

NATIONAL UNIVERSITY OF SINGAPORE

CS1231S – DISCRETE STRUCTURES

(Semester 1: AY2024/25)

Final Assessment Answer Sheets

Time Allowed: 2 Hours

INSTRUCTIONS

1. Write your **Student Number** on the right AND, using a **pencil** (2B or above), shade the corresponding circle **completely** in the grid for each digit or letter. **DO NOT WRITE YOUR NAME!**
2. Zero mark will be given if you write/shade your Student Number incompletely or incorrectly.
3. Write your Student Number at the top of page 3.
4. There are **FOUR (4) pages** in the Answer Sheets.
5. All questions must be answered in the space provided; no extra sheets will be accepted as answers.
6. You must submit only these **ANSWER SHEETS** and no other documents.
7. An excerpt of the question may be provided to aid you in answering in the correct box. It is not the exact question. You should still refer to the original question in the question paper.
8. You may write your answers in pencil (2B or above) or pen. Pencil is preferred in case you need to erase and rewrite your answers.
9. The maximum mark for this paper is 100.
10. **Marks may be deducted** for (i) illegible handwriting, and/or (ii) excessively long answer.
11. Each multiple choice question is intended to have only one answer. Please shade the appropriate bubble in **pencil**.

STUDENT NUMBER														
A														
U	☐	0	0	0	0	0	0	0	0	0	0	0	A	N
A	☒	1	1	1	1	1	1	1	1	1	1	1	B	R
HT	☐	2	2	2	2	2	2	2	2	2	2	2	E	U
NT	☐	3	3	3	3	3	3	3	3	3	3	3	H	W
		4	4	4	4	4	4	4	4	4	4	4	J	X
		5	5	5	5	5	5	5	5	5	5	5	L	Y
		6	6	6	6	6	6	6	6	6	6	6	M	
		7	7	7	7	7	7	7	7	7	7	7		
		8	8	8	8	8	8	8	8	8	8	8		
		9	9	9	9	9	9	9	9	9	9	9		

For Examiner's Use Only		
Question	Marks	Remarks
Q1-23	/ 46	
Q24	/ 20	
Q25	/ 20	
Q26	/ 14	
Total	/ 100	



Any feeling about this exam paper?

This will not be graded! 😊

Part A: Multiple Choice Questions (Total: 46 marks)Please shade only ONE bubble for each question using **pencil**.

	(A)	(B)	(C)	(D)	(E)	
1.	☐	☐	☐	☐	☐	1.
2.	☐	☐	☐	☐	☐	2.
3.	☐	☐	☐	☐	☐	3.
4.	☐	☐	☐	☐	☐	4.
5.	☐	☐	☐	☐	☐	5.
6.	☐	☐	☐	☐	☐	6.
7.	☐	☐	☐	☐	☐	7.
8.	☐	☐	☐	☐	☐	8.
9.	☐	☐	☐	☐	☐	9.
10.	☐	☐	☐	☐	☐	10.
11.	☐	☐	☐	☐	☐	11.
12.	☐	☐	☐	☐	☐	12.
13.	☐	☐	☐	☐	☐	13.
14.	☐	☐	☐	☐	☐	14.
15.	☐	☐	☐	☐	☐	15.
16.	☐	☐	☐	☐	☐	16.
17.	☐	☐	☐	☐	☐	17.
18.	☐	☐	☐	☐	☐	18.
19.	☐	☐	☐	☐	☐	19.
20.	☐	☐	☐	☐	☐	20.
21.	☐	☐	☐	☐	☐	21.
22.	☐	☐	☐	☐	☐	22.
23.	☐	☐	☐	☐	☐	23.
	(A)	(B)	(C)	(D)	(E)	

Student Number: A

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Part B (Total: 54 marks)**24.** (a) GPUs [2]

[20]

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(b) Balls from a bucket [2]

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(c) $x_1 + x_2 + x_3 + x_4 = 12$

(i)[2]

--

(ii)[2]

--

(d) 10 couples, movie

(i)[2]

--

(ii)[2]

--

(e) Markers (i)[2]

--

(ii)[1]

--

(iii)[2]

--

(iv)[3]

--

25. (a) Chromatic number

[20]

(i)[1]

 K_{1231}

--

(ii)[1]

 $K_{1231,1231}$

--

(iii)[1]

 C_{1231}

--

(iv)[1]

Petersen

--

(b) Chromatic index

(i)[1]

 K_{100}

--

(ii)[1]

 $K_{1231,1231}$

--

(iii)[1]

Petersen

--

(c) Petersen graph[2]

Eulerian?

--

Hamiltonian?

--

(d) Min vertex cut set[2]

--

(e) (i)[2]

MST weight

--

(ii)[2]

#MSTs

--

(f) (i) Name of graph[1]

--

(ii) Chromatic idx[1]

--

(g) Inorder [3]

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26. (a) [2]

[14]

(b) [4] Write **True** or **False**.Statement (i) : $\forall x \in S (x \geq 1)$.
Statement (ii): $\forall x \in S (x \neq 8)$.
Statement (iii): $\forall x \in S (\exists k \in \mathbb{Z}^+ x = 3^k)$.
Statement (iv): $\forall x \in S \text{ false}$.
(c) [4] $(\forall x \in S Q(x)) \wedge (\forall P : S \rightarrow \text{Bool} (...))$. What is "..."?
(d) [4] $f(n) = r \Leftrightarrow " ... "$. What is "..."?

=== END OF PAPER ===