	க.பொ.த	(உயர்தரப்) பரீட்	சை – ஜுன்	r 2016		
Conducted by the Field Work Center, Thondaimanaru						
In Collaboration with the Zonal Education Office, Jaffna						
	தகவல், செ	தொடர்பாடல் தொ	ழினுட்பவிய	່ນ (ICT)		
தரம்	o - 13 (A/L) 2016	பகுதி - I		நேரம் : 2 மண்	1	
		Answer all the que	estions.			
1. What is the simp	lified result of the Bo	polean function $f(x, y) =$	$(x+y)(\bar{x}+y)?$			
(1) <b>x</b>	(2) y	(3) 1	(4) $\bar{x}$	(5) $\overline{y}$		
2. Which of the follo	owing is considered a	as first electronic compute	r?			
(1) EDVAC	(2) E	NIAC	(3) Atanasof	f-Berry Computer	(ABC)	
(4) UNIVAC	(5) A	analytical Engine				
2 11 1 64 611	• • • • • •	· · · · · · · · · · · ·		1.10		
<b>5.</b> which of the follo	owing statements is c	orry key	i oi the relational i	nodel?		
(1) Each relation in $(2)$ There can be mu	a ualabase nas a prin Iti-valued attributes i	in a relation		1.00		
(3) Each row is iden	tified uniquely					
(4) The order of colu	umns is must.					
(5) Each value at the	e intersection of a roy	w and a column is unique.				
4. What is the main	function of the BIOS	?				
(1) allows a comput	er to connect to a net	work				
(2) provides tempora	ary data storage for the	he CPU	6.92			
(3) performs a powe	er-on self-test of inter	nal components				
(4) provides graphic	capabilities for com	puter games				
(5) provides power t	to internal componen	ts				
		E E	1 . 0			
<b>5.</b> Which of the follo $(1) RAM$	owing can be categor	lzed as a solid-state mem	(3) CD-RW			
(4) Floppy disk	(2) I (5) F	lash drive	(5) CD KW			
(i) rioppy disk						
6. Binary equivalent	t of 71 <sub>10</sub> .					
(1) 0110011	(2) 1011101	(3) 1000111	(4) 1011	010 (5)	1101010	
	22					
7. A network admin	istrator is testing con	nectivity to a remote com	puter using the IP	address 10.1.1.1. V	What does the	
output of this com	nmand indicate?					
ping 10.1.1.1						
Type escape sequ	ence to abort.					
Sending 5, 100-by	yte ICMP Echoes to	10.1.1.1, timeout is 2 seco	nds:			
Success rate is 0 p	percent (0/5)					
(1) Compatinity (	the remeter comment	waa ayoocaa£-1				
(1) Connectivity to t (2) A router along $4$	the remote computer	was successful.				
(2) A router along the $(3)$ A ping packet is	being blocked by a s	ecurity device along the r	ath			
(4) Success rate of t	he connection is 50%					
(5) None of the above	ve					
		1			10.	
l		1			[see page two	

8. Consider the following statements regarding operating system. A – allocating memory necessary for processes. B – scheduling processes. C – handling file and folders. Which of the above is/are the activities of a memory management? (1) A only (2) B only (3) A,B only (4) A.C only (5) A,B,C all 9.  $233_8 + A9_{16} =$ (1) 504<sub>8</sub>  $(2) 103_8$ (3) 4758 (4) 1245<sub>8</sub> (5) 1713<sub>8</sub> 10. What is the output of the following python program? a = 0while a < 5: a=a+2print (a+1, end = '')(5) 0, 2, 4 (1) 2, 4, 6(2)3, 5, 7(3) 2,3, 4 (4)4,5,611. Consider the following relations. Student (sno, name, age, address) Subject (sub no, name, lecturer) Results (sno, sub no, marks, grade) Which of the following SQL statement can be used to retrieve the names of all the students who scored over 35 marks for any subject? (1) select S.name from Student S. Results R where marks > 35(2) select S.name from Student S, Results R where S.sno = R.sno and marks > 35 (3) select S.name from Student S, Results R where S.sno = R.sno or marks > 35(4) select S.name from Student S, Results R where S.sno = R.sno, marks > 35 (5) select S.name from Student S and Results R where S.sno = R.sno and marks > 35 12. Which of the following is equivalent Boolean expression for XOR logic gate? (4)  $AB + \overline{AB}$ (2)  $A\overline{B} + \overline{A}B$ (5)  $AB + \overline{AB}$ (1) A + B(3) A.B 13. In python programming, which type of file mode should be used to open to append data in a text file "scores.txt" without changing previous data? (2) outfile = open("scores.txt", "rw") (1) outfile = open("scores.txt", "a") (3) outfile = open(file = "scores.txt", "w") (4) outfile = open(file = "scores.txt", "r") (5) outfile = open(file = "scores.txt", "wr") 14. Which of the following is a valid email address? (1) Abc123.example.com (2) Abc.123@example.com (3) Abc.1.2.3.@example.com (4) Abc123@example\$com (5) Abc@123@example.com **15.** The following result is displayed on a web page. One Two Three The following list is a browser rendering of HTML code. (1) < dl > One Two Three </ dl >(2) <tr> <td> One </td> <td> Two </td> <td> Three </td> </tr> (3) One Two Three(4) <u> <li> One </li> <li> Two </li> <li> Three </li> </u>(5) < nl > One Two Three </nl>[See page three

- 16. What is the purpose of ICMP messages?
- (1) to inform routers about network topology changes
- (2) to ensure the delivery of an IP packet
- (3) to provide feedback of IP packet transmissions
- (4) to monitor the process of a domain name to IP address resolution
- (5) to monitor router
- Consider the following scenario to answer the question from (17) to (18).

Pharmaceutical companies produce drugs and the trade name identifies each drug uniquely with respect to each company. Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies at a fixed price. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies.

17. Based on the given scenario, how would the price be represented?

- (1) As an attribute of pharmacy
- (2) As an attribute of the relationship between pharmacy and drug
- (3) As an attribute of the relationship between pharmacy and Pharmaceutical company
- (4) As an attribute of drug
- (5) As an attribute of Pharmaceutical company

18. If the price of each drug could vary from one pharmacy to another, how would the price be represented?

- (1) As an attribute of drug
- (2) As an attribute of the relationship between pharmacy and drug
- (3) As an attribute of the relationship between pharmacy and Pharmaceutical company
- (4) As an attribute of pharmacy
- (5) As an attribute of Pharmaceutical company
- 19. What is the output of the following flowchart?



<b>21</b> . Which protocol trans	slates a website na	me such as www	abe com in	to a network add	lress?
(1) HTTP	(2) FTP	(3) D	НСР	(4) DNS	(5) POP
<b>22</b> The changes made i	n a developed and	implemented sof	tware		is called
(1) System design		stem maintenanc	e	(3) system ana	lycic
(1) System testing	(2) Sy	ding	C	(5) system and	19313
(4) System testing	(5) (1	Julig			
<b>23.</b> Which of the follow	ing represent the c	correct way of ins	erting a M	eta tag in HTML	?
   (1) <meta content="IC]&lt;/td&gt;&lt;td&gt;F. WWW. web. H&lt;/td&gt;&lt;td&gt;TML" name="kevwo&lt;/td&gt;&lt;td&gt;ords"/>					
(2) <meta name="keywo&lt;/td&gt;&lt;td&gt;ords" values="ICT&lt;/td&gt;&lt;td&gt;. WWW. web. H&lt;/td&gt;&lt;td&gt;TML"/>					
(3) <meta/> name="keyw	vords" content="IC	CT, WWW, web,	HTML" <td>neta&gt;</td> <td></td>	neta>	
(4) <meta/> name="keyw	vords" values ="IC	T, WWW, web, I	HTML" <td>neta&gt;.</td> <td></td>	neta>.	
(5) <meta content="IC&lt;/td&gt;&lt;td&gt;T, WWW, web, I&lt;/td&gt;&lt;td&gt;HTML" me<="" name="keywo&lt;/td&gt;&lt;td&gt;ords" td=""/> <td>eta&gt;.</td> <td></td>	eta>.				
24. Consider the following	ng HTML code.				
< Perera & Si	lva Associates &g	t;			
How will a browser of	lisplay this?				
(1) & >; Perera && Silv	a Associates & <;	(2) < 2	Perera Silv	a Associates >	
(3) < Perera & Silva Ass	ociates >	(4) &	< Perera &	& Silva Associa	tes &>
(5) <; Perera &; Silva As	ssociates >;				
<b>25.</b> Which of the followi	ng statements is/ar	re correct regardi	ng normali	zation?	
$\Lambda$ – It reduces undete and	malies				
R - It increases insertion	anomalies				
C - It minimizes redunds	anomanes.				
(1) A only	(2) B only	(3) C only	(4) A F	8 only	(5) A C only
	(2) b only	(5) C only	(4) 11, 1	Joiny	( <i>5</i> ) <i>H</i> , <i>C</i> only
26. In CSS, an external s	tyle sheet is referr	ed to as.			
(1) <li>link src = "styleshee</li>	et" type = "text/css	" href = "mainsty	/le.css">		
(2) <li>link rel = "styleshee"</li>	et" type = "text/css	" href = "mainsty	ele.css">		
(3) <style src="mainsty&lt;/td&gt;&lt;td&gt;vle.css"></style>					

<ul><li>29. What happens v</li><li>(1) The receiving hos</li><li>(2) The sending hos</li><li>(3) The receiving hos</li><li>(4) The sending hos</li><li>(5) None of the above</li></ul>	whenever a TCP segn ost aborts transmission t aborts transmission ost requests a retransm t requests a retransm ove	nent is missing at des n nission ission	stination?		
<b>30.</b> Consider the fo A – Fridge	llowings. B – Human ne	ervous system	C – Human blood circul	lating system	
Which of the at (1) A only	oove is/are closed sys (2) B only	(3) A, B only	(4) B, C only	(5) A,B,C all	
<b>31.</b> Which of the fo	ollowing python prog	ram is syntactically	correct?		
(1)	(2)	(3)	(4)	(5)	
while a < 10:	while a < 10	while a < 10:	while a < 10:	while a < 10:	
print (a)	print (a)	print (a)	print (a)	print (a):	
a = a + 1	a = a + 1	a = a + 1	a = a + 1	a = a + 1:	
<ol> <li>(1) Unavailability o</li> <li>(2) Decrease in the a</li> <li>(3) Automatic increation</li> <li>(4) Automatic increation</li> <li>(5) All of the above</li> <li>33. Which OSI laye</li> </ol>	f a particular website amount of spam ema ase in network bandw ase in network perfor r is responsible for m	ils received vidth mance nultiplexing?	A Sol Inc	S. C.	
(1) Data link	(2) Transport	(3) Session	(4) Network	(5) Physical	
<ul> <li>34. In the process state transition diagram, the transition from the READY state to the RUNNING state indicates that.</li> <li>(1) A process is removed by another process</li> <li>(2) A process has blocked for another application</li> <li>(3) A process is waiting for an I/O operation</li> <li>(4) A process is just created</li> <li>(5) A process is just terminated</li> <li>35. Which of the following is/are the e-Commerce activities?</li> <li>A - Selling goods and services</li> <li>D mine utility hills</li> </ul>					
C - e-Parliamer (1) A only	(2) B only	(3) A, C only	(4) C only	(5) A, B, C all	
<b>36.</b> How many usab (1) 32	le host addresses are (2) 30	there in the subnet 1 (3) 64	92.168.1.32/27? (4) 16	(5) 62	

[See page six ]

**37.** Consider the following two relations.

A (Students)				
St_Id	Name	Address		
1004	Bimal	Colombo		
1001	Damith	Kandy		
1008	Amal	Galle		
1002	Chamil	Jaffna		

	В	
St_Id	Name	Address
1001	Damith	Kandy
1002	Chamil	Jaffna
1004	Bimal	Colombo
1008	Amal	Galle

Applying a certain SQL statement to table A gives table B. Which of the following statements could this SQL statement be?

(1) SELECT \* FROM Students ORDER BY

(2) SELECT \* FROM Students ORDER BY Name

(3) SELECT \* FROM Students ORDER BY St Id DESC

(4) SELECT \* FROM Students ORDER BY Name DESC

(5) SELECT \* FROM Students

**38.** Consider the following data flow diagram.



Customer, Get Order and Order are respectively represented.

(1) Data store, external entity, process (2) Process, external entity, data store

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

#### **39.** Consider the following tasks.

- A Creating a table.
- B Removing a row from a table.
- C Changing data in a column in a table.

(1) ALTER, CREATE, DELETE, UPDATE

(3) UPDATE, CREATE, DELETE, DROP

(e) UPDATE, CREATE, INSERT, DROP

D - Removing a database.

Which SQL keywords have to be used to accomplish the above tasks respectively?

# (2) ALTER, CREATE, INSERT, DELETE

# (4) CREATE, DELETE, UPDATE, DROP

40. Consider the following relations. Student (studentid, sname) House (houseid, studentid, hname) What is the SQL statement that could be used to obtain details sname and houseid only?
(1) select \* from Student, House
(2) select sname, houseid from House
(3) select \* from Student, House where sname = houseid
(4) select sname, houseid from Student, House where sname = houseid

(5) select Student.sname, House.houseid from Student, House where Student.studentid = House.Studentid

[See page seven]

41. Consider the following function	onal dependency diagra	am on student marks	for courses.
StudentID, CourseID, StudentNa	me, SubjectName, Mar	k	
What would be the set of relation A - Students (StudentID, Student C - Subjects (CourseID, Subject)	s after removing all the Name) B Name) D	e functional dependen - Marks (StudentID, - Marks (StudentID,	cies? CourseID, Mark) Mark)
(1) A only (2) B only	(3) A,C only	(4) A, B,C only	(5) A, B,C,D all
<ul> <li>42. Which of the following is an A – it shall be able to wash cl B – it shall be able to wash 50 C – it shall be able to consum</li> </ul>	non-functional requiren othes efficiently. ) kg of clothes at the san e less amount of electri	nent of a washing may me time. city.	chine?
(1) A only (2) B only	(3) C only	(4) A, B only	(5) B,C only
<b>43.</b> Consider the following Lectu	rer relation with the giv	ven attributes and data	a types.
Lecturer (EmpNo VARCHAR(0) Which of the following SQL stat salary is below Rs: 10,000 /=?	3), Name VARCHAR(5 ement will increase the	50), Salary REAL, DI Salary by Rs: 3000/=	No VARCHAR(02)) = for all department '02'employees whose
<ol> <li>UPDATE Lecturer SET Salar</li> <li>INSERT INTO Lecturer SET</li> <li>DELETE FROM Lecturer W</li> <li>UPDATE Lecturer SET Salar</li> <li>INSERT INTO Lecturer SET</li> </ol>	y = Salary + 3000 WH Salary = Salary * 3000 HERE Salary < 10000 J y = Salary + 3000 WH Salary = Salary + 3000	ERE Salary < 10000 ) WHERE Salary < 1 AND DNo = '02' ERE Salary < 10000 ) WHERE Salary < 1	0000 AND DNo = '02' AND DNo = '02' 0000 AND DNo = = '02'
44. What is the output of the following the	owing python program?	. So	
<pre>sub = ['Physics','ICT','Mathen tmp = [ ] for x in sub:    tmp.append (x.lower ( ))    print (tmp)</pre>	natics']		
<ul> <li>(1) ['physics']</li> <li>(4) ['physics']</li> <li>['physics', 'ict']</li> <li>['physics', 'ict', 'mathematics']</li> </ul>	(2) ['physic (5) ['Physic ['Physic ['Physic	s', 'ict'] ss'] ss', 'ICT'] ss', 'ICT', 'Mathematic	(3) ['physics', 'ict', 'mathematics']
<b>45.</b> What is the name of the techn concurrently by switching ba	nique in which the operative and forth between the	ating system of a com hem?	nputer executes several programs
<ul><li>(1) partionaning</li><li>(4) multi-threading</li></ul>	<ul><li>(2) multi-tasking</li><li>(5) processing</li></ul>	(3) pa	aging

<b>46.</b> Which of the	following techno	logies is used as	an internal cache	memory?		
(1) SRAM	(2) DRAM	(3) EPROM	(4) ROM	(5) EEPROM		
<b>47.</b> Which of the	following is corr	ect syntax for def	fining font in CSS	?		
<ul><li>(1) p {font: "Time</li><li>(3) p {fonts: "Time</li><li>(5) p {font-family</li></ul>	es New Roman", nes New Roman' :: "Times New R	Times, serif;} ', Times, serif;} oman", Times, se	(2) h1 {font-ty] (4) h2 {font-ca erif;}	pe: "Times New Ro tegory: "Times New	oman", Times, serif;} v Roman", Times, serif;}	}
<b>48.</b> Consider the f	ollowing statem	ents about malwa	are.			
A - Computer viru B - Trojan horse a C - Spyware colle	us can replicate in the presence of the presen	tself and spread f m useful applicat about users witho	rom one computer tion for the user pr but their knowledg	to another. ior to enter, but ste e.	als information.	
(1) A only	(2) B only	(3) A,	C only	(4) A, B only	(5) A, B, C all	
<b>49.</b> Consider the f	ollowing statem	ents about softwa	are Agents.			
A – Agents operat B – Able to exhib C – Agents can be dynamic envi	te without the di pit goal-directed a part of a user ronment.	rect intervention behavior by takin -friendly transpor	or less intevention ng the initiative. rtation system whi	of humans. ch perform intellige	ently by adjusting to the	
Which of the abov (1) A only <b>50.</b> Consider the f	ve is/are correct? (2) B only following statem	(3) C only ents.	(4) A, B only	(5) A, B, C all		
A - Offering the o B - Automatically C - Identifying po	ptimal route to o calculate road u llution status of	lestination by ana utilization fare by air, water, soil, et	alyzing traffic info recognizing vehic tc.,	rmation eles		
Which of the above	ve can be the ser	vice(s) of ubiquit	ous computing en	vironment?		
(1) A only	(2) B only	(3) A,C only	(4) A, B only	(5) A, B, C all		
		Sector Sector	****			
						[Enc
•			8			

G.C.E. (A/ Conducted by Fig In Collaboration w Information & Grade - 13 (A/L) 2016	L) Examination eld Work Cent ith the Zonal Ec Communicatior Part - II	<ul> <li>June 2016</li> <li>er, Thondaimanaru.</li> <li>lucation Office, Jaffna</li> <li>Technology (ICT)</li> <li>Time: 3 Hours</li> </ul>
Pa	rt II - A Structure Answer all the ques	l Essay tions
<ul> <li>1.</li> <li>(a) A student uses the following URL to down</li> <li>https://www.alict.lk/gc</li> <li>A B</li> </ul>	nload a copy of a previo e/al/ict/2015_2.pdf	ous year's ICT exam paper.
<ul> <li>(i) What is the role of a DNS server?</li> </ul>	B	C.G.
	a clean	
(b) Use two's complement 8-bits method to a	dd numbers 13 <sub>10</sub> and (-	9 <sub>10</sub> ). Show your calculations.
(c) The memory of a Computer system is byte physical memory is 1 GB, divided into 1 F	e addressable and its vir KB pages.	tual memory address is 32 bits and the size of the

(i) How many maximum physical pages are available?

(ii) What is the size of the virtual address space?

(iii) How many virtual pages are available?

# 2.

(a) The incomplete HTML code below will be added to the web page to link it to the external style sheet. [Assume that the name of the external style sheet file is styles.css]

< 1 rel=" 2 " type = "text/css" href=" 3 " />

Complete the following table by writing the missing parts of the HTML code.

Label	Missing part	
0		
0		
3		

(b) The following shows the HTML code for a web page.

<html> <head> <title> AL ICT </title> <meta name="keywords" content="AL, Computing, ICT" /> </head> <body> <div id="header"> <h1> AL ICT </h1> </div> Welcome to the <span class="boldRed"> new </span> page for AL ICT students </body> </html> The following shows the external style sheet *styles.css* which contains three rules. h1 { color:darkblue; font-style:italic; }

#header { font-family:arial; }
.boldRed { color:red; font-weight:bold; }

Using the above HTML and CSS files, write down the followings:

(i) ID selector	:
(ii) Class selector	r:

(c) Describe the purpose of the *Meta elements* line given in above HTML file.

**3.** The table below stores details of students and the overall grade each student obtained in different modules. The table has a composite primary key (StudentID, ModuleID).

Results					
<u>StudentID</u>	StudentName	<u>ModuleID</u>	ModuleName	Grade	
S001	Smith	M01	Java	А	
S001	Smith	M02	Databases	В	
S002	Ford	M01	Java	В	

- (a) Which Normal Form does the above table violate and why?
- (b) Normalize the table up to the normal form identified in question (a).

(c) Draw an ER diagram for the entities you obtained in question (b).

(d) Write down type of the cardinality in the ER diagram drawn in (c) and justify your answer.

- **4.** Software is being developed to allow secure transmission of data over the Internet. The two computers involved in a communication will be known as A and B.
- (a) What is *encryption*?
- (b) The data that are being transmitted will be encrypted using public and private keys. A and B will each have a public key and a private key. A will encrypt the data that it is sending using B's public key. Explain why the data should not be encrypted using:
- (i) A's public key.
- (ii) A's private key.
- (c) A systems analyst is planning a system for the administration of student courses to be used in an office in a school. The system must allow users at ten computers to access and update a central database. The analyst initially plans to use either a peer-to-peer or a server-based network. Give two reasons why a server-based network is likely to be more appropriate than a peer-to-peer network in this situation.

(d) Details of the vehicles, owners and insurance policies are stored in a relational database. The following is a relation for insurance.

Insurance (<u>PolicyNumber</u>, RegistrationNumber, DateStarted, PolicyType, Amount)

Complete the following Data Definition Language (DDL) statement to create the Insurance table, including the key field.

CREATE TABLE Insurance (

\*\*\*\*

### Part II - B Essay Questions

Write down any four questions only

#### (1)

(a) Apply De Morgan's Law to the following expression and simplify the result. Show the stages of your working.

# $F = \overline{\overline{A} + \overline{(B.A)}}$

- (b) A line-following robot has three sensors. It moves along a black line on a white background whilst the following conditions are met:
  - the sensor U does not detect any obstacle and.
  - either, but not both, of the sensors L and R are on the black line only.

Sensor U returns 1 if it detects an obstacle and 0 if the path is clear. Sensors L and R each return 1 if they detect black and 0 if they detect white. A logic circuit will process the input from the sensors and produce an output M. M should be 1 if the robot is to move and 0 if the robot should stop.

- (i) Write down the Boolean expression.
- (ii) Construct a truth table for the Boolean expression obtained above in (i).
- (iii) What is the logic gate which is equivalent to the functionality of the Boolean expression obtained in (i) above?
- (iv) Draw the logic circuit for the Boolean expression obtained in (i).
- 2.

Consider the following scenario.

A company which manufactures milk powder uses manual methods to pack milk powder. All the operations such as weighing milk powder, packing it, and closing packets are done using manual methods. There is a high demand for these milk powders among people and a lot of packets of milk powders are to be manufactured per day. There is a huge amount of delay by packing them manually and it is unable to meet the demand in the market. In addition, more number of employees are needed for these operations. The production manager proposes a computer-based solution to solve these problems. In this method, it is expected to weigh milk powder while milk powder is moving on a conveyer belt in one section and in the next section, packets are closed. So delay is reduced and it is expected to pack a lot of milk packets in a day.

- (a) Write down three drawbacks that the company would face by using manual methods.
- (b) What is functional requirement? Write down two functional requirements of this computer-based system.
- (c) What is non-functional requirement?
- (d) Propose a name of the computer-based system to do manufacturing efficiently.

#### 3.

(a) For each of the following applications in the Internet determine whether you would use TCP or UDP and explain the reasons for your choice.

(i) File transfer

- (ii) Watching a real time streamed video
- (iii) Web browsing

(b) A computer is unable to connect to the network after startup and that a message says "This connection has limited or no connectivity." The user issues the **ipconfig /all** command. The user reports the IP address is 169.254.69.196 with subnet mask of 255.255.0.0 and nothing is displayed for the DNS server IP address. What is the possible cause of the problem?

#### (c)

A medium scale company has 80 employees requires an Internet connectivity for their basic web browsing requirements.

- (i) State a technology which you can utilize to limit the computers to less than 25 in a network in the entire company network.
- (ii) If one is required to provide web and mail facility to users, state four basic equipment you need. Explain using a high level diagram, how you would connect these devices to provide the intended use.

#### 4.

Consider the following scenario.

ABC College has planned to implement a Teachers' Information Management System (TIMS) for their college. The purpose of this system is to identify and manage teachers' responsibilities and tasks. This TIMS uses a database to store the information about teachers, classes and all the subjects.

The employee number, name, address, contact no, the date of appointment, username, password and job role (whether principal or teacher) should be stored in that TIMS. All the teachers and the principal can access to TIMS. All the subjects for each Grade should be stored and identified uniquely. subject\_code, subject\_name, grade are stored in TIMS. The teachers are allocated for subjects. Most of the teachers allocated for one subject and there are some cases that a teacher teaches more than one subject. For one particular subject there can be more than one teacher allocated. There are five classes for one Grade in the college and each classroom can be uniquely identified from the class code and with the class code, the grade, the location and the teacher in charge should be recorded. One teacher is assigned as teacher in charge for only one class and there is only one teacher in charge for each class.

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

#### 5.

(a) What is a context diagram in the context of Systems analysis & design?

#### (b)

A Video shop DVD rental services for people. They use a DVD rental system for this purpose. A customer can give order for DVD and if the order is accepted, the system checks whether DVD is available or not in the shop. If the DVD is available, payment is made by the customer and customer gets invoice and DVD and the details about video rental are recorded in record management system. And the deposit details are sent to payment details system. If the particular DVD is not available in the shop, the order for DVD from the customer is rejected by the system.

Draw a context diagram to show the overview of the DVD rental system described above. Clearly indicate external entities and data flows in the diagram.

# 6.

A text file named 'data.txt' contains a number of students' marks and their names. Every student has three (03) marks. The text file 'data.txt' is shown in the figure 1 as follows. Every students' average marks should be calculated and the average marks calculated and their names are recorded in a text file named 'sol.txt'. The output text file 'sol.txt' is shown in the figure 2 as follows.

