



G.C.E. (A/L) Examination – November 2016
Conducted by Field Work Center, Thondaimanaru.
In Collaboration with the Northern Provincial Education Department
Information & Communication Technology (ICT)

Grade - 13 (A/L) 2017

Part - I

Time: 2 Hours

Answer all the questions

1. “EDVAC computer was designed by”.
Which of the following appropriate to fill the blank in?
(1) John Von Neumann (2) Ada Lovelace (3) Blaise Pascal
(4) Maurice Wilkes (5) Charles Babbage
2. Which of the following was used in second generation computers?
(1) Vacuum tube (2) Transistor (3) Microprocessor (4) IC (5) VLSI
3. Which of the following is correct regarding a relation of a relational model?
(1) Each relation of a database should have a primary key
(2) Order for rows is a must
(3) Each row is identified uniquely
(4) Order for columns is a must
(5) Each value in the intersection of a row and column is unique
4. The component which executes the instructions fetched into the central processing unit is called.
(1) Control unit (2) Arithmetic logic unit (3) Program counter
(4) Register unit (5) Main memory
5. The simplified form of the Boolean function $f(x, y) = (x + y) \cdot (\bar{x} + y)$ is.
(1) x (2) y (3) 1 (4) $x + y$ (5) 0
6. The binary equivalent of 36_{10} is.
(1) 11001_2 (2) 11100_2 (3) 10101_2 (4) 10111_2 (5) 10010_2
7. Which of the following is/are outside the microprocessor?
A – Registers B – Control unit C – Main memory D – L1 cache memory
(1) A only (2) B only (3) C only (4) A, B only (5) A, B, D only
8. Which of the following command is used to display the network configuration of a computer in network?
(1) ping (2) netstat (3) ipconfig (4) nslookup (5) traceroute
9. Consider the followings.
A – Fedora Linux
B – Ms-Windows
C – Mac OS X
Which of the above is/are open source software?
(1) A only (2) C only (3) A, C only (4) A, B only (5) A, B, C all

10. Consider the following statements regarding operating system.

- A – Allocating memory needed for processes
- B – Scheduling processes
- C – Handling of files and folders

Which of the above is/are the functions of operating system?

- (1) A only (2) B only (3) A,B only (4) A,C only (5) A,B,C all

11. Consider the following statements regarding program translators.

- A – Compilers translate entire source code into machine code at a time
- B – Translators translate entire source code into machine code at a time
- C – Program translators are necessary to execute the programs written in high-level languages

Which of the above is/are true?

- (1) A only (2) B only (3) C only (4) A,C only (5) A,B,C all

12. The changes made in a newly developed and deployed software, is called

- (1) System design (2) System maintenance (3) System analysis
(4) System testing (5) Coding

13. Two's complement of (-4_{10}) is.

- (1) 11001100_2 (2) 11111100_2 (3) 10101010_2 (4) 11011011_2 (5) 1000010_2

14. Which of the following python statement(s) is/are correct?

- A – $a, b = 2, 4$ B – $a = 2, 4$ C – $a, b, c = 2, 4$ D – $a = b = 2$
(1) A only (2) B only (3) B,C only (4) A,C only (5) A,C,D only

15. Which of the following is correct regarding database normalization?

- A – It reduces update anomalies
- B – Tables are split further in this circumstance
- C – It minimizes data redundancy

- (1) A only (2) B only (3) C only (4) A, B only (5) A,B,C all

16. Consider the following statements.

- A – Structured
- B – Unstructured
- C – Object oriented

Which of the above may be considered as programming approaches?

- (1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

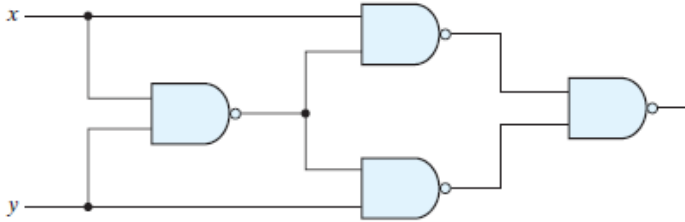
17. In a software, working hours for employees of an organization in a week is limited. The minimum hours is 40 and maximum hours is 50. Which of the following validation check is most appropriate for this?

- (1) Presence check (2) Range check (3) Length check
(4) Format check (5) Type check

18. Which of the following python program is syntactically correct?

- (1) `if a > b` (2) `if a > b` (3) `if a > b:` (4) `if a > b:` (5) `if a > b:`
 `return a` `return a` `return a` `return a` `return a`
 `else:` `else` `else:` `else:` `else`
 `return b` `return b` `return b` `return b` `return b`

19. What would be the output of the following logic circuit?



- (1) $\bar{x}y + x\bar{y}$ (2) $xy + \bar{x}y$ (3) $\bar{x}y + x$ (4) $xy + \bar{x}\bar{y}$ (5) $x + y$

20. Consider the following statements.

- A – DRAM technology is used in RAM
- B – SRAM technology is more speed rather than DRAM technology
- C – Cache memory is made of SRAM technology

Which of the above is /are correct?

- (1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

21. Which of the following is/are the benefits of e-commerce?

- A – Selling of goods and services via the Internet
- B – The payments for goods and services are made from home
- C – Customers are able to reach huge amount of sellers

- (1) A only (2) B only (3) A, C only (4) C only (5) A,B,C all

22. Which of the following relation is in third normal form (3NF)?

- (1) Member (MemberID, MemberName, BookID, BookName)
- (2) Book (BookID, MemberName)
- (3) Student (RegNo, StudentName, TeacherID, TeacherName)
- (4) Teacher (TeacherID, TeacherName, Address, Dateofbirth)
- (5) Subject (SubjectID, SubjectName, StudentName)

23. Which of the following correctly describes user-defined function in python program?

- (1) fun maxcalc(): (2) def maxcalc: (3) def maxcalc:
 (4) function maxcalc(): (5) def maxcalc()

24. What is the output of the following python code?

```
n =3
fact =1
i =2
while i <= n:
    fact = fact*i
    i = i+1
print (fact)
```

- (1) 6 (2) 24 (3) 2 (4) 3 (5) 1

25. Which of the following symbol is used to write comments in a python program?

- (1) @ (2) # (3) // (4) % (5) *

26. An organization provides insurance services for its employees through organization's website. Which of the following e-commerce model is suitable for this?

- (1) C2C (2) B2C (3) B2B (4) B2E (5) G2C

27. Consider the following HTML code fragment.

```
<ul>
  <li> Python </li>
  <li> Java </li>
  <li> C++ </li>
</ul>
```

Which of the following result would be rendered on web browser?

- | | | | | |
|--------|----------|----------|-----------|-----------|
| (1) | (2) | (3) | (4) | (5) |
| Python | • Python | ▪ Python | 1. Python | i. Python |
| Java | • Java | ▪ Java | 2. Java | ii. Java |
| C++ | • C++ | ▪ C++ | 3. C++ | iii. C++ |

28. What is the output of the following python code?

```
a=0
b=1
while b < 6:
  print (b,end=' ')
  a,b=b,a+b
```

- (1) 1 2 3 4 5 (2) 1 3 5 7 (3) 2 4 6 8 (4) 1 4 7 (5) 1 1 2 3 5

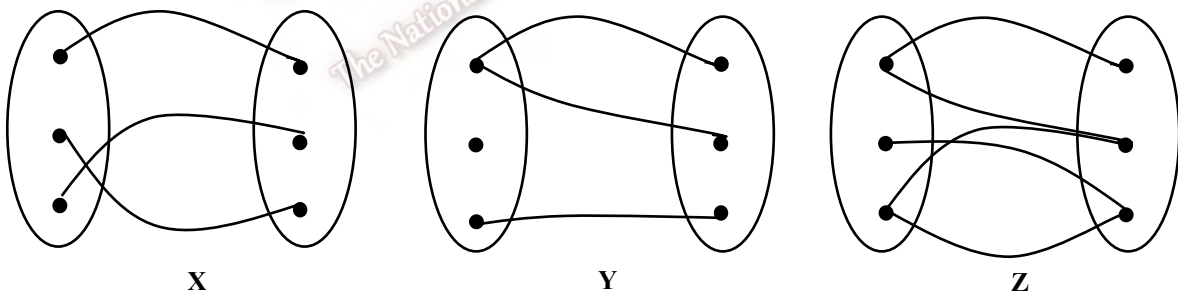
29. In web technology, HTML stands for.

- (1) Hypertext Margin Language (2) Hypertext Markup Language (3) Hypertext Macro Language
 (4) Hypertension Markup Language (5) Hypertext Markup Learning

30. $AC_{16} + 9B_{16} =$

- (1) $2BC_{16}$ (2) $4A2_{16}$ (3) 147_{16} (4) 254_{16} (5) ABC_{16}

31. Three figures relating to the relations of the relational database are given below.



- (1) X is a one-to-many relationship (2) Z is a one-to-many relationship
 (3) Y is a one-to-one relationship (4) Y is a many-to-many relationship
 (5) Z is a many-to-many relationship

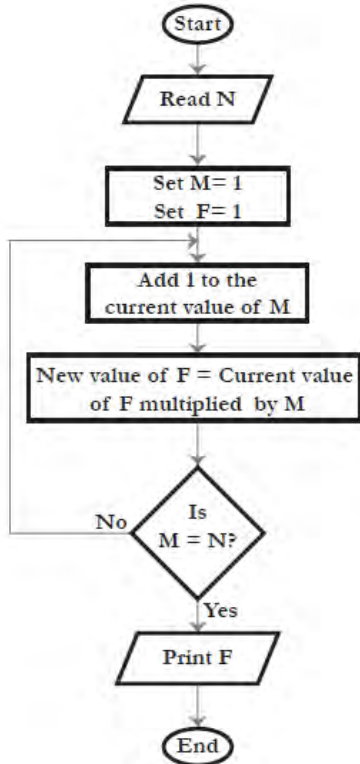
32. The result would be obtained to execute python statement `print (5+”2”)` is.

- (1) 52 (2) 7 (3) 2 (4) 5 (5) Compile-timer error

33. Which of the following tag is not commonly used to render a table in HTML?

- (1) `<tr>` (2) `<td>` (3) `<th>` (4) `
` (5) `<caption>`

34. Which of the following is correct regarding the flowchart given below?

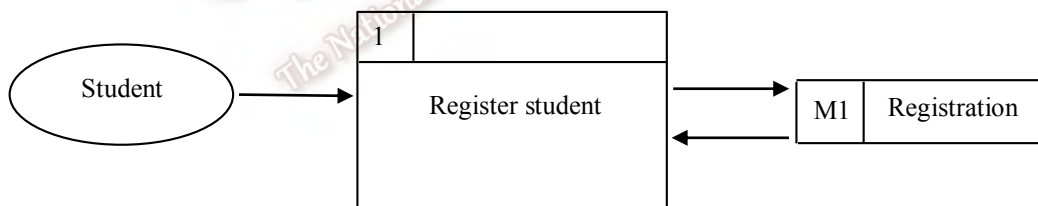


- (1) When the value of N is 3, the value of F is 12
- (2) The value of F may be 5
- (3) The value of F may be 8
- (4) When the value of N is 4, the value of F is 24
- (5) When the value of M is equivalent to the value of N, it iterates

35. Which of the following is/are incorrect regarding computer data storage?

- (1) Secondary storage is a volatile type memory
- (2) Secondary storage is accessed directly by CPU
- (3) RAM is directly accessed by CPU
- (4) Random access memory uses sequential access
- (5) Floppy disk and magnetic tape are secondary storage devices

36. Consider the following dataflow diagram.



Student, Register student and Registration are respectively.

- (1) Data store, external entity, process
- (2) Process, external entity, data store
- (3) External entity, process, data store
- (4) External entity, data store, process
- (5) Process, data store, external entity

37. Consider the following software process models.

- A – Waterfall model
- B – Spiral model
- C – Rapid application development(RAD)
- D – Incremental development

Which of the above is /are linear model(s)?

- (1) A only
- (2) B only
- (3) B,C only
- (4) B,C,D only
- (5) A,B,C,D all

38. Which of the following tag is required to create a hyperlink on webpage?

- (1) <hr>
- (2)

- (3) <h1>
- (4) <p>
- (5) <a>

39. Consider the followings regarding virtual private network.

A – It stands for Visual Private Network

B – It is created on a public network such as the Internet

C – It improves security of a private network

Which of the above is /are correct?

- (1) A only (2) C only (3) A, B only (4) B, C only (5) A,B,C all

40. Consider the followings.

A – Software piracy is legal

B – Violating of data privacy is ethical

C – Plagiarism is the use of others' works and ideas as his/her own

Which of the above is /are incorrect?

- (1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

41. Consider the followings.

A – Functional requirement is the services provided to the users by the system

B – Non-functional requirement is the constraint of a system

C – Efficiency and user friendly are generally non-functional requirements

- (1) A only (2) B only (3) C only (4) A, B only (5) A,B,C all

42. Which of the following is not a stage of fetch-execute cycle?

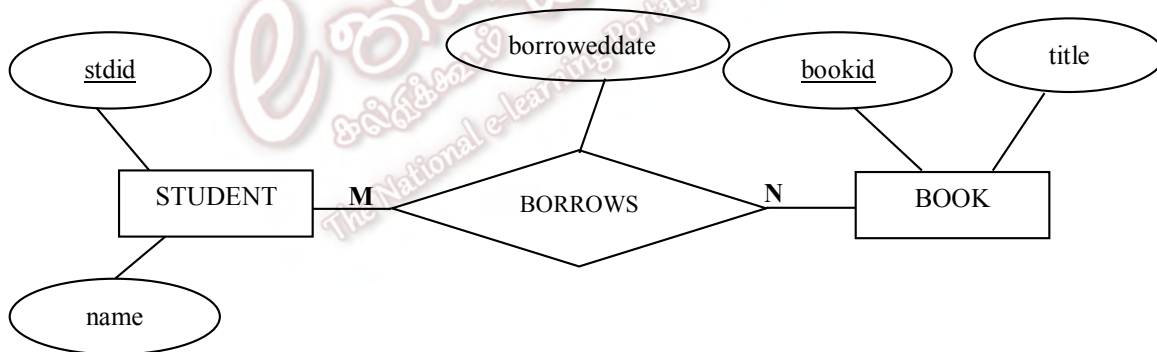
A – Fetching next instructions from main memory to main memory

B – Decoding instructions in order to understand by central processing unit

C – Executing instructions by arithmetic logic unit

- (1) A only (2) A,B only (3) A,C only (4) B,C only (5) A,B,C all

43. Consider the following ER diagram.



Which of the following would be obtained for the relationship BORROWS when mapping the above mentioned ER diagram into relations?

- (1) BORROWS (stdid)
(2) BORROWS (stdid, bookid)
(3) BORROWS (borroweddate)
(4) BORROWS (stdid, bookid, borroweddate)
(5) BORROWS (bookid)

44. Which of the following is an invalid identifier in a python program?

- (1) x_y (2) xy (3) _xy (4) x2 (5) for

45. What is/are the characteristic(s) of client-server network model comparing with peer-to-peer?

- A – Workload is centralized in one place
- B – More security
- C – Less cost

(1) A only (2) B only (3) A, B only (4) B, C only (5) A, B, C all

46. Consider the following statements regarding automated system.

- A – Less user interaction
- B – All the expert systems are automated systems
- C – Automated systems always use artificial intelligence technology

Which of the above is /are correct?

(1) A only (2) A,B only (3) A,C only (4) B,C only (5) A,B,C all

47. Consider the following statements.

- A – Fiber optics cable is more expensive than copper cable
- B – Fiber optics cable is generally used for longer distance communication network
- C – Co-axial cable is made of copper cables

Which of the above is /are correct?

(1) A only (2) A, C only (3) A, B only (4) B, C only (5) A, B, C all

48. Which of the following may be used to classify computer memory?

- A – Capacity
- B – Cost
- C – Density
- D – Access speed

(1) A only (2) B,C only (3) A, D only (4) A, B, C only (5) A, B, C, D all

49. Consider the following statement.

“.....converts source code written in programming languages into computer understandable object code”.

Which of the following is appropriate to fill the blank in?

- (1) Program translator
- (2) Syntax
- (3) Bug
- (4) Debug
- (5) Operator

50. Consider the following statements about errors occurred in computer programming.

- A – Syntax error reveals error messages
- B – Syntax error is also called semantic error
- C – Run-time error does not reveal error messages

(1) A only (2) B only (3) C only (4) A,B only (5) A,B C all

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Information & Communication Technology (ICT)

Grade - 13 (A/L) 2017

Part – II A

Time : 3 hours

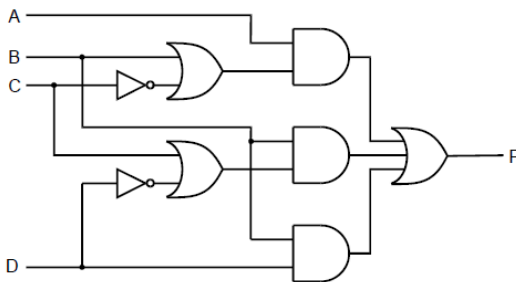
Structured Questions

Answer all the questions

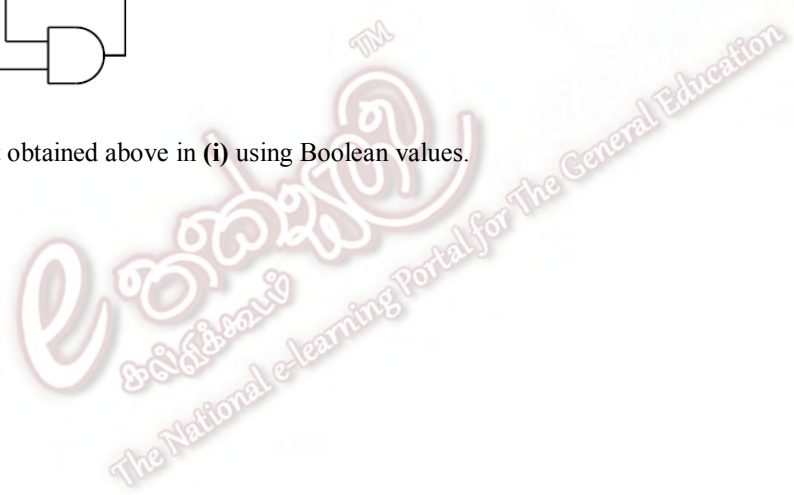
(1)

(a)

(i) What is the output of the following logic circuit?



(ii) Simplify the output obtained above in (i) using Boolean values.



(b) Use two's complement 8-bits method to add numbers 19_{10} and (-13_{10}) . Show your calculations.

(c) A bank provides the services such as getting account balance and money transactions to their customers via its website. In addition, it provides payment particulars and transfer details for their employees via its website. Write down the e-commerce services with the help of examples mentioned in this scenario.

(2)

(a) Write down the purposes of the following HTML tags.

	Tags	Purpose
(i)	<hr>	
(ii)	 	

(b) Write down HTML code segment to create the following description list.

Java

Object-oriented programming

Pascal

Procedural programming

(c) Consider the following HTML code segment to create a table.

```
<table border="1">
<caption> Marks </caption>
<tr>
<th> Subjects </th>
<th colspan="2"> Marks </th>
</tr>
<tr>
<td> Physics </td>
<td> 89 </td>
<td> 92 </td>
</tr>
</table>
```

Write down the results rendered on the web browser.

(3)

(a) Write down the normal form conditions for a relation in a relational database.

	Normal forms	Normal forms conditions
(i)	1NF	
(ii)	2NF	
(iii)	3NF	

(b) The characteristics of memory technologies such as SRAM and DRAM are given below. Underline with suitable answers.

	Characteristics	SRAM	DRAM
(i)	refreshing	Yes / No	Yes / No
(ii)	speed	Low / High	Low / High
(iii)	cost	Low / High	Low / High
(iv)	density	Low / High	Low / High

(c) Secondary storage devices use three kinds of data reading and writing technology. State them and give one example for them.

(4) Consider the following python program.

```
# pro.py
def calc():
    n = 1
    sum = 0
    while n <= 5:
        sum = sum + n
        print (sum, end=' ')
        n = n+1
    calc()
```

(a) Write down in the followings in the table regarding the python program given above.

	Column A	Column B
(i)	conditional statement	
(ii)	program comments	
(iii)	function call	
(iv)	variables	

(b) What is the output of this program?

(c) A computer system uses 32-bit width address bus as its byte addressable memory. What is the maximum usable size of memory in this scheme? Show your computations clearly and give the answer in Kilo Bytes.

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Part – II B

Essay Questions

Answer four questions only



(1)

An alarm sounds when certain conditions occur in a nuclear reactor. The output, X, of a logic circuit that drives the alarm must have a value of 1 if:

Either carbon dioxide pressure too low and temperature $\leq 300^{\circ}\text{C}$ or water pressure > 10 bar and temperature $> 300^{\circ}\text{C}$.

The inputs to the system are:

Inputs	Binary values	Condition
P	0	Carbon dioxide pressure too low
	1	Carbon dioxide pressure acceptable
T	0	Temperature $> 300^{\circ}\text{C}$
	1	Temperature $\leq 300^{\circ}\text{C}$
W	0	Water pressure > 10 bar
	1	Water pressure ≤ 10 bar

- Write down Boolean expression.
- Construct truth table for the Boolean expression obtained above in (a).
- Draw the logic circuit for the Boolean expression obtained above in (a).
- Write down the Boolean expression obtained above in (a) in the SOP (Sum-Of-Product) form.

(2)

A university is planning to introduce electronic identity cards system for their students. This identity card contains identity details of each students and in addition, the details about academic (e.g., examination results) and attendance for lectures of each students are also recorded. For this purpose, card readers to read these cards are installed in each lecture halls. Students are required to update when entering lectures and leaving it. In addition, the details about free Internet services provided for students are also stored.

- Write down two benefits that university administration would obtain by giving these cards to the students.
- Write down one possible issue in which students would face if the unauthorized persons would obtain students' individual and examination results records.
- State one computer-based risk reduction method to obtain information by unauthorized persons in which students are losing their electronic identity cards.
- Write down three functional requirements of this electronic identity cards system.

(3)

- (a)** Draw the diagrams for bus and star topologies.
- (b)** A financial company decided to provide services for their customers via their website. The decision was made to implement a virtual private network and to provide improved services via it. Explain two reasons to accept it.
- (c)** Compare and contrast optical fiber and co-axial cables.
- (d)** Write down any three network configuration items which would be obtained by giving ipconfig command to a computer in a network.

(4)

- (a)** Write down major difference between computer program translators such as compiler and interpreter.
- (b)** The players of a team would get scores from 1 to 100 for each sports event. Draw a flowchart to get output of the average score in which scores of a numbers of students ($n > 0$) would be obtained.
- (c)** Write down python program for the logic drawn in flowchart above in (b).

(5)

Draw a single ER diagram for the following mentioned scenario and identify attributes and associate them with entity or relationship types and mark primary key attributes for each entities. State any assumptions necessary to support your design.

A company has a number of employees. The data about employee include employeeid, name, address and birthdate. The company also has several projects. Data about project are projected, projectname, and startdate. Each employee may be assigned to one or more projects. A project must have at least one employee assigned and may have any number of employees assigned. An employee's billing rate may vary by project, and the company wishes to record the applicable billing rate for each employee when assigned to a particular project.

(6)

Draw a context diagram to show the overview of the medical store management system (MSMS) described above. Clearly indicate external entities and data flows in the diagram.

A company which sells medicines, has medical store management system. The details of medicines are obtained from store keeper and they are sent to medical representative. The medical representative sends ordered medicines to the MSMS. The customer who needs medicines, gives the needed medicine details and payments to the MSMS. The MSMS hands over them to the store keeper. According to the details of medicines obtained from customers, the store keeper sends medicines to the MSMS. The MSMS hands over them to the customers.

