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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர) முன்னோடிப் பரீட்சை - 2018  
General Certificate of Education (Adv. Level) Pilot Examination - 2018

தகவல், தொடர்பாடல் தொழினுட்பவியல் I  
Information & Communication Technology I

20 T I

இரண்டு மணித்தியாலயம்  
Two hours

### Instructions:

- \* Answer all the questions.
- \* This paper contains 50 MCQs in 8 pages.
- \* Write your index number in the space provided in the answer sheet.
- \* In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is correct or most appropriate and mark your response on the answer sheet with a cross (X) in accordance with the instructions given on the back of the answer sheet.

**Answer all questions**

- The decimal equivalent to  $101.1101_2$   
(1)  $5.5_{10}$  (2)  $5.25_{10}$  (3)  $5.125_{10}$  (4)  $5.15_{10}$  (5)  $5.225_{10}$
- The simplified form of the boolean function  $f(x, y) = \bar{x}y + xy\bar{z} + xyz$   
(1)  $x$  (2)  $y$  (3)  $1$  (4)  $\bar{x}$  (5)  $\bar{y}$
- The person who designed the first integrated circuit(IC) is  
(1) John Bardeen (2) John Ambrose Fleming (3) Federico Faggin  
(4) Ted Hoff (5) Jack Kilby
- Which of the following generates beep code in a personal computer?  
(1) CMOS (2) POST (3) ROM (4) operating system (5) IRQ
- The correct boot sequence of a personal computer from left to right is  
(1) POST, CPU, boot loader, operating system  
(2) CPU, POST, boot loader, operating system  
(3) Boot loader, operating system, CPU, RAM  
(4) CPU, RAM, boot loader, operating system  
(5) operating system, CPU, RAM, Boot loader
- Which of the following is a valid process transition with the conditions, in Operating System?  
(1) Event wait : ready state  $\rightarrow$  running  
(2) I/O wait : ready state  $\rightarrow$  running  
(3) Dispatch : ready state  $\rightarrow$  running  
(4) Timeout : ready state  $\rightarrow$  running  
(5) Release : ready state  $\rightarrow$  running

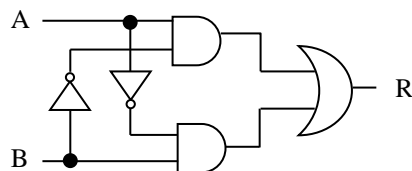
7. Which of the following is true when a data table contains two candidate keys

- (1) One of them should be removed from the Database
- (2) Both of them are primary keys
- (3) Both of them should be removed from the database
- (4) One of them can be chosen as primary key
- (5) One of them can be chosen as primary key and the other as foreign key

8. The 2's complement form of  $13_{10}$  in 8 bits

- (1) 01100111
- (2) 10111011
- (3) 10001101
- (4) 10110100
- (5) 00001101

9. The equivalent logic gate for resultant R of the following logic circuit is



- (1) NOT
- (2) AND
- (3) OR
- (4) XOR
- (5) NAND

10. The..... layer of the OSI model consists of MAC and LLC subnets. Which of the following is suitable for the space provided

- (1) physical
- (2) transport
- (3) network
- (4) datalink
- (5) application

11. It is required to create six subnets of class B address space within a building. At the same time future extension is needed. Which of the following subnet mask is required?

- (1) 255.255.0.0
- (2) 255.255.248.0
- (3) 255.255.224.0
- (4) 255.255.240.0
- (5) 255.255.255.224

12. The html code to produce the last row of following table is?


- (1) `<tr><td></td><td rowspan="2"></td></tr>`
- (2) `<tr><td colspan="2"></td><td rowspan="2"></td></tr>`
- (3) `<tr><td rowspan="2"></td></tr>`
- (4) `<tr><td colspan="2"></td></tr>`
- (5) `<td><td colspan="2"></td></td>`

13. Which is not a common function of the system development process?

- (1) specification
- (2) development
- (3) validation
- (4) user training
- (5) evolution

14. The correct syntax used to define a border in CSS is

- (1) `p {border: 5px solid red; }`
- (2) `p {borderstyle: 5px solid red; }`
- (3) `p {bordertype: 5px solid red; }`
- (4) `p {border-type: 5px solid red; }`
- (5) `p {border-family: 5px solid red; }`

15. Which of the following schedulers control the degree of multi-programming in an operating system?

- (1) long term scheduler
- (2) mid-term scheduler
- (3) short term scheduler
- (4) very long term scheduler
- (5) very short term scheduler

16. “..... is a data structure which maintains operation for each process

The suitable phrase to fill the blank is?

- (1) context switch method
- (2) Process control block (PCB)
- (3) scheduler
- (4) swapping
- (5) paging

17. Consider the following statements regarding **World Wide Web**.

A - It was invented by Tim Berners Lee.

B - It is the another name of internet

C - It is the collection of a system of hypertext documents which are connected to each other that can be accessed through internet

D - W3C is the institute responsible for its maintenance

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

18. Which of the following is considered as Metadata

- (1) ER Diagram                      (2) Table                      (3) data dictionary
- (4) relationship                      (5) field

19. Which of the following statement regarding the query **update student set student\_id='104' where student\_id='101'** is true?

- (1) It changes only **student\_id** of student table from 101 to 104.
- (2) It changes **student\_id** as 104 in all the records of student table.
- (3) It changes only **student\_id** of student table from 104 to 101.
- (4) It changes **student\_id** as 101 in all the records of student table.
- (5) It deletes student table.

20. Which of the following is a valid MAC address?

- (1) 199.165.217.45                      (2) 00076A: 01A5BBA7FF60                      (3) 255.255.255.0
- (4) 0.0.255.192                      (5) 01:A5:BB:A7:FF:60

21. A command **ping -n 10 facebook.com** is given from computer A to computer B. Which of the following statement regarding the command is true?

- (1) Command is incorrect
- (2) Executes ping for n times
- (3) Executes ping for 10 times
- (4) Executes ping continuously
- (5) Executes ping for 4 times

22. Which of the following statement/s is/are correct?

A - **SWITCHES** transfer the frames based on the MAC address.

B - MAC address is un-necessary while accessing internet using IP address

C - MAC addresses are of 48 bits size.

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

23. Consider that you need to upgrade the memory of your personal computer. Which of the following Memory can be upgraded by the user?

(1) BIOS            (2) DRAM            (3) SRAM            (4) ROM            (5) Register

24. Which of the following is a function of **SMTP (Simple Mail Transfer Protocol)**?

- (1) Monitoring the network devices in internet
- (2) Help the users to receive email from postal service provider
- (3) Sending emails to postal service provider
- (4) File transferring from one computer to another computer
- (5) Routing the data packets on the internet

25. Which of the below can be an application of Expert system?

- A. Playing chess against computer as opponent
- B. Identifying problems in motor vehicles
- C. Giving financial suggestions to companies
- D. Locating places for underground water wells

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

26. Consider the following statements

- A. Observation of patients from remote places
- B. Control lighting systems in houses
- C. Giving location based services for e-commerce customers
- D. Supervising and controlling machines in factories

Which can be considered as applications of **ubiquitous computing** ,in above statements

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

27. Which of the following can be considered as the properties of UDP (User Datagram Protocol) when comparing with TCP (Transission Control Protocol)

- A. Connection oriented
- B. Low overhead
- C. Ordered sequence of packets
- D. Unreliable

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

28. Which of the following is a correct method to insert Meta tag in html?

- (1) <meta name="keywords" content="java,php,www,ict">
- (2) <meta name="keywords" values =" java,php,www,ict " />
- (3) <meta> name="keywords" content=" java,php,www,ict "</meta>
- (4) <meta> name="keywords" values =" java,php,www,ict "</meta>
- (5) <meta name="keywords" content =" java,php,www,ict "/meta>

29. Which of the following is/are the common function of a shopping cart in e commerce?

- A - Allow the customers to synchronize all the goods to be bought
- B - Calculate the total amount for the ordered goods
- C - Transaction services between customers and the sellers

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

30. Consider the following Python statement

```
print (4*2+8/2-1+3**2)
```

Which of the following is the correct precedence order of operators in evaluation process (from left to right)?

(1)	*	/	**	+	-	+
(2)	**	/	*	+	+	-
(3)	**	*	/	+	-	+
(4)	+	-	+	/	*	**
(5)	-	+	+	*	**	/

31. Which one of the following python statements is syntactically correct?

- |  |  |  |
|--|--|--|
| <p>(1)</p> <pre>for i in [1,2,3,4]:     print(i):</pre>      | <p>(2)</p> <pre>for i in [1,2,3,4]     print(i)</pre>  | <p>(3)</p> <pre>for i in [1,2,3,4]:     print(i)</pre> |
| <p>(4)</p> <pre>for i in range [1,2,3,4]     print(i):</pre> | <p>(5)</p> <pre>for i in [1,2,3,4]:     print(i)</pre> |  |

32. What is the output of the python program?

```
num1 = 5
i = 0
num2 = [8,7,6,5,4,3,2,1]
while(num1>0):
    num2[i] = num1%2
    num1 = num1//2
    i=i+1
for k in range(0,3):
    print(num2[k],end = '  ')
```

(1) 1 0 1                      (2) 1 2 3                      (3) 8 7 6                      (4) 4 5 6                      (5) 5 4 2

33. What is the correct SQL statement for obtaining all the records having 'Biology' value in 'Course' field of 'Student' table?

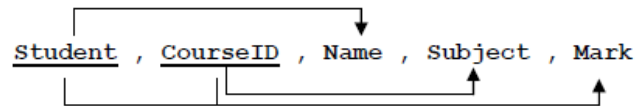
- (1) select each from Student where Course ='Biology'
- (2) select \* from Student where Course ='Biology'
- (3) get all from Student where field = Course
- (4) import \* from Student where Course ='Biology'
- (5) select all from Student where Course = 'Biology'

34. In the following integrity constraints, which one assures the purpose of a foreign key in a table?

- A - Domain integrity
- B - Entity integrity
- C - Referential integrity

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

Consider the following logical scheme to answer question number 35 and 36.



35. If the above data forms a table, which of the following statements are correct regarding the **Normal Form** of table formed

- (1) It is in 0 normal form
- (2) It is in 1st normal form
- (3) It is in 2nd normal form
- (4) It is in 3rd normal form
- (5) Its normal form cannot be decided

36. Which of the following are the suitable tables, when all the functional dependencies are removed?

- A - Student (Student, Name)
- B - Marks (Student, CourseID, Mark)
- C - Student (Student, Course)
- D - Subject (CourseID, Subject)
- E - Marks (Student, Mark)

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

37. Which of the following statement/s is/are correct, regarding Data Flow Diagram (DFD) of Structured Systems Analysis And Design Method (SSADM)?

- A - A Database can be directly connected to another Database
- B - A Database can be directly connected to external entity
- C - A Database can be directly connected to process

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

38. Which one is correct regarding the errors in computer programs?

- (1) Syntax error is also called run time error
- (2) Syntax error is also called semantic error
- (3) A program with semantic error will not give the expected output
- (4) Semantic error is also called run time error
- (5) A program with run time error will have syntax error

39. A workstation has to transfer HTTP data packets with a web server.

- (1) UDP connection has to be created between workstation and default gateway
- (2) UDP connection has to be created between workstation and web server
- (3) TCP connection has to be created between workstation and default gateway
- (4) TCP connection has to be created between workstation and web server
- (5) ICMP connection has to be created between workstation and default gateway

40. Which one of the following is incorrect?

- (1) Python is an open source programming language
- (2) Python is a high level programming language
- (3) Assembly is a low level programming language
- (4) Translator is not essential for CPU to understand programs written in high level languages
- (5) Translator is not essential for CPU to understand programs written in low level languages

41. Which type of software present in the microchip included in modern washing machines?

- (1) Web based software
- (2) System software
- (3) Embedded software
- (4) Artificial intelligence software
- (5) Application software

42. Which is not a functional requirement of an Online banking system?

- (1) Users are able to login to the system
- (2) Users are able to understand the interface with less efforts
- (3) Users are able to transfer money between one bank account to another
- (4) Users are able check their transaction details
- (5) Users are able to check their account balance

43. In the below table, X - software process models, Y - the statements about the software process models

	Coloumn X		Coloumn Y
1	Rapid Application Development model (RAD)	A	Sri Lankan Railway tickets system
2	Prototyping model	B	Library system needed to be developed in three months
3	Waterfall model	C	An online purchase system needed to be developed step by step with its initial features
4	Incremental development model	D	Sri Lankan pilot training simulator system

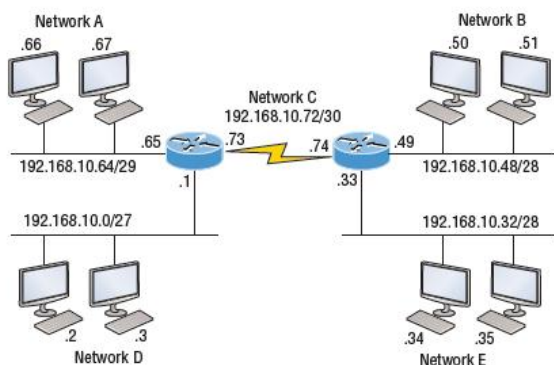
Which one of the following is a correct combination?

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

44. Which of the following is correct regarding digital signature?

- (1) Message sender will encrypt using public key, receiver will decrypt using his/her public key
- (2) Message sender will encrypt using his/her private key, receiver will decrypt using his/her private key
- (3) Message sender will encrypt using public key, receiver will decrypt using his/her private key
- (4) Message sender will encrypt using his /her private key, receiver will decrypt using his/her public key
- (5) Identification of message exchangers in internet, cannot be confirmed using that

45. What is the number of hosts which can be allocated to the subnet B shown in the following network diagram?



- (1) 6
- (2) 12
- (3) 14
- (4) 28
- (5) 30

46. Output of the python programme given in the right side is?

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

```
n1 = 1234
n2 = 0
while (n1>0):
    n2 = n1%10
    n1 = n1//10
    print (n2, end = ' ')
```

47. The correct python statement/s of following is/are ?

- A - a, b = 2, 3, 5      B - a, b = [1,2]      C - a, b, c = True, false, 'string'      D - a, b = (1,2), {1:'A',2:'B'}
- (1) A only      (2) B only      (3) B,C only      (4) B,C,D only      (5) A,B,D only

48. which of the following is an invalid HTML code

- (1) <a href="web2.html" target="\_blank"> Click </a>
- (2) <a href="web2.html" target="\_open"> Click </a>
- (3) <a href="web2.html" target="\_parent"> Click </a>
- (4) <a href="web2.html" target="\_self"> Click </a>
- (5) <a href="web2.html" target="\_top"> Click </a>

49. Consider the following statements

- A - Enable multiple computers to share one common IP address  
 B - Using IPV4 address efficiently  
 C - Providing higher security for the computers presents in intra-computer network  
 Which of the following is/are the benefits of using private IP addresss

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

50. consider the following 3 methods in CSS (Cascading Style Sheet) ?

<p>❶</p> <pre>p {     text-align: center;     color: red; }</pre>	<p>❷</p> <pre>#para1 {     text-align: center;     color: red; }</pre>	<p>❸</p> <pre>.center {     text-align: center;     color: red; }</pre>
---	--	---

which of the following are the **selectors** used in the CSS methods above

- (1) id, element and class      (2) element, id and class      (3) class, id and element
- (4) id, class and element      (5) element, class and id

\*\*\*\*



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Information & Communication Technology II

20 E II

மூன்று மணித்தியாலயம்  
*Three hours*

Index Number : .....

- \* This question paper consists of 10 pages.
- \* This paper comprises of two parts **A and B**. The time allotted for the **two parts** is **three hours only**.
- \* Use of calculators is not allowed.

- \* Answer all the questions on the question paper itself.
- \* Write your answers in the space provided for each question.
- \* Please note that the space provided is sufficient for the answer and that extensive answers are not expected.

- \* This part consists of **six** questions. Answer **four** questions only. Use the papers supplied for this purpose.
- \* At the end of the time allotted for this paper, tie the two papers together so that Part **A** is on top and hand them over to the Supervisor.
- \* You are permitted to remove only Part **B** of the question paper from the Examination Hall.

## 01- ICT-II

Part	Question No.	Marks
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total		
Percentage		

In Numbers	
In Letters	

Marking Examiner 1	
Marking Examiner 2	
Checked by	
Supervised by	

**Part II – Structured Questions****Answer all Questions****1.**

(a) Write the HTML coding for the given output displayed in a website ?

- Piano
- Guitar
  - Acoustic guitar
  - Electric guitar
- Banjo

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(b) Write the external styles required to apply the document exfile.css into web.html document. ( consider that both the documents are stored in same folder)

.....

.....

(c) Consider the following statement about schedulers in Operating Systems.

"Long term scheduler is used to make frequent scheduling decisions than short term and mid term schedulers "

Do you agree with the statement ? justify your answer.

.....

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2.(a) Write a difference between expert system and software agent except comparing their software abilities. Write a difference for each of them.

.....

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.....

(b) Consider the following Python coding.

```
a      =      2
b      =      0
while (b<10):
    b = b+1
    if (b%a == 0):
        continue
    elif (b == 8):
        break
    else:
        print (b, end = '  ')
```

(i) What is the output of this program when it is executed?

.....

.....

.....

(ii) How will you change the coding to get the output 2    4    6. ( you **can't** add extra lines)

.....

.....

.....

(c) Calculate the value of  $17_{10} - 12_{10}$  using 8 bits two's complement method?

.....

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- 3.(a) 32 byte addressable memory is not enough to access 16GB main memory. It requires 64 byte addressable memory. Do you agree with this statement? Show your computations clearly.

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- (b) A web user complains to the network administrator that he finds difficulty in sharing files remotely. So, the administrator checks and finds out that connection can be made using IP address and URL as well. What can be the possible issue here?

.....

.....

.....

.....

- (c) Write two functions of mobile software agent?

.....

.....

.....

.....

4. Consider the following table of a relational database.

BranchNumber	BranchAddress	TelephoneNumber
B001	Jaffna	021 222 2221, 021 222 2222, 021 222 2223
B002	Chankanai	021 222 2254, 021 222 2276
B003	Chavakacheri	021 222 2200
B004	Chunnakam	021 222 2201, 021 222 2209

(a). Explain that this table is not in first normal form (1NF)?

.....

.....

.....

.....

(b) Convert this table into third normal form (3NF)?

.....

.....

.....

.....

(c) Write the primary key and foreign key with their table names respectively after converting the given table into 3 NF.

.....

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(d) After converting the given table into 3 NF, Write the SQL command to obtain the BranchAddress and TelephoneNumber of BranchNumber B001.

.....

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\*\*\*\*

**No questions in this page**

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Information & Communication Technology II

20 E II

## Part II - B Essay Questions

Answer only four Questions

**1.**

**(a)** Simplify the following Boolean algebra using De Morgan's law. Show your computations clearly.

$$F(A, B, C) = (\bar{A} + \bar{B} + \bar{C}) + (\overline{ABC})$$

**(b)** An alarm is designed by the electronic system to protect the museum. Museum has three rooms. Three rooms have three motion sensors  $m_1$ ,  $m_2$ ,  $m_3$  respectively. When it senses a motion, it gives 1 as output. In night time, only one watchman is at duty who looks into each rooms by walking into them. If at least two rooms sense motion in the electronic system, it will ring the alarm. (The output for this is 1)

- (i) Write the truth table for the given scenario.
- (ii) Derive Boolean statement from the truth table.
- (iii) Simplify the Boolean statement you got in (2) using Karnaugh map only.
- (iv) Draw the logic gate for the simplified statement you got in (3) using NAND and OR only.

**2. Consider the following scenario**

A private company wants to create an educational website to fulfill the needs of students from age 6 to 19. Students can register into this system by paying annual fee. Students can login from their smart phones as they do in computers. They can access to all the study notes they registered using the website. Teachers in the company can login, upload study notes, edit and can grade the exams papers online. Company should create user friendly interface. And they also need a system to handle the ignorant mistakes of users.

- (a) Write two functional requirements of this system.
- (b) Write two non-functional requirements of this system.
- (c) Show the main components of this system using a diagram.
- (d) The administration thinks using an agent in the system will enhance efficient usage of both the students and teachers. Write three reasons as evidence to this statement.

3.

- (a) ) Write a device that works in all the layers of OSI model?
- (b) Mention which protocol is appropriate **TCP** or **UDP** for the following instances with reasons.
- (i) A mobile conversation. (Voice over protocol VoIP)
  - (ii) File transfer
- (c) Class C network 200.138.10.0 is divided into subnets using subnet mask 255.255.255.240.
- (i) What is the maximum number of subnets?
  - (ii) What is maximum number of hosts in each subnets?
  - (iii) Write the usable range of limits of first three subnets?
  - (iv) Write the broadcast addresses of first three subnets?

4.

- (a) Write the types of errors in computer programming and write the differences among them.
- (b) Consider the following scenario.

A program is needed to monitor the temperature in a swimming pool. Reading of the temperature of water is measured every hour in 12 hours' time. Every time the output is displayed. A warning message should be displayed when temperature is too high or too low.

Program consists of the following.

- Input the current water temperature
- Output the current water temperature
- Output a warning if the water temperature is below 26 degree Celsius.
- Output a warning if the water temperature is above 29 degree Celsius.

A portion of the input and output are given below.

```
Enter the current temperature of water in Celsius: 27
Current temperature of water in Celsius: 27

Current temperature of water in Celsius: 25
Current temperature of water: 25
Warning Temperature of water is too low
.....
```

- (i) Write down the pseudo code for the described scenario.
- (ii) Write the python program for the given pseudo code in (1) . The output should be stored in the FinalTemp.txt file.



**5. Consider the following scenario.**

A private vocational college has to create an information system for admission of students. You are asked to develop a database for this. Requirements below are expected on the computerized system.

A student will apply for a course when entering a college. Departments provide courses. Courses have course id and course name. Each student is attached to a department. All the students are provided with the hostel facility and made to stay there. One student can stay only in one hostel. Departments have instructors, and they lecture the students. Instructors are attached to more than one department, and one department has instructors more than one.

The details below are required to be taken

- Details of each student (Student admission number, student name, address)
- Details of students staying in any of the hostel ( Hostel name, hostel address, number of beds)

Draw the ER diagram for the above condition; identify each entity, relationship, attributes and primary key. State any of the assumptions you take.

**6. Consider the following scenario.**

A young inventors club has decided to implement a website to motivate its members. It does many activities to fulfil the dreams of its users. Website has the following data. People having essential qualifications, are requested to fill the application forms and hand over. Member details are stored in member file. Accounts department gets the details from member file and decides the membership fees. And it sends the receipt to the member. Membership payments are registered in payment file. Director can table the activities of the members but paid members can participate in the activities. Table file maintains all the table details. System maintains all the outputs in output file. Members can view the outputs.

- (a) Draw the context diagram for the above website system
- (b) Draw the level one Data Flow Diagram (level 1 DFD) for the above system.

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**No questions in this page**