G.C.E. (A/L) Examination – March 2019
Conducted by Field Work Center, Thondaimanaru.
In Collaboration with Northern Provincial Education Department
Information & Communication Technology (ICT)

Gr. 13 (A/L) 2019	Part - I	Time : 2 hours

Instructions:
- ❖ Answer all questions
- ❖ Write down your index number on the space provided.
- ❖ In each of the questions 1 to 50, pick one of the alternatives (1),(2),(3),(4),(5) which is correct or most appropriate. Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.
- ❖ No use of calculators.

1. Which of the following is correct regarding read only memory (ROM)?
(1) Application programs write data on ROM
(2) Contents of ROM will not be lost while computer is switched off
(3) Web pages are stored in ROM while they are downloaded
(4) Contents of ROM will not lost while computer is switched off
(5) All the inputs entered by users will be stored in ROM

2. Which software installation option would allow you to select the components you wish to install?
(1) Typical (2) Portable (3) Selection
(4) Full (5) Custom

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3. Which of the following is correct regarding L1 cache memory?
(1) It is always built-in on CPU
(2) It resides in register
(3) It comes in between register and RAM
(4) Its access speed is less than of RAM
(5) It resides in RAM

4. What is the simplified result of Boolean function $f(a,b,c) = ab + ab + ac + bb + bc$?
(1) a (2) b (3) c (4) $b + ac$ (5) $a + bc$

5. The memory that can be accessed by a processor having 32-bit address bus is.
(1) 2MB (2) 2KB (3) 4KB (4) 8GB (5) 4GB

6. AC_{16} is equivalent to.
A – 254_8 B – 10101100_8 C – 182_{10}
(1) A only (2) B only (3) A,B only (4) A, C only (5) A,B,C all

7. Which of the following is correct about composite keys in a relational database?

(1) The value of attribute of a composite key is null

(2) Each of the attributes in a composite key can be used to uniquely identify records

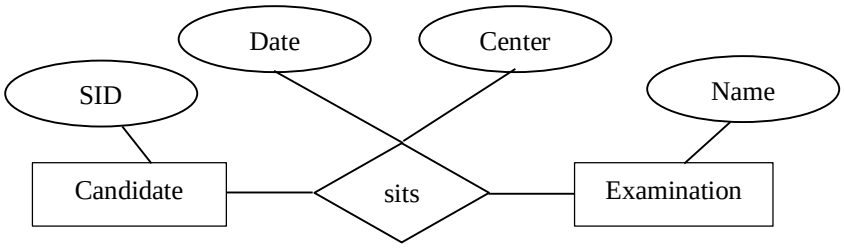
(3) A foreign key, if available, should be a part of the composite key

(4) Composite key is necessary when any individual attribute cannot identify records uniquely

(5) Composite key is called as alternate key

8. Consider the following ER diagram.

A candidate may sit more than one examination and an examination may have more than one candidates.



The tables obtained by mapping this ER diagram into database tables are.

(1)

SID	Name	Date	Center

(2)

SID	Date

Center	Date

(3)

SID	Name

Date	Center

(4)

SID

Name

SID	Name	Date	Center

(5)

SID

Name

Date	Center

9. Two's complements of (9_{10}) and (-9_{10}) are respectively.

(1) 10101111_2 , 10101111_2

(2) 10001111_2 , 10001111_2

(3) 00001001_2 , 11110111_2

(4) 11101111_2 , 01110001_2

(5) 11111111_2 , 11100010_2

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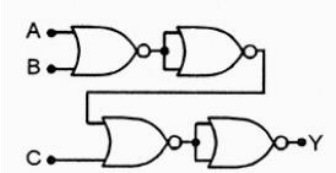
10. What is the output Y of the following logic circuit?



(1) $A + BC$ (2) $B + AC$ (3) $C + AB$ (4) ABC (5) $A + B + C$

11. Consider the following stakeholders of a software development project.

A – Programmer
B – System analyst
C – User

Who is/are involved in the acceptance testing?

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

12. A relational database table in 0NF can be converted to 1NF for by reducing…….

Which of the following is appropriate to fill blank in?

(1) Duplicate values of its fields
(2) Duplicate attributes in the tables
(3) All attributes which do not depend on the primary key
(4) Duplicates columns in the tables
(5) Duplicates rows in the tables

13. A and B are attributes of a composite key. If, only the attribute B decides a non-key attribute C, there is.

(1) Transitive functional dependency
(2) Partial functional dependency
(3) Internal functional dependency
(4) External functional dependency
(5) Consists of repeating group of values

14. Which of the following is incorrect about python programming language?

(1) It is used to create web applications
(2) It can be connected to database
(3) It functions in various operating systems
(4) It is a fourth generation computer programming language
(5) It was developed by Guido Van Rossum

15. If network address is *148.75.0.0/26*, what is maximum number of hosts that can be connected on this network?

(1) 64
(2) 32
(3) 62
(4) 30
(5) 126

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16. Consider the following statements about IP (Internet Protocol) in computer networks.

A – It functions on transport layer

B – Connectionless

C – The delivery of data packets are not guaranteed

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

17. Which of the following is a data definition language (DDL) statement?

(1) drop table employee;

(2) insert into employee values('e002','Naveen',43);

(3) update employee set age=42 where empid='e001';

(4) select * from employee;

(5) delete from employee;

18. Consider the following integrity constraints.

A – primary key

B – foreign key

C – unique

D – not duplicate

Which of the above avoid data duplication?

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

19. To which layer of the OSI model of data communiaction systems does the router belong?

(1) Physical layer

(2) Application layer

(3) Data link layer

(4) Network layer

(5) Presentation layer

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20. The SQL statement DROP TABLE EMPLOYEE;

(1) Deletes only the structure of a table

(2) Deletes all the data and structure of a table

(3) Deletes only the data of a table

(4) Deletes first attribute of a table

(5) Creates error

21. What is the correct order of data encapsulation in computer network?

(1) frame, bit, packet, segment, data

(2) segment, bit, frame, packet, data

(3) bit, frame, packet, segment, data

(4) packet, frame, bit, segment, data

(5) data, packet, bit, frame, segment,

22. Which of the following protocol is related to e-mail?

(1) FTP (2) HTTP (3) TCP (4) SMTP (5) UDP

23. Which of the following Python program is syntactically correct?

(1)
```
marks1=int(input('Enter marks1:'))
marks2=int(input('Enter marks2:'))
if marks1>50
   if marks2>60:
      print('Pass')
```

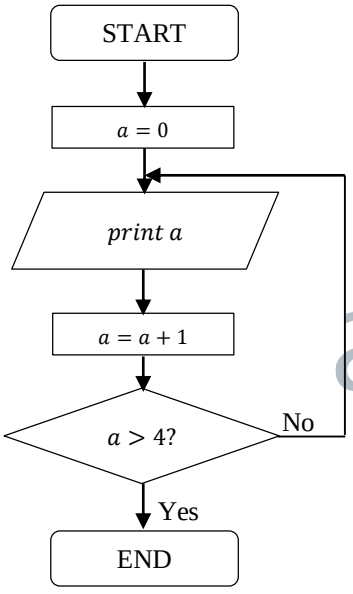
(2)
```
marks1=int(input('Enter marks1:'))
marks2=int(input('Enter marks2:'))
if marks1>50
   if marks2>60
      print('Pass')
```

(3)
```
marks1=int(input('Enter marks1:'))
marks2=int(input('Enter marks2:'))
if marks1>50:
   if marks2>60:
      print('Pass')
```

(4)
```
marks1=int(input('Enter marks1:'))
marks2=int(input('Enter marks2:'))
if marks1>50:
if marks2>60:
print('Pass')
```

(5)
```
marks1=int(input('Enter marks1:'))
marks2=int(input('Enter marks2:'))
if marks1>50:
   if marks2>60
   print('Pass')
```

24. Which of the following Python program is corresponding to the output of the flowchart given below?



(1)
```
a = 0
while (a > 5):
    print(a, end =' ')
    a = a + 1
```

(2)
```
a = 0
while (a < 4):
    print(a, end =' ')
    a = a + 1
```

(3)
```
a = 0
while (a < 5):
    print(a, end =' ')
    a = a + 1
```

(4)
```
a = 0
while (a > 4):
    print(a, end =' ')
    a = a + 1
```

(5)
```
a = 0
while (a < 5):
print(a, end =' ')
a = a + 1
```

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25. The objective of unit testing is to assure that ……..

(1) The system is error free
(2) The program of the system works according to the specifications
(3) The program of the system is free of syntax errors
(4) The program of the system is free of logical errors
(5) The program of the system is free of runtime errors

26. Which of the following is a server-side script?

(1) HTML (2) CSS (3) Javascript
(4) Python (5) PHP

27. Which of the following is correct about asymmetric data encryption?

(1) Data encrypted by private key of a sender can only be decrypted by public key of the receiver
(2) Data encrypted by public key of a sender can only be decrypted by private key of the receiver
(3) Data encrypted by public key of a sender can only be decrypted by public key of the receiver
(4) Data encrypted by private key of a sender can only be decrypted by private key of the receiver
(5) Data encrypted by private or public key of a sender can only be decrypted by public or private key of the receiver

28. Operating system uses various ways to allocate disk space to files. Out of them, "……... allocates disk space as a collection of adjacent blocks".
Which of the following is appropriate to fill the blank in?

(1) Linked allocation
(2) Memory allocation
(3) Contiguous allocation
(4) Indexed allocation
(5) Hard disk allocation

29. Which of the following is true with respect to a 'frame' in a computer network?

(1) It helps error checking at the application layer
(2) It contains only one packet
(3) A data packet can have one or more frames
(4) It is used by the data link layer to check communication errors
(5) It helps error checking at the physical layer

30. Which of the following statements about HTML is/are correct?

A – The vlink attribute specifies the color of visited links in a document
B – The alink attribute specifies the color of an active link in a document
C – tag defines a division or a section in an HTML document

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

31. Which of the following is incorrect about PHP?

(1) Its acronym is Hypertext Preprocessor
(2) It is an alternative to HTML
(3) It is an open source, scripting language
(4) A web server is needed to execute it
(5) It is free to download and use

32. Which of the following CSS coding is correct to render a font?

(1) p {font: "Times New Roman";}
(2) p {font-type: "Times New Roman", serif;}
(3) p {type: "Times New Roman", Times, serif;}
(4) p {font-family: "Times New Roman", Times, serif;}
(5) p {fontfamily: "Times New Roman", Times, serif;}

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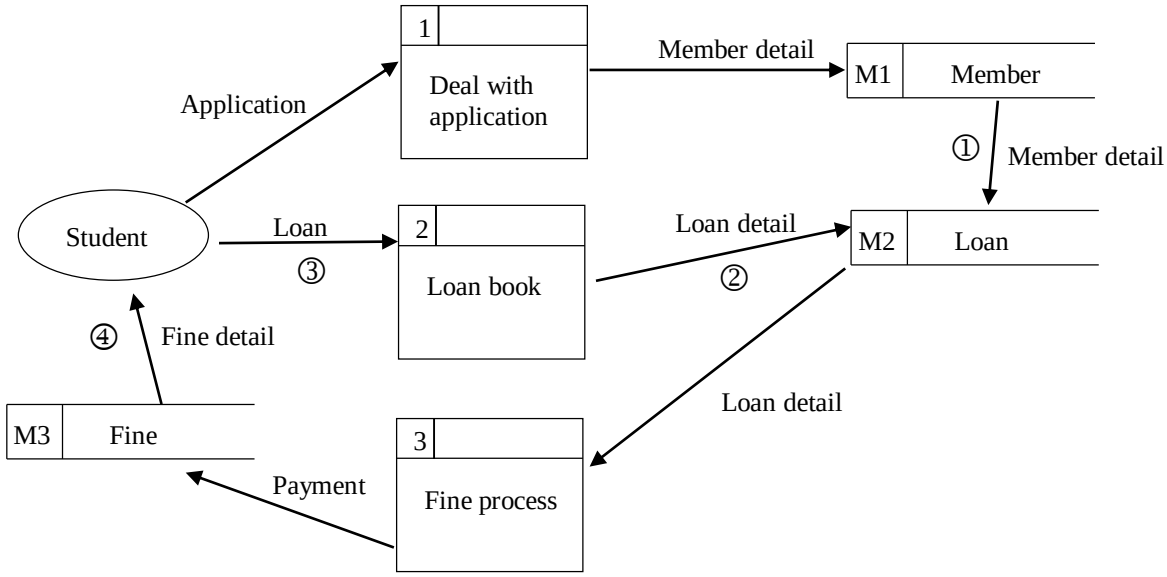
33. Consider the following data flow diagram (DFD) segment.



Which of the following(s) is/are invalid data flow(s) in this data flow diagram segment?

A – ①

B – ②

C – ③

D – ④

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

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34. Consider the following statements about static random access memory (SRAM).

A – Cache memory is made of using it

B – Its manufacturing cost per memory unit is high

C – Random access memory (RAM) is made of using it

D – It always requires refresh

Which of the above is/are correct?

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

35. Consider the following statements about software process models.

- Software tasks are divided into components according to time for every release
- It is an iterative approach
- Easily adopting static and dynamic user requirements

Which of the following software process model consists of these characteristics?

(1) Waterfall model

(2) Spiral model

(3) Agile model

(4) Prototyping model

(5) RAD model

36. The checking process of the components of the computer by itself while booting of computer is called.
(1) CMOS (2) POST (3) BIOS (4) EEPROM (5) CHECK

37. Consider the following statements about proxy server.
A – It allows an Internet connection to share among multiple computers
B – It allows caching webpages in order to reduce congestion of an Internet connection
C – It redirects IP packets from private IP addresses to public IP address
(1) A only (2) B only (3) C only (4) B,C only (5) A,B,C all

38. Which of the following is a combined assignment operator?
(1) += (2) + (3) % (4) < (5) >=

39. Consider the following statements regarding Python program.
A – List is a collection which is ordered and changeable and allows duplicate members
B – Set is a collection which is unordered and unindexed and no duplicate members
C – Dictionary is a collection which is unordered, changeable and indexed and no duplicate members
(1) A only (2) C only (3) A,B only (4) B,C only (5) A,B,C all

40. What is the output of the following Python program?

```
i=1
while i<6:
  print (i, end ='    ')
  if i==3:
    break
  i+= 1
```

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

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41. A continuous power supply is needed for CMOS RAM to store its configuration data. It is provided by ……..
(1) AC adapter
(2) Uninterruptible power supply (UPS)
(3) Power inverter
(4) DC adapter
(5) CMOS battery

42. Consider the following statements regarding http requests.
A – GET request is suitable for dealing with sensitive data
B – GET request has length restrictions in data transfer
C – POST requests can be bookmarked
Which of the above is/are correct?
(1) A only (2) B only (3) C only (4) B,C only (5) A,B,C all

Consider the following user requirements for a mobile phone to answer questions *43-45*.

A – A user shall be able to make a call

B – A user should be able to receive a call

C – The weight of the phone shall not exceed 500g

43. Which of the above represent the functional requirement(s)?

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

44. What is/are (a) non-functional requirement(s)?

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

45. What is/are (a) mandatory functional requirement(s)?

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

46. Which of the following is a network port number generally assigning for POP (Post Office Protocol)?

(1) 80 (2) 110 (3) 21 (4) 22 (5) 60

47. Consider the following relation.

Employee (Empid, NIC, Fname, Lname, Address, Salary)

By concerning the following functional dependencies, what is normal form of this relation?

Empid → NIC, Fname, Lname, Address, Salary

NIC → Fname, Lname, Address

(1) 0NF (2) 1NF (3) 2NF (4) 3NF (5) BCNF

48. A database table is created as follows.

CREATE TABLE Employee (Name VARCHAR (50) PRIMARY KEY, Payment INT CHECK (Payment > 75,000));

This table initially contains three records.

Name	Payment
Ashintha	100,000
Oshan	120,000
Tharinda	140,000

Assume that the following SQL statements are executed in sequence in this table. Some of them will not be executed because of the constraints given to the table.

(i) INSERT INTO Employee VALUES ('Vimal', 120000);

(ii) UPDATE Employee SET Payment = 150000 WHERE Name = 'Tharinda';

(iii) INSERT INTO Employee VALUES ('Alwis', 65000);

(iv) DELETE FROM Employee WHERE Name = 'Ashintha';

What will be the total Payment of Employee table after executing the above SQL statements?

(1) 390000 (2) 455000 (3) 650000 (4) 555000 (5) 370000

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49. Consider the following statements about computer program errors.

A – Programs consisting of syntax errors will not be executed

B – Runtime error does not show error messages

C – Logical error is also called semantic error

Which of the above is/are correct?

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

50. Consider the following statements regarding commercially off-the-shelf (COTS) packages.

A – They are designed in order to satisfy common users' requirements in the world

B – Their all the features are not always used by all the users in comparison with customized software

C – They are less cost in comparison with customized software

Which of the above is/are correct?

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

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[End

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Grade 13 (A/L) 2019	Part – II A	Time : 3 hours

Structured questions **Answer all questions**

1.

(a) State whether the following statements about HTML is correct or incorrect.

(i) HTML documents are defined by HTML elements

(ii) Another name for tag is attribute

(iii) A document with HTML coding is a computer program

(iv) HTML defines how data are displayed

(i) …….. **(ii)** ……

(iii) …… **(iv)** ……

(b) Write down in the given space how the following HTML coding is rendered on a web browser.

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```
<table border="1">
  <caption> Marks </caption>
  <tr>
    <th> Subject </th>
    <th colspan="2"> Marks </th>
  </tr>

 <tr>
    <td> ICT </td>
    <td> 98 </td>
    <td> 87 </td>
  </tr>

</table>
```

(c) Write down selector, property and value for the following CSS definitions each in the given table.

(i)

```
h1 {
    color: red;
}
```

(ii)

```
p {
    font-family: verdana;
}
```

(iii)

```
body {
    background-color: blue;
}
```

(iv)

```
p {
    text-align: center;
}
```

	Selector	Property	Value
(i)			
(ii)			
(iii)			
(iv)			

(d) State whether the following http requests is true or false.

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(i) POST requests can be cached
(ii) GET requests can be bookmarked
(iii) GET requests cannot be used when handling important data
(iv) POST requests are not stored in browser history continuously
(v) GET requests are not limited to data length

(i) …….

(ii) …….

(iii) …….

(iv) ……..

(v) ……..

2.

(a) Consider the following Python program.

```
for i in "GUIDO VAN ROSSUM":
    if i=="D":
        break
    print (i,end='  ')
```

(i) Write down output of this program.

……

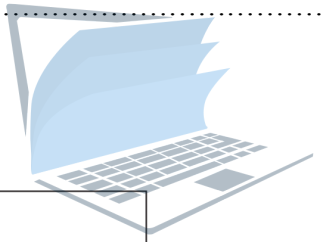
……

(ii) Write down the output obtained if the statement 'break' of this program is replaced by the statement 'continue'.

……

……

(b) Consider the following algorithm.



```
set counter = 0
output "Before the loop"

repeat
    set counter = counter + 1
    output "Count is" counter
until counter = 3

output "Loop has ended"
```

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Write down the output generated by this algorithm.

……

……

……

……

……

……

(c) The various kinds of errors reveal when developing computer programs. Two types of errors are described below. Write down their kinds.

(i) Programs are not given expected output

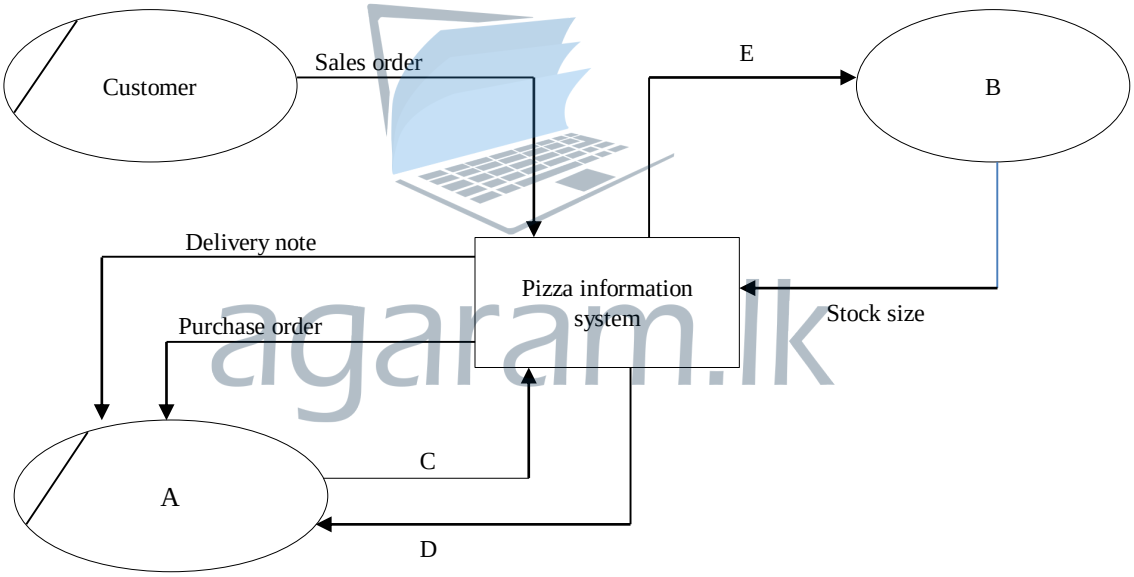
……

(ii) Programs are exceptionally closed

……

(d) A massive Pizza production company receives sales orders from the customers. Then the purchase order is sent to the distributor. The distributor will send the stock size detail to the Pizza Information System if there is sufficient stock size. Customer will provide a payment detail. Subsequently the purchase receipt is sent to the customer. Delivery note is sent to him after customer receives payment slip.

The segment of a context diagram is given below



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Write down appropriate terms for A, B, C, D and E based on the context diagram given above.

A ……

B……

C……

D……

E……

3.

(a) The following table consists of particulars of a medical company.

PatientNo	PatientName	TestType	Charge	TreatmentDate
1002	Rajaram	MRI	15000	2/5/2018
1203	Deepika	Blood test	1500	5/2/2108
1401	Alwis	Urine test	2000	6/2/2018
1002	Rajaram	Blood test	1500	7/3/2018
1002	Rajaram	ECG	4500	4/7/2018
1002	Rajaram	X-Ray	7000	1/2/2018
1203	Deepika	Blood test	1500	3/5/2018

(i) In a relational database table, write down the condition for third normal form.

……

……

……

(ii) Convert the table given above to third normal form (3NF).

……

……

……

……

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(b) Consider the following "EMPLOYEE" data table.

EmpNo	EmpName	Position	Department	BasicSalary
e_01	Raj	FC	Finance	87000
e_02	Hakeem	MA	Finance	50000
e_03	Ratnayake	AccClerk	Accounting	55000
e_04	Kayathiri	Manager	Marketing	90000

Write down SQL statements for the following requirements given below.

(i) Adding a new record details with data of e_05, Rajaratnam, SysEng, IT,120000 for a new employee (data are given in order of attributes)

……

……

……

(ii) Obtaining details of all the employees who gets Rs. 60000 or above as Basic Salary

……

……

……

……

(iii) Obtaining department name, number of employees in each department and total Basic Salary department wise.

……

……

……

……

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(c) Machine A sends data *10101001* and machine B receives data *11101101.* State that can machine B detect this error by using odd parity method? and give reason for that.

……

……

……

……

4.

(a) Using of 8-bits two's complement method, calculate $15_{10} - 24_{10}$.

……

……

……

……

(b) Briefly explain what happens in the POST (Power-On Self-Test) process in computer system.

……

……

……

……

(c) Briefly explain the function of complementary metal oxide semi-conductor (CMOS) battery built-in on computer motherboard.

……

……

……

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(d) Operating system uses various ways to allocate space for files. Underline whether True or False for each characteristic in the following table.

	Characteristics	**contiguous allocation**	**linked allocation**
(i)	Allocates disk space as a collection of adjacent/contiguous blocks	True / False	True / False
(ii)	Extending file size is difficult	True / False	True / False
(iii)	External fragmentation	True / False	True / False
(iv)	File size is not needed to know at the time of creation	True / False	True / False

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Gr. 13 (A/L) 2019	Essay questions	Part – II B

Answer any four questions only

01.

(a) Consider the following Boolean expression.

$$\overline{B}\,\overline{C}\,\overline{D} + \overline{A}B\overline{C}\,\overline{D} + AB\overline{C}\,\overline{D} + \overline{A}\,\overline{B}CD + A\overline{B}CD + \overline{A}\,\overline{B}C\overline{D} + \overline{A}BC\overline{D} + ABC\overline{D} + A\overline{B}C\overline{D}$$

(i) Convert this Boolean expression into standard SOP form.
(ii) Give a Karnaugh map to represent this Boolean expression.
(iii) Simplify Boolean expression given by using Karnaugh map.
(iv) Draw a logic circuit for the simplified Boolean expression.

(b) A full-adder obtains three inputs A, B and C_{in} and gives the outputs Sum and Carry.
(i) Give a truth table to obtain Sum.
(ii) Draw a logic circuit to obtain simplified output for Sum and write down Boolean expression for the output.

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02. Consider the following scenario.

'BookMart' is a popular library. It plans to implement newly developed computerized library information system instead of using manual information system. Library officers such as Librarian and assistant librarian may use this system. Books and member's particulars should be stored mandatory in this system. All the details about borrowing books by a member should be stored in this systems. Barcode technology is used in book borrowing process. In addition, 'BookMart' plans to have adequate data security features and user-friendly interface.

(a) What do you mean by functional requirement? Write down three functional requirements of this system.
(b) What do you mean by non-functional requirement? Write down two non-functional requirements of this system.
(c) 'BookMart' is reluctant to deploy instantly the newly developed computerized library information system fully. So it thinks of to use old manual information system in a short period. State what deployment method is appropriate for this purpose.
(d) Write down one advantage and disadvantage each in implementing this deployment method (in **(c)**).

03. Consider the following scenario.

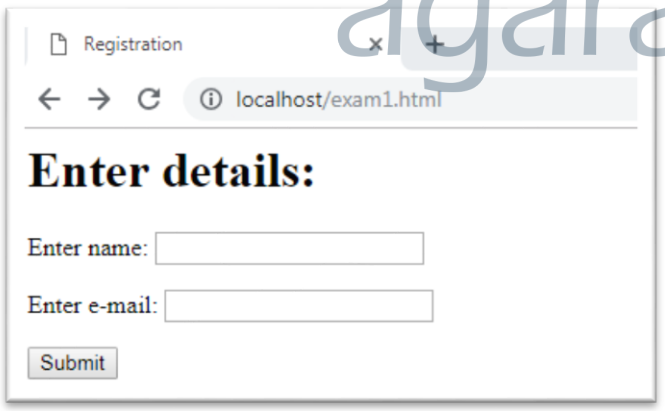
The car engine manufacturing company inputs the size of a number of car engines. An engine size should be entered at a time. While a value of –1 is entered, it should be stopped. In this situation, outputs such as average engine size and number of engines with size > 1.5 should only be displayed.

(a) State inputs and outputs for this purpose.
(b) Draw a flowchart algorithm for this purpose.
(c) Write down a Python program for this flowchart.

04.
(a) In data communication, write down three major differences between circuit switching and packet switching.
(b) Compare and contrast TCP and UDP on the basis of connection and reliability.
(c) Assume that you are given a full block of IP addresses from 192.168.40.0 to 192.168.40.255. You are required to subnet this block into at least 5 subnets each able to support a maximum number of hosts.
(i) What is the subnet mask of this network?
(ii) Give the start and the end IP address of each subnet.

05. An organization depends on a number of different types of persons for its successful operation. The organization is interested in the following attributes for all of these persons: SSN, Name, Address, and Telephone number. A person may have multiple telephone numbers. Three types of persons are of greatest interest: employees, volunteers, and donors. Employees only have a Date Hired attribute, and volunteers only have a Skill attribute. Donors only have a relationship with an Item that has number and name. A donor must have donated one or more items, and an item may have no donors, or one donor.
There are persons other than employees, volunteers, and donors so that a person need not belong to any of these groups. On the other hand, at a given time, a person may belong to two or more of these groups (for example, employees and donors).
Draw an EER diagram based on the requirements above, write down assumptions (if any) you make in your answer.

06. A private education center uses the following part of a web page on its website for registering new students.



(a) Write down full HTML code to create this webpage.
(b) This webpage is linked to an external CSS. The 'Enter details' is to be displayed with blue colour, aligned text and a border around it. Write down CSS definition for this purpose.
(c) If the name of the CSS definition written above **(b)** is reg.css**,** write down an external CSS (external style sheet) code segment to link with the web page given above.
(d) Assume that details about name and e-mail are given to the web page given above and those details are sent to the file while clicking on submit button. Write down PHP code segment for this purpose.

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