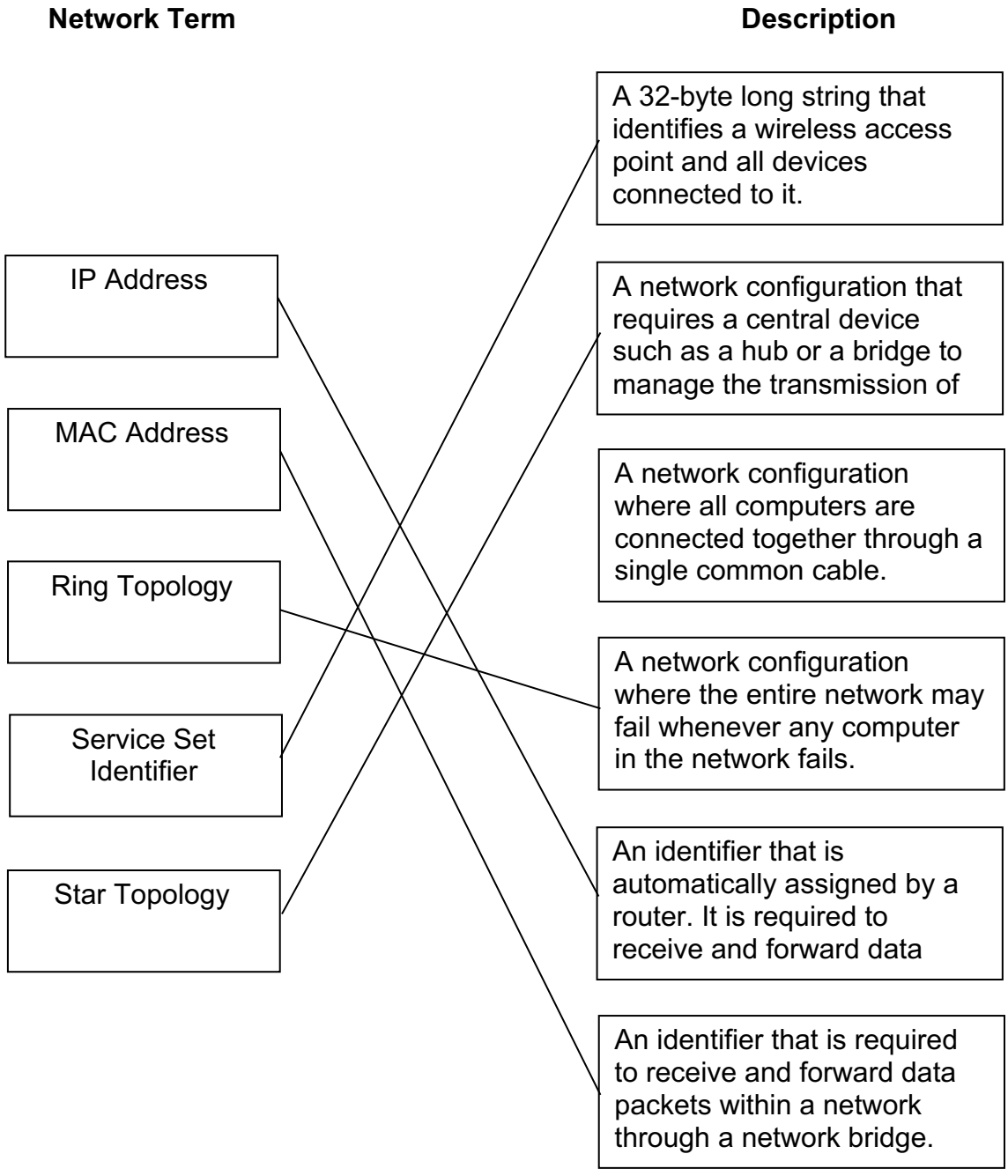
\Serangoon Secondary Computing
Sec 4E
2019 Preliminary Exams (Marking scheme)

Q1) **[5]**



Q2)

a) $(10000101)_2$
= (1*128) + (1*4) + (1*1)
= **133** or **$(133)_{10}$** **[2]**

b) $F_{16} = (1111)_2$ $B_{16} = (1011)_2$

$(FB)_{16}$
= **11111011** or **$(11111011)_2$** **[2]**

c) $(11110)_2$
= $(0001\ \ 1110)_2$
= $(\ 1\ \ \ E\ )_{16}$
= **1E** or **$(1E)_{16}$** **[2]**

d) $(365)_{16} = (3 \times 16^2) + (6 \times 16^1) + (5 \times 16^0)$
= **869** **[2]**

Q3) **(a)** **(i)** **[5]**

Highest	Num1	Num2	Range	i
1	15	6	15	1
1			6	2
3				3
				4
				5
				6

(ii) **[1]**

- Find the highest common factor of 2 inputs
- Find the largest common factor of 2 inputs
- Find the greatest common factor of 2 inputs

(b) **(i)**

[2]

Validation check: Presence check
Description: To check that the user has entered a value in the inputs

Validation check: Format check
Description: To check that the user has entered only numbers in the inputs

Validation check: Length check
Description: To check that the user has entered at least 1 character/digit in the inputs

Validation check: Range check
Description: To check that the user has entered numbers greater than zero

(ii) **[2]**

- Presence check
- Length check
- Format check
- Range check

(c) **[4]**

Test Case Condition	Test Data
Boundary condition	1, 1
Error condition	0, 10

Q4) **(a)** **[2]**

- Poor authentication
- Poor access control or authorization
- Poor understanding of privacy policies

(b) **[2]**

- Use of passwords

- Use of security tokens
- Use of Biometrics
- Setting file permissions
- Use of firewalls
- Encryption of files (password protecting of files)
- Reading and fully understanding privacy policies on use of services online
- Use of anti-virus software

(c) **[4]**

- Cookies. Personal information stored in cookies can be stolen and misused.
- Pharming. Interception of requests sent from a computer to a legitimate website and redirecting the user to a fake website to steal personal information.
- Phishing. Sending of emails/text messages from fake websites that appear to be from legitimate reputable companies (e.g. banks). Users who are unaware will submit personal information to the phishing websites.
- Spamming. Mass distribution of unsolicited digital content to email addresses or phone numbers collected from various sources.
- Spyware. Having a hidden program that secretly collects personal information from its host computer and transmitting them to attackers without the host computer's knowledge.
- Trojan horse. A computer program that disguises itself to be a harmless program in a host computer but instead opens backdoors on the host computer to allow unauthorized access to attackers.
- Virus. A malicious program that attaches itself to a normally harmless file and modifies (corrupts) it and subsequently attaches copies of itself to other programs.
- Worm. A computer program that runs automatically and attempts to spread by sending copies of itself to other computers. It often affects computers by taking up bandwidth and memory which slows the computer down.

Q5) (a) **[4]**

Household Device	Input Component	Output Component
Washing Machine	**One** from: • Selection knobs • Buttons	**One** from: • Motor • LCD panel • Buzzer/Beeper
Smart Mobile Phone	**One** from: • Buttons • Touchscreen panel • Microphone • Camera • Fingerprint scanner	**One** from: • LED display • Speakers • Headphones • Flash light

(b) **[3]**

Component: Central Processing Unit or Processor

Functions: Any 2 from:

- Arithmetic calculations
- Perform logical functions
- Controls flow of data in the computer
- Decides when data is stored, received or transmitted in the computer

(c) **[3]**

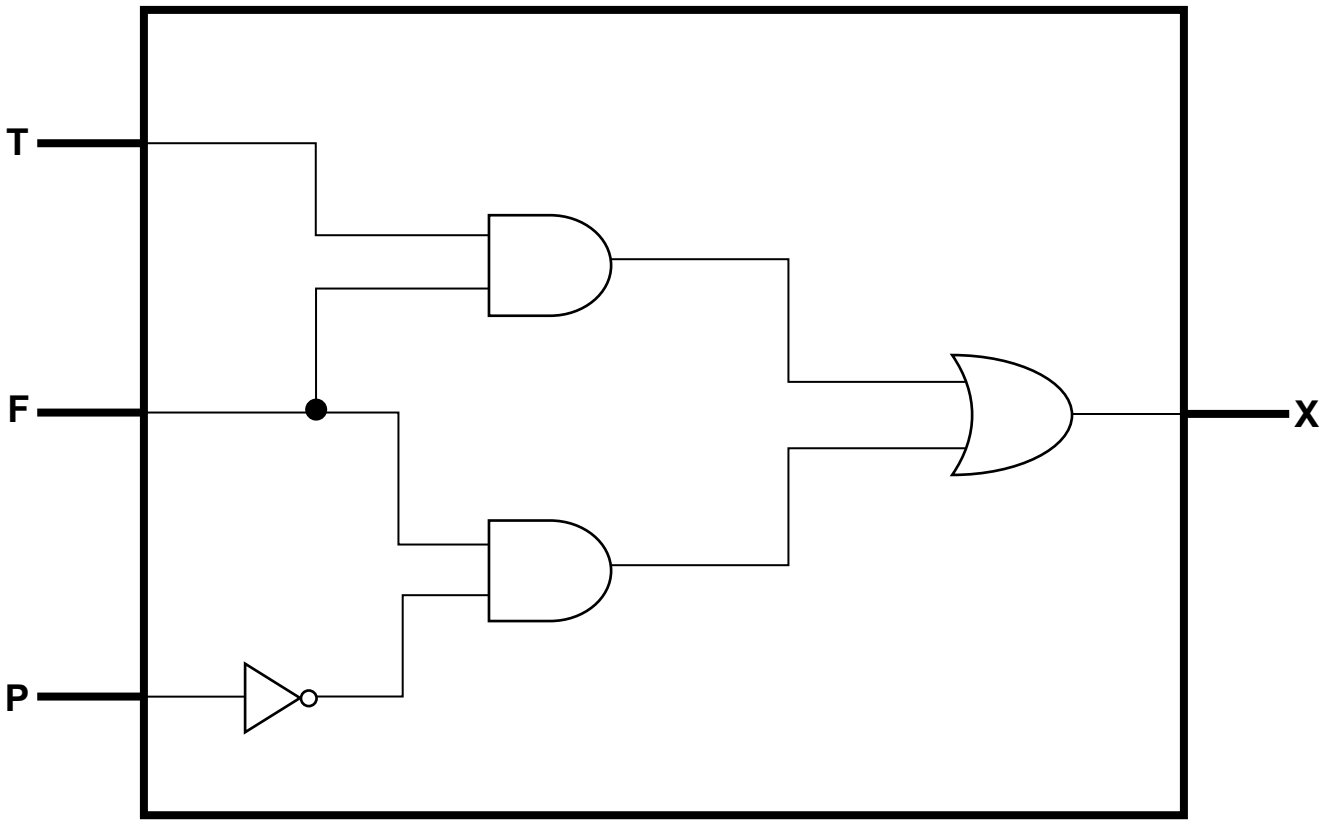
- Storage device: Thumbdrive or other memory cards

Storage medium: Solid state
Advantage: **One** from:
- Faster read/write speed
- Light weight and portable
- Silent operation
- Low power consumption

- Storage device: CD/DVD or other optical medium
  Storage medium: Optical
  Advantage: **One** from:
  - Light and portable
  - Cheaper than SSD devices

- Storage device: Hard disk drive (can be portable)
  Storage medium: Magnetic
  Advantage: **One** from:
  - Extremely large capacity
  - Relatively cheap considering storage capacity

Q6) (a) **[4]**



(b) **[4]**

F	T	P	Working Space			X
			T AND F	NOT P	NOT P AND F	
0	0	0	0	1	0	0
0	0	1	0	0	0	0
0	1	0	0	1	0	0
0	1	1	0	0	0	0
1	0	0	0	1	1	1
1	0	1	0	0	0	0
1	1	0	1	1	1	1
1	1	1	1	0	0	1

7) a) **[8]**

- Error 1: Line 5
  Correction: `WHILE Guess != Answer`
- Error 2: Line 10
  Correction: `BREAK`
- Error 3: Line 13
  Correction: `Record[Count] = Guess`
- Error 4: Line 15
  Correction: `Count = Count + 1`
  (Single indentation. This statement must be within the While loop.)

8) a) **[3]**

A5 – Text / General
D5 – Currency / Accounting / Money
H10 – Date

b)

= C5 * B2

c) **[2]**

= MAX(D5:D22)

9) **(a)** **(i)** **[2]**

- Byte 5
- Byte 7

(b) **(i)** **[1]**

- Byte 3

(ii) **[1]**

- Column 7

(iii) **[1]**

1	0	1	0	0	**0**	0	0

(iv) **[1]**

- Auto rectification of errors
- Sender does not need to send data again when error is detected
- Precise error can be located

10) **[6]**

- Initialization of 2 variables to store highest score and count inputs
- Loop management 32 repetitions

- Input name and score
- …… and check if name is “DONE” then break
- Input name and/or score in separate arrays
- Check if score input is higher than the highest recorded score
- …… and update as highest score if it is higher
- Loop management to read scores from array
- …… and output name and score of top student(s)

Sample algorithm:

```
Highest = -1
Count = 0

FOR i = 1 to 32
    OUTPUT "Enter student name: "
    INPUT Name
    IF Name == "DONE" THEN
        BREAK
    ENDIF

    OUTPUT "Enter student score: "
    INPUT Score
    IF Score > Highest THEN
        Highest = Score
    ENDIF

    Namelist[Count] = Name
    Scorelist[Count] = Score

NEXT i

FOR j = 1 to Count
    IF Scorelist[j] == Highest THEN
        OUTPUT Namelist[j],Highest
NEXT j
```