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மாகாணக் கல்வித் திணைக்களம், வடக்குமாகாணம்

Provincial Department of Education, Northern Province

கல்விப் பொதுத் தராதரப் பத்திர (உயர்தர ஆறாம் தவணைப்) பரீட்சை, 2024

General Certificate of Education (Adv. Level 6th Term) Exam. 2024

தகவல், தொடர்பாடல் தொழினுட்பவியல் I **Information & Communication Technology - I**	**G 12**	**20 T**	**Two hours**

Instructions:

- Answer all questions.
- Write your index number in the space provided in the answer sheet.
- Read and follow the instructions given in the answer sheet carefully.
- For each of the questions from 1 to 50, select the correct or most appropriate answer from the answers numbered as 1, 2, 3, 4, 5 and show it by placing a cross (X) on the answer sheet as per the instructions.
- Each question carries 01 marks for a total of 50 marks.
- Use of calculators will not be allowed.

1) Observe the following statements."

A) Tarun, a student, attempts to send an email as if it was from the school email service administrator to acquire usernames and passwords of his fellow students' email accounts.

B) Shanth, a writer, publishes a novel written by his friend as if it were his own creation.

C) Pradeep, the owner of a computer repair shop, installs MS Office software on his customers' computers without obtaining the proper license.

1. Piracy, Digital divide, Plagiarism
2. Stealing / Phishing , Piracy, Plagiarism.
3. Stealing / Phishing, Plagiarism , Piracy.
4. Plagiarism, Stealing / Phishing, Piracy.
5. Piracy, Plagiarism, Stealing / Phishing

2) Which of the following statements related to Big Data are correct?

A) Big Data refers to a large collection of data that has been gathered.

B) Due to the volume of Big Data, challenges arise in analyzing, searching, and updating it.

C) The characteristics of Big Data can be described as volume, variety, and variability.

1. Only A is correct.
2. Only B is correct.
3. Only C is correct.
4. Both A and B are correct.
5. A, B, and C are all correct.

3) The following statements relate to the properties of three types of computer screen.

A - Behind the screen fluorescent tube are used as lamps (back light) and screen filters (polarizing filters) are used.

B - Screen flicker free and suitable for large screens.

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C – Power efficiency is high and viewing angle definition is low.

Cathode ray tube screen, liquid crystal display screen, light emitting diode screen perfectly match the above characteristics.

1. A-cathode ray tube screen B - liquid crystal display screen C- light emitting diode screen
2. A - liquid crystal display screen B - light emitting diode screen C - cathode ray tube screen
3. A - cathode ray tube screen B - light emitting diode screen C - liquid crystal display screen
4. A - light emitting diode screen B - liquid crystal display screen C - cathode ray tube screen
5. A - liquid crystal display screen B - cathode ray tube screen C - light emitting diode screen

4) Which of the following set only volatile memory type?

1. Random access memory, Read-only memory and Cache memory
2. Register memory, Read only memory and Cache memory
3. Random access memory, Register memory and Cache memory
4. Random access memory, CMOS memory, and Cache memory
5. Random access memory, Read-only memory and CMOS memory

5) What is the answer that shows the decimal number 12 as a BCD code, and $12F_{16}$ as a binary value respectively?

1. 1100 and 11001111_2
2. 1100 and 100101111_2
3. 00010010 and 100101111_2
4. 00010010 and 11001111_2
5. 1100 and 111111_2

6) What is the answer when 25+(-43) is simplified using two's complement method?

1. 11101101_2
2. 11101110_2
3. 01000100_2
4. 10111010_2
5. 10011101_2

7) What is the correct bit sequence when the sequences of bits 1001011, 0101101 and 1101011 are operated using bitwise XOR?

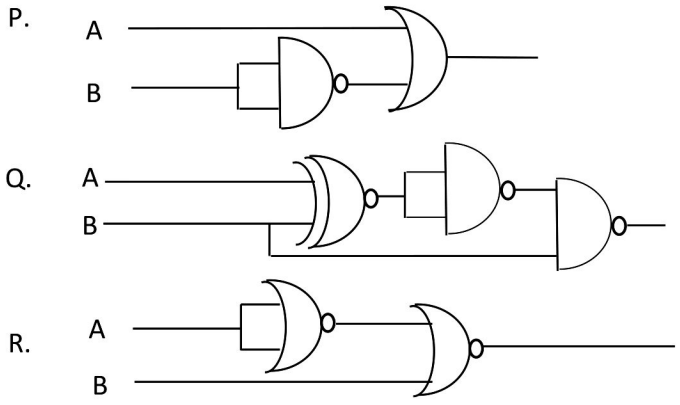
1. 0001001
2. 1101111
3. 1100110
4. 0001101
5. 0011001

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8) $2B4_{16}+47_8=$
   1. 1307_8
   2. $2CB_{16}$
   3. 1333_8
   4. $3DC_{16}$
   5. 1300_8

9) Converting 0111011.100_2 to base 16 yields which of the following results?
   1. 73.8_{16}
   2. $3C.4_{16}$
   3. $3B.8_{16}$
   4. 73.4_{16}
   5. $3B.4_{16}$

10) Consider the Boolean expression Q=$\overline{((\bar{A}B + A\bar{B})B)}$,
   Which of the following circuit/s act/s according to the expression given above?



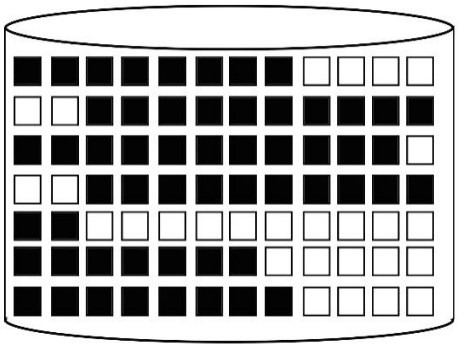
   1. P only
   2. Q only
   3. P and Q only
   4. P and R only
   5. Q and R only

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11) Steps of designing a digital circuit to solve a real-world problem are given below
   A - K-Maps are used to simplify the equations
   B - The truth table is developed
   C - Implemented using logic gates
   D - The problem is analyzed
   E - Identify input variables and output variables
   Find the correct order of execution, select one
   1. D,E,B,A,C
   2. A,C,B,D,E
   3. D,A,B,E,C
   4. B,D,E,C,A
   5. A,C,E,B,D

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12) In contiguous allocation, the partitioning of the disk where files are stored is provided below. Assume that each block size is 4 MB. The areas where files are stored are shaded and shown. Among the following files, which one will cause external fragmentation when stored?



1. 12KB
2. 24KB
3. 42KB
4. 16KB
5. 4KB

13) Which of the following statements related to schedulers is/are correct?

A) The goal of long-term scheduling is to mix jobs evenly, i.e., to balance I/O-bound and CPU-bound jobs.

B) The short-term scheduler selects a process from the ready queue and allocates the CPU to that process.

C) The medium-term scheduler is part of the time-sharing operating system.

Options:

1. A and B are correct
2. A is correct
3. A and C are correct
4. A, B, and C are all correct
5. B and C are correct

14) Consider the following statements about the IP address range 110.10.32.0 – 110.10.63.255.

A. The maximum number of hosts that can be connected within this IP range is 4094.

B. The network address of this range is 110.10.32.0/19.

C. The subnet mask of this range is 255.255.224.0.

Which of the following options is correct?

1. A only
2. A and C only
3. A, and B only
4. B and C only
5. A, B and C all are correct

15) Which of the following statements are true?

A: In IPv4, each IP address has 32 bits used to identify a host.

B: In IPv6, each IP address has 128 bits.

C: The MAC address, also known as the physical address, has 128 bits.

Which is the correct answer?

1. A only
2. B only
3. B and C only
4. A and B only
5. A, B, and C all are true

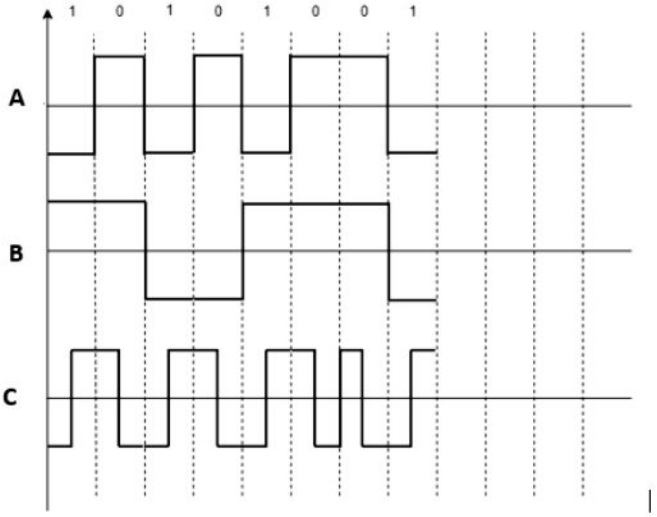
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16) In the OSI reference model, which of the following correctly classifies the protocol data units (PDUs) at the Physical Layer, Data Link Layer, Network Layer, and Transport Layer?
1. Segment, Packet, Bit, Frame
2. Frame , Packet , Segment , Bit
3. Bit , Frame , Packet , Segment
4. Frame , Bit , Segment , Data
5. Bit , Segment , Packet , Data

17) Consider the following protocols . Which of these are correctly applied at the application layer?
1. FTP,HTTP,TCP,UDP
2. FTP,HTTP,PPP,POP
3. FTP,HTTP,IP,ICMP
4. FTP,HTTP,POP,DNS
5. FTP,HTTP,,DNS,PPP

18) In a single parity (even parity) system, which of the following is considered to be a received byte with an error?
1. 11001100
2. 11001101
3. 01001100
4. 11101100
5. 00001000

19) The data "10101001" has been encoded using various line coding schemes, and a diagram below shows the representations of these schemes. The labels A, B, and C refer to the respective encoding schemes. Which of the following options correctly identifies the line coding schemes represented by A, B, and C?



1. A-NRZ-L, B-NRZ-I, C-Manchester
2. A-NRZ-I, B-NRZ-L, C-Manchester
3. A- Manchester, B-NRZ-I, C- NRZ-L
4. A-NRZ-L, B- Manchester, C- NRZ-I
5. A-NRZ-I, B- Manchester, C- NRZ-L

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20) Match the servers labeled from A to D with the corresponding descriptions labeled from 1 to 4.

Servers:	Descriptions:
A –DNS Server	1. Dynamically allocates IP addresses for network devices.
B – Web Server	2. Caches recently accessed web pages.
C – DHCP Server	3. Translates domain names into IP addresses.
D – Proxy Server	4. Stores web content for users to access through the network.

1. A – 3, B – 1, C – 4, D – 2
2. A – 3, B – 4, C – 1, D - 2
3. A – 3, B – 1, C – 2, D - 4
4. A – 3, B – 2, C – 1, D - 4
5. A – 2, B – 4, C – 1, D - 3

21) Which of the following statements about data encryption is incorrect?

1. In asymmetric encryption, two keys are used: a public key (for encryption) and a private key (for decryption).
2. In symmetric encryption, the same key is used for both encryption and decryption.
3. In digital signature verification, the public key is used to decrypt the signed document.
4. Private key encryption is more commonly used than public key encryption.
5. In digital signing, the sender's private key is used to encrypt the data.

22) Select the statement related to the non-functional requirements of a system.

1. The facility to send a text message on a mobile phone.
2. The facility to provide a receipt for a transaction in an automated teller machine (ATM).
3. The facility to access the required information or resources on a website within three clicks.
4. The facility to log in to an email by providing a username and password.
5. The facility for a customer to withdraw money using a collateral service in a bank.

23) 2. Select the statements related to system development models.

A. The prototyping model is suitable for scenarios where user requirements are unclear or confusing.

B. The rapid application development (RAD) model is appropriate when user requirements are very clear.

C. In the prototyping model, problems cannot be identified in the early stages.

D. In the iterative development model, changes in the system design are made during all iterations, and new functionalities are added.

Which of the above statements are correct?

1. A and B only
2. A, B, and C only

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3. A, B, and D only
4. A, B, C, and D (All of the above)
5. None of the above

24) Which of the following is not typically considered an activity in the maintenance phase of the system development life cycle?
1. Providing training to users on how to use the new system.
2. Making changes to adapt to new technology.
3. Incorporating new requirements as requested by users.
4. Periodically removing temporary files generated by the new system.
5. Providing updates to the system

25) Which of the following is considered an unstructured decision-making system for strategic-level users in a bank, providing enhanced reporting and communication?
1. Transaction Processing System (TPS)
2. Office Automation System (OAS)
3. Executive Support System (ESS)
4. Knowledge Management System (KMS)
5. Content Management Systems (CMS)

26) Which of the following is not an example of a batch processing system?
1. Preparation of employee payroll
2. Airline seat reservation
3. Preparation of electricity bills
4. University admission process for students
5. Assigning class ranks to students after semester exams

27) Consider the following statements about Commercial Off-The-Shelf (COTS) software packages:
A. They are mostly developed to meet the general needs of users.
B. They are comparatively more expensive than custom-made software.
C. Most of the features in these packages are not used by all users.

Which of the above statements are correct?
1. A only
2. A and B only
3. A and C only
4. B and C only
5. A, B, and C (All of the above)

28) In the context of Structured Systems Analysis and Design Methodology (SSADM), which of the following statements regarding Data Flow Diagrams (DFD) are correct?
A. A data store can be directly connected to a process.
B. A data store can be directly connected to another data store.
C. A data store can be directly connected to an external entity.
D. A process can be directly connected to another process.

Options:

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1. A and B only
2. C and D only
3. A and C only
4. A and D only
5. A, B, and C

29) A …….. is the set of values that a field can contain in a table.
Which of the following is the most appropriate to fill the blank in the above statement?
1. Cardinality 2. Degree 3. Null value 4. *R*ecord 5. Domain

30) Consider the following table Student in a relational database.

StID	STName	Grade
S01	Danish	A
S02	Sarmi	A
S03	Nithi	A
S04	Venu	B
S05	Kaja	C

What is the suitable SQL Statement to update all the values of the attribute Grade in the above table to "A"?
1. Update Student Set where Grade= "A"
2. Update * Set Student where Grade= "A"
3. Update Student Set Grade= "A" Where Grade= "B";
4. Update Student Set Grade= "A";
5. Update Student Set Grade Where Grade= "B"& "C";

31) Which of the following is incorrect with respect to the keys of relational database tables?
1. A Primary key is selected from Candidate keys.
2. The same value can be used repeatedly in the foreign key field.
3. The main key uniquely identifies a record in a table.
4. Primary key and foreign Key establish the relationship between two tables.
5. The table must have alternative keys.

- Consider the following relational schemas consisting of text fields in answering questions 32 and 33.
  Vehicle (Reg_no, model, colour)
  Person (Pno, name, address)
  Owner (Pno, Reg_no)

32) Which of the following statement is correct regarding the Owner relation?
1. Pno is the primary key
2. Reg_no is the primary key
3. Any single attribute can be a candidate key
4. Reg_no is a candidate key
5. Any single attribute can be a foreign key

33) What is the relationship between the two tables Vehicle and Person?
1. One to One 2. One to many

3. Many to many
4. No relationship
5. Many to One

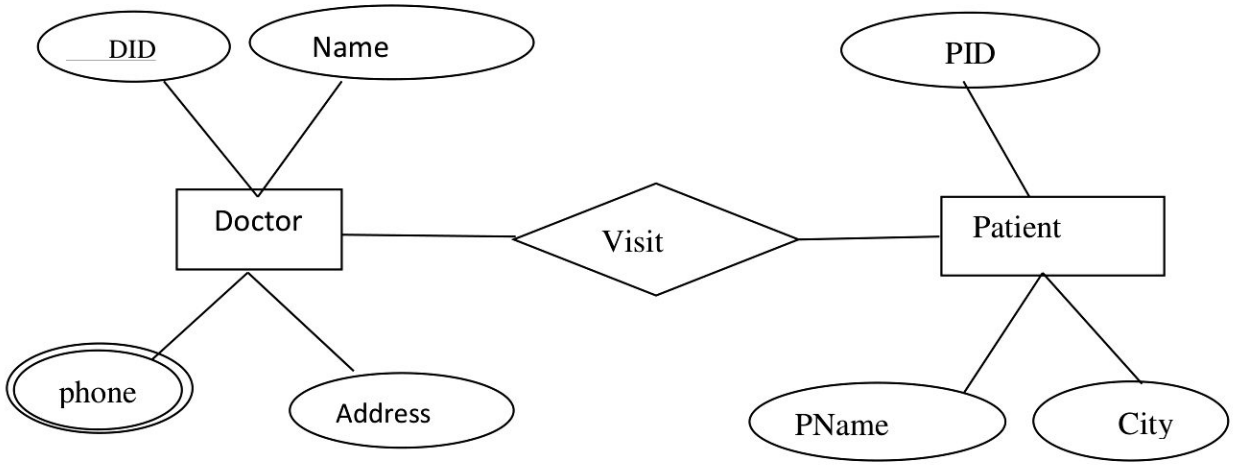
34) Consider the following relation

art (art_code, art_title, artist_id, artist_name)

Which of the following statement is correct with respect to the normal form of the above relation?

1. This relation is in 3rd normal form.
2. Three tables are available while normalizing this table.
3. This relation is in 2nd normal form.
4. This table cannot be made more normalization.
5. No Transitive dependency in this relation

- Consider the following ER Diagram



35) Which of the following relational tables are constructed using the ER diagram shown above.

A. Doctor(DID, Name, Address, Phone)
B. Patient(PID, PName, City)
C. Visit(DID,PID)
D. PhoneDoctor(DID, Phone)
E. Doctor(DID, Name, Address)

1. A, B Only
2. A,B,C Only
3. B,C,D,E Only
4. A, B ,C Only
5. A,B,C,D Only

36) Which is the appropriate place on the ER Diagram to mark the date of the doctor's visit to the patients?

1. It should be represented as a multi-value attribute in the entity of Patient.
2. It should be represented as a derived attribute in the entity of Doctor.
3. It should be represented as a descriptive attribute in the entity of Visit.
4. It should be represented as a composite attribute in the entity of Patient.
5. It should be represented as a composite attribute in the entity of Doctor.

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37) What is the output of the following Python code?

```
x = 3
y = []
while x < 5:
        for i in range(3):
                if x % 2 ==0:
                        y.append(x)
                else:
                        break
        x = x + 1
        continue
print(y)
```

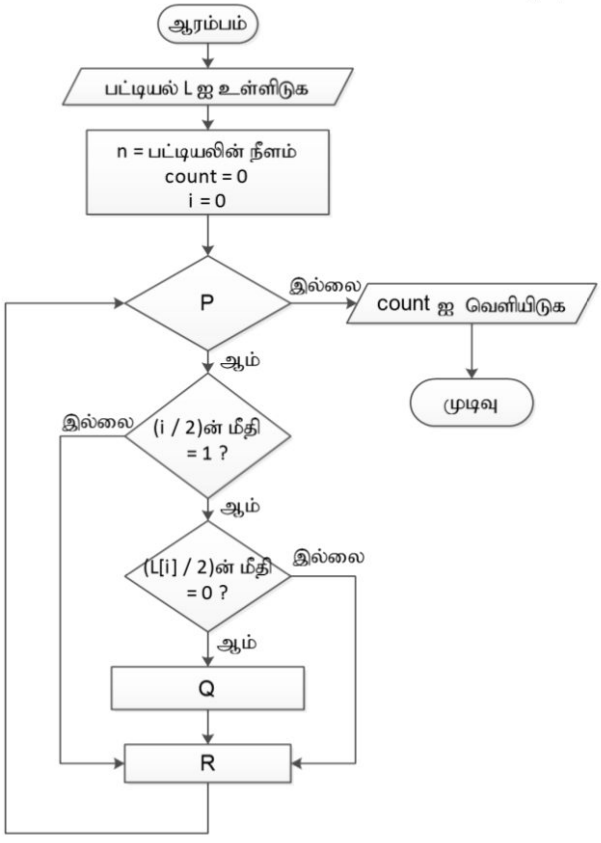
1. [3, 4, 5] 2. [4] 3. [4, 6] 4. [] 5. [4,4,4]

38) What is the output of the following Python code?

```
n = [5, 4, 7, 6, -1, 9, 8]
m = []
for i in range(len(n)):
        if n[i] < 0:
                break;
        if n[i]%2==0:
                m.append(n[i]);
print(m)
```

1. error 2. [4,6] 3. [5, 4, 7, 6] 4. [4, 6, 8] 5. [5, 7]

- consider the flow chart for following question number 39 to 41



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39) What should be written in P for flow chart to work properly?

1. I <= n? 2. is i < n 3. is i = n 4. is count < n? 5. is n < 0?

40) What should be written in Q for flow chart to work properly?

1. i = i + 1 2. i = i – 1 3. count = count + i 4. count = count + n 5. count = count + 1

41) correctly identify the control structure shown in this flow chart.

1. repetition within the selection
2. Repetition within Repetition
3. Repetition, selection within the selection
4. sequence, selection
5. sequence, Repetition

42) What is the output of the following Python code?

```
a=3
def define_num(a,b):
    if a>b:
        return a
    else:
        return b
print (define_num(7,6)),
def main():
    c=define_num(4,5)
    if a==c:
        print a
    else:
        print c
main()
```

1. 7 3 2. 3 6 3. 7 4 4. 7 5 5. 5 6

43) What is the output of the following Python code?

```
a,b = 3,5
def max (a,b):
        if  a>b:
                return a
        else:
                return b
print (max (7,6)),
print (a)
```

1. 5 3 2. 7 7 3. 7 3 4. 5 3 5) 3 7

44) Thisaro Perera fills out a form to open an email. In this way the first name, last name, username and password must be completed by him. above mentioned, Which attribute is used in HTML input field to perform the data validation? (3)

1. name 2. type 3. required 4. size 5. Present

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45) Consider the following statements

A – GET method can send images, documents etc.

B – GET method is more efficient than POST method

C – POST method can send large amount of data

Which of the following statements is/are correct?

1. A only 2. B only 3. B, C only 4. A, C only 5. All A, B and C

46) What is the expected output of the following PHP code block?

```
<?php
$i = 5;
while (--$i>0 && ++$i)
{
        print $i;
}
?>
```

1. 555555555...infinitely 2. 54321 3. error 4. 5 5. 4321

47) Consider the following statements related to CSS.

A - More than one class cannot be used on a single element.

B - Multiple IDs can be used on a single element.

C - CSS code can be used in an HTML file in three ways.

Which of these statements is/are correct?

1. A only 2. B only 3. C only
4. A, B only 5. B, C only

48) What is the main function of actuator in Internet of Things (IOT)?

1. A device used to produce output
2. A device for interpreting input
3. A device that processes the inputs and produces the output according to the previously given instructions.
4. To ensure intermediate between devices
5. To provide for graphics user interface.

49) Which of the following statements related to e – commerce are true?

A) A particular product may be available at different prices at different e- commerce sites.

B) Payment option at the receipt of goods allows customers to verify the quality of their purchases made through the e- commerce site.

C) Additional charges can be included as delivery and service fees of and service fees over and about the stated.

1. A only
2. B only
3. C only
4. A and C only
5. All A, B and C

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50) Which of the following statements is/are correct?

A) Biological computing is a research method that uses computer models based on biological and natural world principles to solve complex problems.

B) A quantum computer performs calculations based on the behavior of particles at the subatomic level.

C) Natural computing (NIU) is an emerging field that develops new computational techniques by observing how natural phenomena behave in various environmental conditions to solve complex problems.

Options:

1. A and B are correct
2. A is correct
3. A and C are correct
4. B and C are correct
5. A, B, and C are all correct

***

khfhzf; fy;tpj; jpizf;fsk;>tlkhfhzk; Provincial Department of Education, Northern Province

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Provincial Department of Education, Northern Province

கல்விப் பொதுத் தராதரப் பத்திர (உயர்தர ஆறாந் தவணை)ப் பரீட்சை, 2024
General Certificate of Education (Adv. Level 6th Term) Exam. 2024

தகவல் தொடர்பாடல் தொழினுட்பவியல் II Information & Communication Technology - II	G 13	20 T	II

மூன்று மணித்தியாலம்

இவ் வினாத்தாள் A,B என்னும் இரு பகுதிகளைக் கொண்டுள்ளது. இரு பகுதிகளுக்கும் ஒதுக்கப்பட்ட நேரம் மூன்று மணித்தியாலங்கள் ஆகும். (மேலதிக வாசிப்பு நேரமாக 10 நிமிடங்கள் வழங்கப்படும்.)

❖ கணிப்பானை பயன்படுத்தக்கூடாது.

❑ பகுதி A - அமைப்புக்கட்டுரை

❖ வினாக்களுக்குரிய விடைகளை இவ் வினாத்தாளிலேயே எழுதுக.

❖ ஒவ்வொரு வினாவுக்கும் விடப்பட்டுள்ள இடத்தில் உமது விடைகளை எழுதுக.

❖ கொடுக்கப்பட்டுள்ள இடம் உமது விடைகளுக்குப் போதுமானது என்பதையும் விரிவான விடைகள் அவசியமில்லை என்பதையும் கவனிக்க.

❑ பகுதி B - கட்டுரை

❖ இப்பகுதி மூன்று வினாக்களைக் கொண்டுள்ளது. அவற்றில் இரண்டு வினாக்களுக்கு மாத்திரம் விடை எழுதுக. உமக்கு வழங்கப்படும் தாள்களை இதற்கு பயன்படுத்துக.

❖ இவ் வினாத்தாளுக்கென வழங்கப்பட்ட நேர முடிவில் பகுதி A மேலே இருக்கும் படியாக A, B ஆகிய இரண்டு பகுதிகளையும் ஒன்றாகச் சேர்த்துக் கட்டிய பின்னர் பரீட்சை

சுட்டெண் : .....

பரீட்சகரின் உபயோகத்திற்கு மாத்திரம்

20 – தகவல் தொடர்பாடல்தொழினுட்பவியல் II		
பகுதி	**வினா இல.**	**புள்ளிகள்**
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
மொத்தம்		
சதவீதம்		

இறுதிப் புள்ளிகள்

இலக்கத்தில்	
எழுத்தில்	

குறியீட்டெண்கள்

விடைத்தாள் பரீட்சகர் 1	
விடைத்தாள் பரீட்சகர் 2	
புள்ளிகளைப் பரீட்சித்தவர்	
மேற்பார்வை செய்தவர்	

இப்பகுதியில் எதனையும் எழுதுதல் ஆகாது

Part A - Structured Essay

Write the answers to all four questions on **this paper**.

1. (a) Draw the output of the following HTML code

```
<html>
<head>
<style>
        ol{list-style-type:upper-latin}
</style>
</head>
<body>
        Ordered List
        <ol style="list-style-type:lower-roman">
                <li> Book </li>
                <li>Pen </li>
                <li>Pencil</li>
        </ol>
</body>
</html>
```

Note : ✶ Consider the following dash line box as the visual representation of a web browser.

✶ Show the blank line using .....

(b) The registration form for students studying G.C.E. (A/L) and the associated HTML source code are provided in sections 1.1 and 1.2, respectively.

AL Academy

Registration Form

Name: your name

Phone No: 0777123456

Gender: Male ○ Female ○

Stream: Physical Science ○ Bio Science ○ Commerce ○ Arts ○

more info click here

submit clear

உரு 1.1

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```
<html>
<h1 align="center">AL Academy</h1>
<fieldset >
<legend><h2>Registration Form</h2></legend>
<form method="POST" action="../action.php">
   <p>
      < (A)  for="Name">Name:< (A) >
      <input type="text" name="name"    placeholder ="your name"/>
   </p>
   <p>
      <label for="Name">Phone No:<label>
      <input type="tel" name="name"        (B) ="0777123456"/>
   </p>
      <label for="gender">Gender:<label>
      <label for="male">Male<label>
      <input type="radio" name=" (C) " value="male"/>
      <label for="female">Female<label>
      <input type="radio" name="gender" value="female"/>
   <p>
      <label for="stream">Stream:<label>
      <label for="Physical Science">Physical Science<label>
      <input type="radio" name=" (D) " value="Physical Science"/>
      <label for="Bio Science">Bio Science<label>
      <input type="radio" name="Stream" value="Bio Science"/>
      <label for="Commerce">Commerce<label>
      <input type="radio" name="Stream" value="Commerce"/>
      <label for="Arts">Arts<label>
      <input type="radio" name="Stream" value="Arts"/>
   </p>
   <p>
   more info <a href=" (E) ://newacademy.lk">click here</a>
   </p>
   <input type="submit" name="submit" value="submit">
   <input type="reset" name="submit" value="clear">
</form>
</fieldset>
</html>
```

உரு 1.2

இப்பகுதியில் எதனையும் எழுதுதல் ஆகாது

Write the appropriate words for each tag from A to E in the HTML code in Figure 1.2.

A : ..... B : .....

C : ..... D : .....

E : .....

(c) A store wants to collect its customer details. For this, it has developed a website to gather information. The code developed for this purpose is provided below.

```
<form action="">
<p>Customer NIC:<input type="text" name="cusno" required/></p>
<p>Customer Name:<input type="text" name="cusname"/></p>
<input type="submit" name="add" value=" Add Records"/>
</form>

<?php
if(isset($_GET['add']))
{
    $cus_no= (A) ["cus_no"];
    $cus_name= (A) ["cus_name"];
    $con=new mysqli("localhost","root","","cus_db");
    if(!$con)
            {
                    (B) ("Could not connect:".$con->connect_error);
            }
    $sql="insert into customer(cus_no,cus_name) values('".$cus_no."','".$cus_name."')";
    if($con->query($sql))
            {   echo "Record Successfully inserted";
            }
    else    {
                    echo $con->error;
            }
}
?>
```

Write the appropriate words for each tag from A to B in the PHP code

A : ..... B : .....

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2. (a) Provide two measures that can be taken to maintain the confidentiality of data and information in information and communication technology?

.....

.....

(b) (i) Mention four semi-automated and automated methods that can be used for data collection?

.....

.....

.....

(ii) Name two companies that provide cloud computing services for free?

.....

.....

(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box

List: { **1** – Process, **2** – Information broker, **3** – B2C, **4** – B2E, **5** – Online Service Provider, **6** - Pure click, **7** – Brick and Click }

i. A job opening in the Sales Department is posted on the company's intranet by the Human Resources Department. ☐

ii. It provides online services such as news, search engines, banking, healthcare, entertainment, and social networking. ☐

iii. Anitha Kumara purchased an e-book online ☐

iv. Filter the countless available resources available on the internet and provide the user with the information they need. ☐

(d) (i) What are two differences between dynamic random memory and static random memory?

.....

.....

.....

(ii) Give one advantage and one disadvantage of the von Neumann structure?

.....

.....

3. (a) Below is a Python program to count the number of even numbers in the sequence entered by the user.

ப்பகுதியில் எதனையும் எழுதுதல் ஆகாது

```
L=[ (A) for i in input(). (B) ]
count=0
for i in range( (C) ):
   if (D) % 2 ==0:
      count+=1
print(count)
```

Write the appropriate words for each tag from U to N in the Python code?

A : ..... C : .....

B : ..... D : .....

(b) Consider the Python program below

```
L=[5,4,9,8,6]
def find_num(n):
   dif=abs(n[0]-n[len(n)-1])
   for i in n:
      if dif==i:
         return True
         break
   else:
      return False
find_num(L)
```

i) Write the output of the above program?

.....

II) What is the purpose of this program?

.....

.....

(c) The following Python program has converted the binary numbers entered by the user into their equivalent decimal numbers. The program contains both syntax errors and semantic errors. Line numbers are not part of the program. But they are used as references for the lines.

```
1.  def binary2decimal();
2.      L=[int(i) for i in input()]
3.  decimal=0
4.      for i in range(len(L)):
5.          bit=L[i]
6.          place_value=2**(len(L)-1-i)
7.          decimal+=binary_digit*place_value
8.          print(decimal)
```

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i) State the lines with syntactic errors and state the error.

.....

.....

.....

.....

.....

ii) Which lines of the program should be changed and state how they should be changed to obtain the desired results. (You are **not** allowed to add new lines or to delete existing lines)

.....

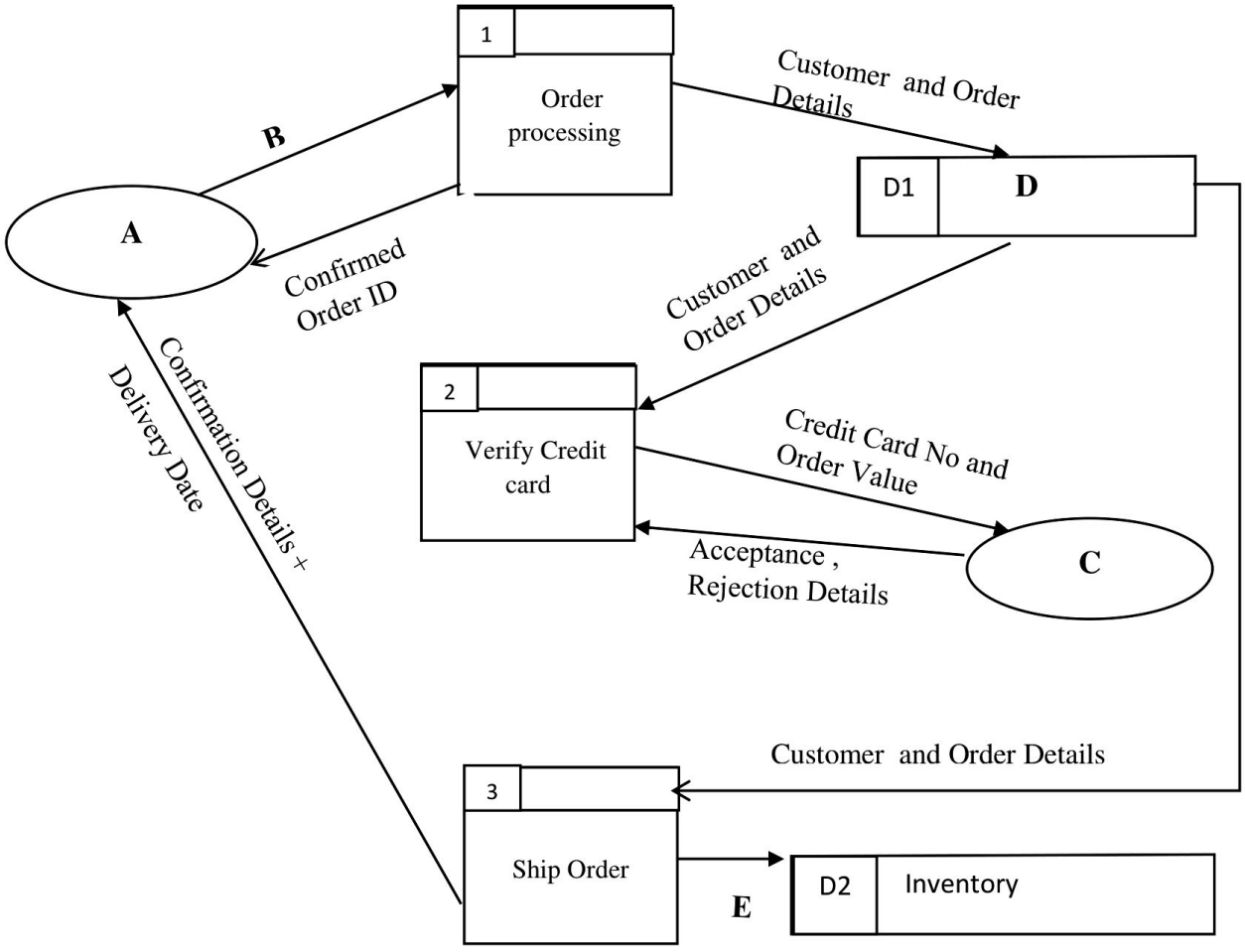
.....

.....

.....

.....

4. (a) A part of the data flow diagram related to the activities that take place on an e-commerce website that allows real-time product purchases is given below.



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From the list given below, identify and write down the appropriate substitutions for 'A' to 'E'

List : Bank , Order , Customer Details , Item Details , Customer

A : - .....

B : - .....

C: - .....

D: - .....

E: - .....

(b) Give 3 main differences between developing a new system like this and purchasing existing software from the market.

.....

.....

.....

.....

(c) Various testing methods are used during system development. Explain black-box testing and white-box testing with examples.

.....

.....

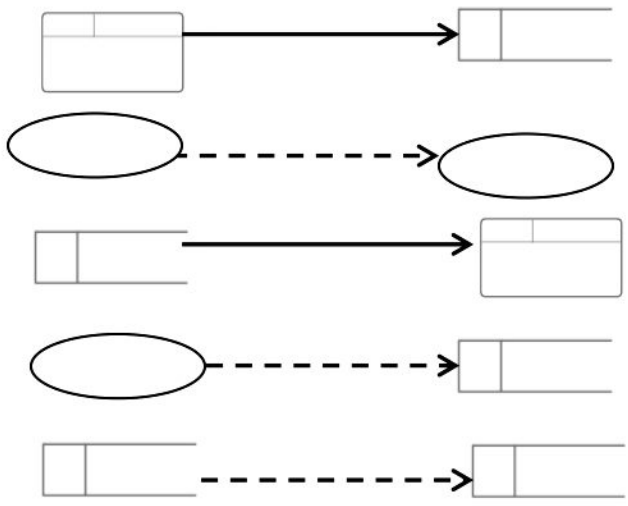
.....

.....

.....

.....

(d) Identify the correct and incorrect data flows from the following and mark them as correct (√) or incorrect (x).



....

....

....

*****

khfhzf; fy;tpj; jpizf;fsk;>tlkhfhzk; Provincial Department of Education. Northern Province

மாகாணக் கல்வித் திணைக்களம், வடக்குமாகாணம்

Provincial Department of Education, Northern Province

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General Certificate of Education (Adv. Level 6th Term) Exam, 2024

தகவல் தொடர்பாடல் தொழினுட்பவியல் I

Information & Communication Technology - II

G 13	20 T	II

Part B

- Write answers for only four questions.

5.

(a) What is the difference between combinational and sequential circuit?

(b) Consider the following logical expression, which A, B and C are the input and F is the output.

$$F = \bar{A}BC + AB\bar{C} + ABC + A\bar{B}C$$

(i) Give the complete truth table for the logical circuit constructed in above

(ii) Using a Karnaugh map derive a simplified SOP expression for the output F.

(iii) Construct a logical circuit for the above logical expression using the least number of NAND gates.

(iv) Using a Karnaugh map derive a simplified POS expression for the output F.

(v) Construct a logical circuit for the above logical expression using the least number of NOR gates.

(c) Following is the conduct of logic circuit of a digital system, where the inputs are X, Y and Z and the output is R. If the value of X is 1 or if the value of Z is 1, the output will be 1.

(i) Draw the truth table for the output R.

(ii) Write the Boolean expression of R in SOP (Sum of Products) form.

(iii) Simplify the Boolean expression derived in (b) using the Boolean rules.(Rules need to be mentioned)

6.

(a) Consider an IP address range of 192.167.16.0/26 that has been allocated to a network administrator. The network administrator needs to assign IP addresses to all nodes in each department. For this purpose, four subnets are to be created. The above-mentioned IP address range should be subnetted to meet the following requirements. Assume that each department is located in different buildings in a region.

Subnet No	**Name of the Department**	**Number of Computers**
SUB001	Information System	20
SUB002	Accounts	13
SUB003	Development	7
SUB004	Administration	5

(i) Write the first and last address of the given IP address set.

(ii) Write the subnet mask of the given address set in the specified decimal notation.

(iii) How many host bits are required to produce the required number of subnets?

(iv) Use the following table to allocate IP addresses after subnetting. (For this purpose, use a method that efficiently utilizes IP addresses without wastage as much as possible.)

Subnet Number	Network Address	Subnet mask	Used First IP Address	Used Last IP Address	Broadcast Address
SUB001					
SUB002					
SUB003					
SUB004					

(b) (i) Write the two main differences between the two methods used for subnetting: Fixed Length Subnet Mask (FLSM) and Variable Length Subnet Mask (VLSM)?

(ii) Write the two main differences between IPv4 and IPv6?

7. (a) An arduino UNO board give you with the following items:

- Piezo Buzzer
- Reed Switch
- 10kΩ Resistor

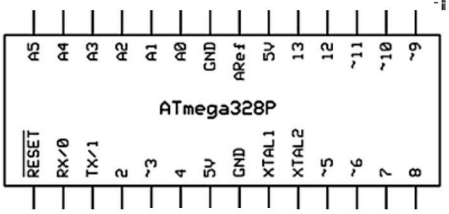


Figure 1.2

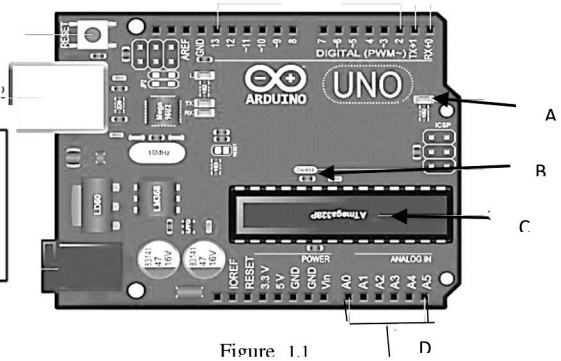


Figure 1.1

(i) Identify the parts marked as A, B, C, and D at Figure 1.1 and briefly explain their function?

(ii) Assume that you need to create an Internet of Things module system that can make a sound by buzzer when the room door opens and does not make a by buzzer sound when the room door is closed. For this scenario draw a schematic diagram showing the proper connection of the above items to the given arduino UNO board. For this purpose use the given in Figure 1.2.

(b) The airline seat booking system is based on a software agent system. A user can enter the route, date, time and seat class of his/her flight through the web portal. While selecting, the details of the companies where seats are automatically available through the multi-agent system will be displayed along with the date, time and fee.

(i) What is Software Agent System?

(ii) Give four characteristics of agent system?

(iii) Name an autonomous agent and a user agent in the above mentioned airline seat reservation system?

(iv) Draw and denote the agent structure of the above airline seat reservation system?

8. Consider an input that has a sequence of integers. The sequence can contain a maximum of 100 numbers. If there are n numbers in the sequence where n < 50, the end of the sequence is denoted by the (n+1) th number being -1. For example, in the following input sequence, there are 5 integers, while the 6th input, which is -1, indicates the end.

23 12 54 76 89 -1

(i) Propose an algorithm in pseudocode to find the largest even number in a sequence of n integers as described above.

(ii) What type of error would it be if there is an error in Question (i)?

(iii) What types of structural constraints are present in Question (i)?

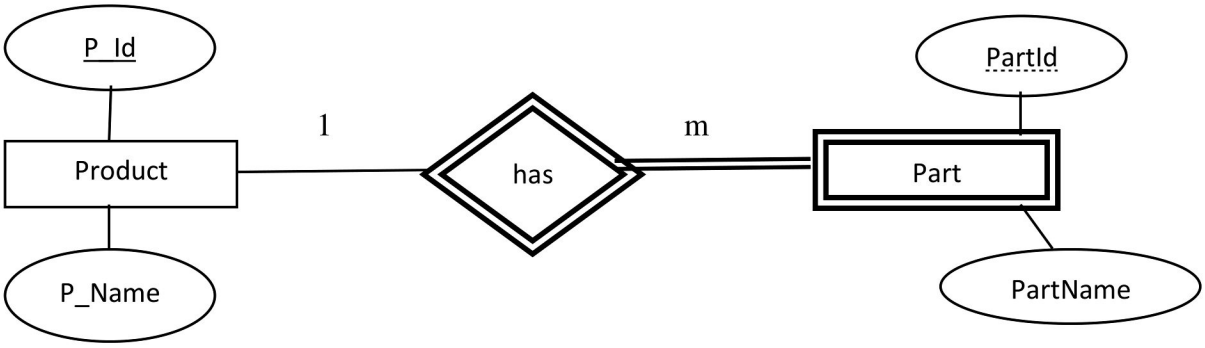
(iv) Write a suitable Python program for Question (i)?

9.

(a) Draw a EER diagram for the following scenario.

The Motor Vehicle Branch administers driving tests and issues driver's licenses. Any person who wants a driver's license must first take a learner's exam at any Motor Vehicle Branch in the province. If he/she fails the exam, he can take the exam again after a week of the failed exam date, at any branch. If he passes the exam, he is issued a license (type = learner's) with a unique license number. A learner's license may contain a single restriction on it. The person may take his driver's exam at any branch before the learner's license expiry date (which is usually set at six months after the license issue date). If he passes the exam, the branch issues him a driver's license. A driver's license must also record if the driver has completed driver's education, for insurance purposes.

(b) Write the relational tables of the following ER Diagram?



(c) Write two advantages of converting a database table into a normal form?

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(d) Consider the following **Interview** table related to Interview details.

ClientNo	InterviewDate	InterviewTime	StaffNo	Room
CR76	13-Apr-24	10.30	SG1	G101
CR56	13-May-24	12.00	SG1	G101
CR74	13-May-24	12.00	SG7	G107
CR56	1-July-24	10.30	SG5	G105

(i) In which normal form does the **Interview** table exist?

(ii) What needs to be done to convert the **Interview** table into its next normal form? Justify your answer?

(iii) Write an SQL statement to display the clientNo who are called in the date of "13-May-24"?

10.

(a)

(i) What is the difference between NTFS and FAT32 file systems?

(ii) Write down two reasons for a process termination

(iii) write down two reason for a running state process is moved to block state?

(b) A user running two python programing on single processer computer. the left side python program (printRandomTotal.py) get three random number from user and print the input numbers total. other python program(printNUMTotal.py) print the first three numbers total

printRandomTotal.py	printNUMTotal.py
x=0 t=0 for i in range(0,3): x=int(input("enter the number")) t=t+x print(t)	te=0 for y in range(1,4): te=te+y print(te)

the figure 10.1 showing printRandomTotal.py program process (PO), printNUMTotal.py Program process (PE) and operating system process (OS) running state

Time	CPU
1s	OS
2s	PO
1s	OS
2s	PE
1s	OS
2s	PO
1s	OS
2s	PE
1s	OS
2s	PO
1s	OS
2s	PE

figure 10.1

(i) give a suitable reason for the process PO (printRandomTotal.py) blocking time to time?

(ii) give a suitable reason for the process OS (Operating system process) running time to time?

(iii) what is the waiting time for the process PE? Note:- " Waiting time (WT) is defined as the total time that is spent by the process while staying in a ready queue before it reaches the CPU."

(c) A computer uses 30-bit virtual addresses. This computer has a 2 GB physical memory and a 4 KB page size. this computer is 4 Byte addressable (word size)

(i) Write down the virtual address space capacity?

(ii) Write down the physical address size?

(iii) Write down the number of frames in physical memory as a power of 2.

(iv) If the virtual address 1713 of a particular process is mapped to Frame 6 of physical memory, write down in decimal form, the physical address corresponding to the virtual address 1713. (Assume that page numbers, frame numbers and addresses begin from 0)

(d) What type of process scheduling selects the processes and loads them into memory and the ready queue for execution?

(e) Mention two purposes of virtual memories?

(f) What do you understand by "Plug and Play"?

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