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 General Certificate of Education (Adv. Level) Examination 2022- Model Paper 01

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 Information & Communication Studies - II

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II

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 Three Hours

## Part A - Structured Essay

Answer all four questions on this paper itself

- (1) (a) Observe the output of the code below and write down the matching terms in the 3 spaces given.

HTML Code	Output
<pre>&lt;html&gt; &lt;body&gt; &lt;ul .....&gt; &lt;li&gt;Sri Lanka   &lt;ol&gt;&lt;li&gt; Colombo &lt;/li&gt;     &lt;li&gt; Gampaha&lt;/li&gt;   &lt;/ol&gt; &lt;/li&gt; &lt;li&gt; India   &lt;ol&gt;&lt;li&gt; Mumbai &lt;/li&gt;     &lt;li&gt; Kolkata &lt;/li&gt;   &lt;/ol&gt;&lt;/li&gt;&lt;/ul&gt; ..... list ends here ..... &lt;/body&gt;&lt;/html&gt;</pre>	<pre> ○ Sri Lanka   1. Colombo   2. Gampaha ○ India   1. Mumbai   2. Kolkata</pre>

(Marks 02)

- (b) When you click on Sri Lanka in the above diagram, you need to access the website <https://www.gov.lk>. write only the relevant code section to do the above requirement.

(Marks 01)

(c)	(1)	Sri Lanka	h1, font color – blue, font type - Arial
	(2)	Pearl of the Indian Ocean	p, font color – green, font type – Times new roman

Write inline style sheet (CSS) code that meets the above requirements.

(Marks 02)

- (1) .....  
 (2) .....

(Note: - The default value is used for font size)

Part of the code written for this has been deleted by mistake. Complete that section with your knowledge. (Marks 03)

```
<form action="welcome.php" method="POST">
```

2

(e) Below is a code section of the welcome.php page created to take data from the above form. Write the appropriate terms in (1) and (2) that are used in the blanks.

(Marks 02)

Name: <?php echo \$\_....(1).... ["name"]; ?> <br>

Telephone number : <?php echo \$.....(1)....["....(2)...."]; ?>

(1) - ..... (2) - .....

(2) (a) Indicate the business model for the event shown on the left in the blank column in the right.

(Marks 05)

(i)	Obtaining vehicle revenue license online	G2C
(ii)	Selling some the used books to another through a website	
(iii)	Get details of government job vacancies through government gazette published online.	
(iv)	A bookstore outsources the distribution of its business to an outsourcing distribution company through a contract.	
(v)	Investment by a foreign government in an energy project in another country	
(vi)	A business company allows its employees to apply for their salary increment online.	

(b) Local food restaurant chain “Dharani” intends to go online to increase its sales. In its first phase, they create a website and give customers the opportunity to order food through it. Apart from this, they also intend to attract more consumers by promoting valuable content on local food and nutrition in written and video form through their website. Mention 2 business revenue models that “Dharani” company can use through this process.

(Marks 02)

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.....

(c) Answer the questions based on the Python code given below.

```
x = [35, 24, 27, 24, 25, 20, 35, 25, 25]
num=int(input("Enter a number :"))
count=0
for i in x:
    if i == num:
        count=count+1
print(count)
```

(i) When the program is executed, what will be the output if the value 25 is given as the input.

(Mark 01)

.....

(ii) What is the purpose of the above program

(Mark 02)

(3) (a) There are 2 files named exam.py and school.py in a computer and their capacities are 8KB and 16KB respectively. The relevant part of the FAT of the disk where those files are stored is given below and the size of one Block is 4KB. It says -1 is the last block of the file.

The Directory entry in FAT for the first block of the file exam.py is 304.in school.py that value is 303.

(i) Complete the table given below by filling in the blanks with suitable values. (Marks 03)

300	
301	-1
302	-1
303	
304	302
305	

(ii) Write the security mechanism used in FAT to protect the data in files. (Marks 01)

(b) (i) while an accounting clerk opening a spreadsheet file on a single-processor computer and processing its accounts he opens a word processing file to obtain some relevant information. Consider the following statement for this scenario.

In this case the spreadsheet process comes from .....(X)..... to .....(Y).....

Choose and write the two words that match X and Y from the brackets below. (Marks 02)

(blocked/ suspend/ terminate/ running)

X - ..... Y - .....

(ii) After opening the above word processing file, the account clerk has to open a number of word processing files to confirm the information in it and in that situation, the main memory space has become insufficient. What happens to the spreadsheet process which is at the position Y at this moment? (Marks 01)

(iii) Briefly explain what would happen to answer Y if, in (b) (i) above, instead of opening the word processing file, the accounting clerk saved the spreadsheet operation to the hard disk. (Marks 01)

(c) Show that the maximum capacity of main memory that can be used in a byte addressable computer with a 32-bit address bus is 4GB.

(Marks 02)

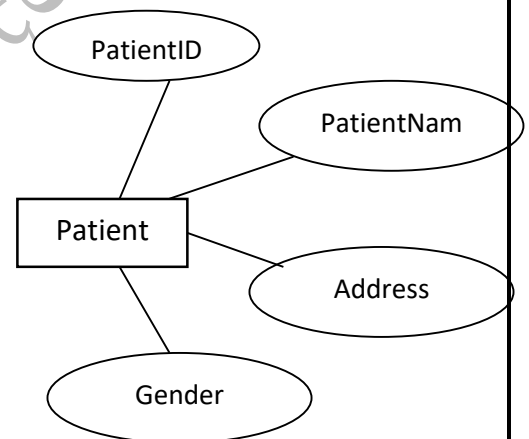
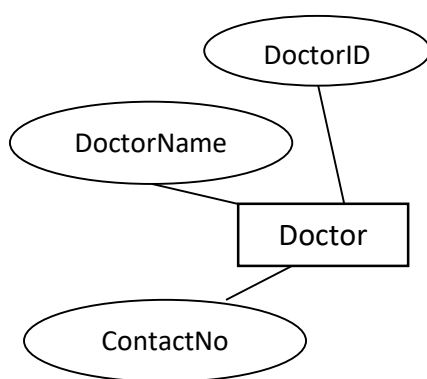
(4) (a) The ER diagram of a system which contains the facts about doctors and patients of a medical institution is given below.

Doctor (DoctorID, DoctorName, ContactNo)

Patient (PatientID, PatientName, Address, Gender)

Appointment (AppointmentDate, AppointmentTime, DoctorID, PatientID)

(i) Complete the ER diagram given below according to the relationship given. (The cardinality should be shown on the diagram.) (Marks 04)



(ii) Regarding the above appointment table, a student mentions that it is in the 3<sup>rd</sup> Normal form. Do you agree with it? Justify your answer.

(Marks 02)

(iii) Note that these relationships have been converted into tables and the relevant database has been built and data entered into it. In that case, what happens when the SQL code "delete from patient" is given to the relevant database? (Marks 01)

(b) Errors in dealing with data in a table that is not properly normalized are called data anomalies. Write down 3 such errors.

(Marks **03**)

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## Part B – Essay

This section consists of six (06) questions. Answer only **four (04)** questions.

- (1) A machine which is used in a target shooting game has three targets X,Y,Z. There are separate points for these goals and a gift for the player is output from this machine if the total score is 40 or more. The points for the goals are as follows.

TARGET	MARKS
X	10
Y	20
Z	30

A logical value of 1 represents the event that a shot hits the target and a gift is output.

- a) Construct the truth table showing the operation for the gift output of the above circuit  
b) Based on the truth table in part (a) above, derive an SOP expression  
c) Simplify the expression derived in part (b) above using Boolean rules.  
d) Construct a logic circuit for the simplified expression in part (c) above using only NAND gates.
- (2) (a) The company called EngineeringPRO has obtained an IP address block of 200.120.110.0/24 and has shared the three departments of its company namely Development, Institutions and Accounts for data exchange. The development department consists of two sections namely Construction and Research and there are 10 and 25 computers in those sections respectively. Institutions and Accounts departments have 45 and 55 computers respectively. Accordingly, the IP address ranges related to each department are shown in the table below. Copy it in your answer sheet and fill in the blanks.

section/ Department	Network IP	Broadcast IP	Nodes	Subnet mask	Usable IP range
construction	200.120.110.0		16		
Research		200.120.110.63	32		
Institutions		200.120.110.191	64		
Accounts	200.120.110.192		64		

- (b) In addition to the two divisions of Construction and Research, the Development Department is hoping to establish a new division called Planning by purchasing 50 new computers and creating a new subnet called Planning. In this subnet find the following.
- (i) Network IP  
(ii) Broadcast IP  
(iii) Subnet mask  
(iv) Usable IP range which can be used for computers

- (c) Ranidu, who runs a playstation, hopes to network his 15 computers to share information with each other in order to provide a very good service to the clients of his company. Also the internet connection is expected to be obtained and provided at optimum level. For this he bought a server computer and a central wire as the main equipment and is looking to buy the internet connection from an internet service provider. මධ්‍ය වයරයක්. Create a suitable network diagram for the above network. State your assumptions if any.
- (3) A waste management company in Colombo introduced an online system to manage polythene related waste in the Colombo city area. The system uses a sensor-based network to detect overflowing bins at polythene waste collection points and notify the nearest worker that it has reached the point of disposal. Biometric features are used to track the attendance of employees. The system will also be used to automatically forward the information on polluted areas to the Ministry of Environment, online through their surveys identified by the Colombo Metropolitan Waste Management Company.
- What type of e-business model can be established in the above situation?
  - What is the e-commerce transaction type used in the public feedback process? Justify your answer.
  - Write three special features of an e-commerce system.
  - This system shows the characteristics of an agent system. Do you agree with this idea? Justify your answer.
  - Draw and explain a diagram of a multi-agent system showing how the proposed e-business web portal can be enhanced using intelligent agent technology.

The interface of the system connects the public, employees, the company and the Ministry of Environment. The presence of workers and the location of full bins are automatically updated to the company through sensor devices. Locations of employees and garbage bins are located by search agents through sub-agents.

- Mention two limitations that may arise in the implementation of such a system in Sri Lanka.
- (4) (a) Identify the errors in the following Python program by the relevant line number and indicate what the error is with the line number. (Note: The numbers shown along with the code are not relevant to the python code.)

```

1. Def all(X,Y):
2.     return X+Y,X-Y,X*Y,X/Y
3.     a,b,c,d=All(4,2)
4.     print(a,b,c,d)

```

- Correct the errors in the program and rewrite it.
- show the output of the program.



- (b). (i). Draw a flowchart to calculate the bill payable based on item numbers, item prices and quantities purchased based on input from the keyboard and insert it at the end of an existing file named bill.txt.
- (ii) Convert a flowchart into a Python program.

- (5) (a) It has been decided to create a database for Niroga Hospital, a newly established private hospital and the information obtained for the same is as follows.

The hospital has a ward number and name for all the available wards. Each specialist doctor within the hospital has an ID number, name and address. Their names consist of their first name and last name. One specialist will serve only one ward and one ward will be served by one specialist.

One specialist doctor treats many patients and one patient can receive treatment from several specialists. A patient has a unique code (PID), name and phone number. When a patient receives treatment from a specialist, the date and time reserved should be stored.

A patient may have one or more medical records. Each medical record has a unique record number, disease description, date and one medical record belongs to only one patient..

- (i) Draw the Data Flow Diagram (DFD) for the above description. (Marks 09)

- (ii) A ward has a number of beds and one bed belongs to only one ward. Each bed has a bed number (BHNO) and a type (Type). Add this description to the ER diagram drawn in (1).

(Marks 02)

- (b) Consider the insurance table given below about the life insurance policies provided by the National Insurance Trust Fund.

PersonID	InsuranceID	InsuranceType	Value
P001	Li001	AgraharaGold	1000000
P002	Li003	AgraharaBronze	250000
P003	Li001	AgraharaGold	1000000
P002	Li002	AgraharaSilver	750000
P001	Li002	AgraharaSilver	750000

- (i) Write the SQL statement to change the insurance type of the person whose PersonID is P003 in the Insurance table to AgraharaSilver. (Marks 01)

- (ii) In which of the normal form the above insurance table belong to (Mark 01)

- (iii) Turn the Insurance table to the next normal form. (It is not necessary to write the data in the derived tables in the next normalization. (Marks 02)

(6)

- (A) Petroleum Corporation has decided to present a software solution to reduce the congestion in the fuel stations and to reduce the irregularities caused due to the fuel crisis.

- (i) Write down the steps to be followed by the ICTA organization in building this solution according to the SSADM methodology.

- (ii) It has been revealed in the feasibility study that user resistance may be raised due to lack of technical knowledge, lack of tools, reluctance to change in the use of this system. What feasibility can this be called?
- (iii) Fuel Corporation has informed ICTA that this software solution is needed in a very short time due to the crisis. What system development model can be used to create these software solutions?

Explain how to create this solution in a very short time using that model.

- (iv) To get this right in a short period of time a hyperlink was directed to the users to troubleshoot the usage after completing the unit test. What type of test is this?
  - (v) Mention two functional requirements and two non-functional requirements that can be identified in this system.
- (B) It has been decided to use a learning management system to maintain the teaching and learning process of a school.
- (i) For this, instead of a standard business application, a commercial off-the-shelf (COTS) package has been advised by the school's IT teacher. Mention two advantages of using a , a commercial off-the-shelf (COTS) package for this purpose.
  - (ii) Even if a ready made package is used for this, it is better to perform a requirements analysis for this as well. Do you agree with this statement? Confirm your answer.
  - (iii) In the implementation of this system, it was first implemented in the junior section and after it was successful, it was decided to gradually use it in other sections. What kind of installation method can this be called?