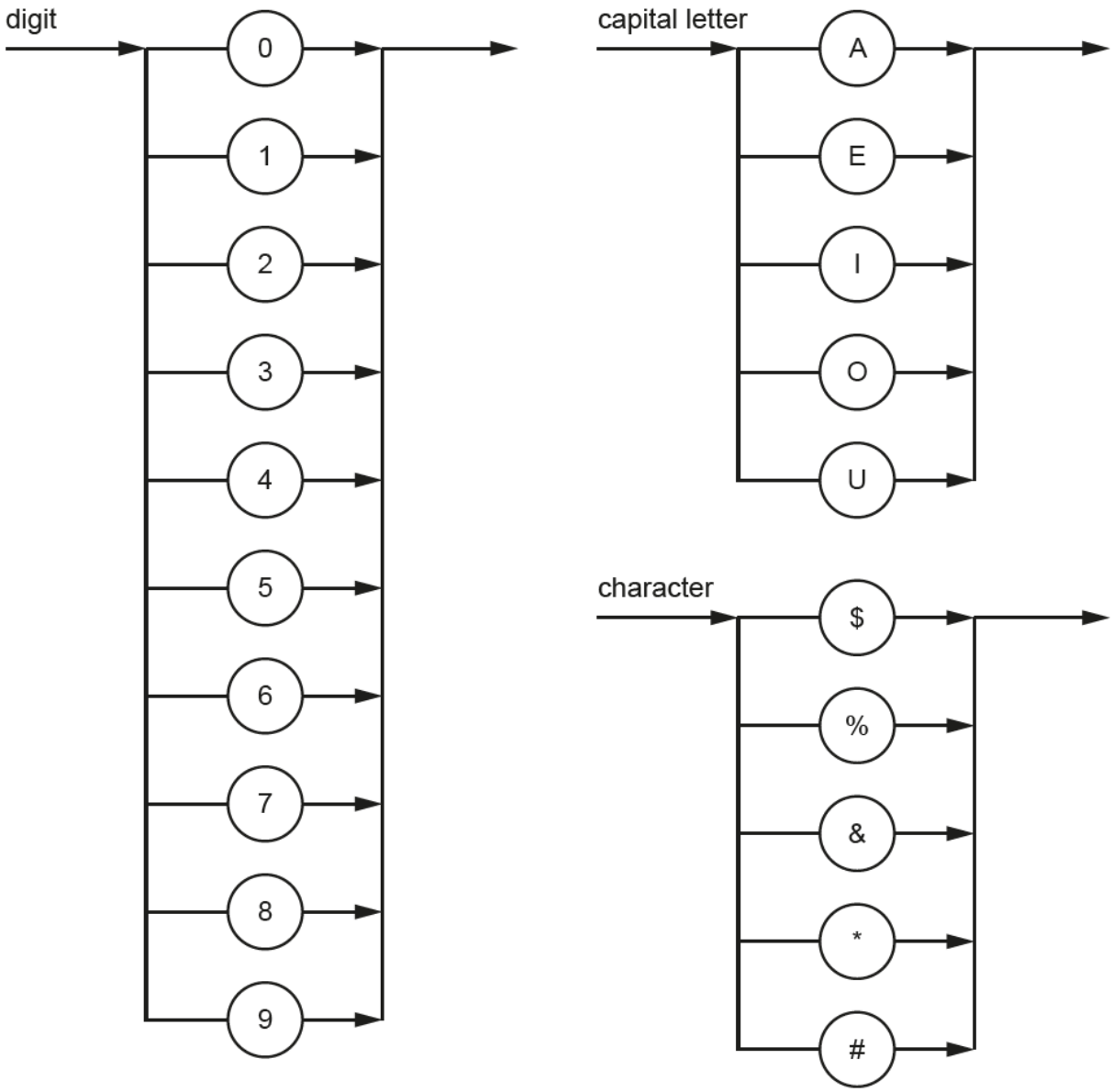
System Software – 2021 A2 9618

1. Nov/2021//Paper_31/No.4

The following syntax diagrams for a particular programming language show the syntax of:

- a digit
- a capital letter
- a character.



(a) Write the Backus-Naur Form (BNF) notation of the syntax diagram for character.

.....

.....

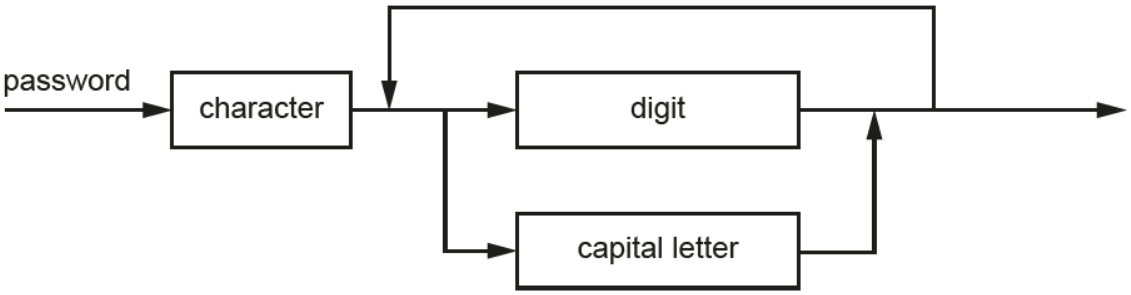
..... [2]

(b) A password must begin with a character and be followed by one or more digits or capital letters.

(i) State an example of a valid password.

..... [1]

(ii) A valid password is represented by the syntax diagram:



Write the BNF notation of the syntax diagram for password.

.....

.....

.....

.....

.....

.....

.....

..... [4]

2. June/2021//Paper_31/No.3

(a) Draw **one** line to connect each **Operating System (OS)** term to the **most appropriate** description about it.

OS term	Description
Multi-tasking	Using secondary storage to simulate additional main memory
Paging	Managing the processes running on the CPU
Interrupt handling	Managing the execution of many programs that appear to run at the same time
Scheduling	Locating non-contiguous blocks of data and relocating them
Virtual memory	Transferring control to another routine when a service is required
	Reading/writing same-size blocks of data from/to secondary storage when required

[5]

(b) Explain how an interpreter executes a program without producing a complete translated version of it.

.....

.....

.....

.....

.....

.....

.....

..... [4]

3. June/2021//Paper_31/No.4

(a) **(i)** Explain why Reverse Polish Notation (RPN) is used to carry out the evaluation of expressions.

.....

.....

.....

..... [2]

(ii) Identify, with reasons, a data structure that could be used to evaluate an expression in RPN.

.....

.....

.....

..... [2]

(b) Write the infix expression in RPN.

```
(a - b) * (a + c) / 7
```

.....

..... [1]

(c) Write the RPN expression as an infix expression.

```
a b / 4 * a b + -
```

.....

..... [1]

(d) Evaluate the RPN expression:

```
a b + c d / /
```

where `a = 17, b = 3, c = 48 and d = 12.`

Show your working.

.....

.....

.....

..... [2]