answers:
For a finite graph G, the edge shift X_G is a subshift of finite type
Every subshift of finite type is sofic
Factor of a subshift of finite type is sofic

4) Which of the following is/are true; *1 point*

- A factor of a subshift of finite type is always a subshift of finite type
- A factor of a subshift of finite type need not to be a subshift of finite type
- For a given square matrix A, the subshift X_A is always transitive
- Suppose G is a graph with the adjacency matrix A. Suppose there is an $n \geq 1$ such that $A^n = 0$ then $X_G = \emptyset$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
A factor of a subshift of finite type need not to be a subshift of finite type
Suppose G is a graph with the adjacency matrix A. Suppose there is an $n \geq 1$ such that $A^n = 0$ then $X_G = \emptyset$.

5) Which of the following is/are true; *1 point*

- Even shift over $\{0, 1\}$ is sofic
- Even shift over $\{0, 1\}$ is not sofic.
- Every M-step subshift of finite type need not to be written as a vertex shift
- A sofic shift can be conjugate to a non-sofic shift space

No, the answer is incorrect.
Score: 0
Accepted Answers:
Even shift over $\{0, 1\}$ is sofic

6) Which of the following is/are true; *1 point*

- The full shift over an alphabet set $\{0, 1, 2, \ldots, 1729\}$ has positive entropy.
- The golden mean shift has entropy 0
- Let $\mathcal{A} = \{0, 1\}, \mathcal{F} = \{111\}$ then entropy of $X_{\mathcal{F}}$ is 0
- For an irreducible graph G, the entropy of X_G is always 0

No, the answer is incorrect.
Score: 0
Accepted Answers:
The full shift over an alphabet set $\{0, 1, 2, \ldots, 1729\}$ has positive entropy.

7) For an irreducible square matrix A; *1 point*

- All eigen values of A will be 0
- There will always be a positive eigen value
- There is an eigen value which is greater in magnitude than all other eigen values
- None of the above is true

No, the answer is incorrect.
Score: 0
Accepted Answers:
There will always be a positive eigen value
There is an eigen value which is greater in magnitude than all other eigen values