දිවයිනේ ජ්‍යෙෂ්ඨතම ICT ගුරුවරයාගේ 17 වන
වාර්ෂික මහා සම්මන්ත්‍රණය,

ICT 2025 A/L Final SEMINAR

- ✓ ඒඳින මුළු විෂය නිර්දේශයම ආවරණය වන පරීදි අනුමාන ප්‍රශ්න පත්‍රයක් ලබා දේ..
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බුද්ධ ශ්‍රීමාල්

B.Sc (IT), SCS, RHCSA, CCNA

15th OCTOBER

8.00AM to 3.00PM

@ Sasip Nugegoda

Fee - Rs. 1500/=

More info :
071 77 88 014

G.C.E. (Adv. Level) Examination - 2022 (2023)

Information & Communication Technology - I

Answers

01.	①	②	③	④	⑤	26.	①	②	③	④	⑤
02.	①	②	③	④	⑤	27.	①	②	③	④	⑤
03.	①	②	③	④	⑤	28.	①	②	③	④	⑤
04.	①	②	③	④	⑤	29.	①	②	③	④	⑤
05.	①	②	③	④	⑤	30.	①	②	③	④	⑤
06.	①	②	③	④	⑤	31.	①	②	③	④	⑤
07.	①	②	③	④	⑤	32.	①	②	③	④	⑤
08.	①	②	③	④	⑤	33.	①	②	③	④	⑤
09.	①	②	③	④	⑤	34.	①	②	③	④	⑤
10.	①	②	③	④	⑤	35.	①	②	③	④	⑤
11.	①	②	③	④	⑤	36.	①	②	③	④	⑤
12.	①	②	③	④	⑤	37.	①	②	③	④	⑤
13.	①	②	③	④	⑤	38.	①	②	③	④	⑤
14.	①	②	③	④	⑤	39.	①	②	③	④	⑤
15.	①	②	③	④	⑤	40.	①	②	③	④	⑤
16.	①	②	③	④	⑤	41.	①	②	③	④	⑤
17.	①	②	③	④	⑤	42.	①	②	③	④	⑤
18.	①	②	③	④	⑤	43.	①	②	③	④	⑤
19.	①	②	③	④	⑤	44.	①	②	③	④	⑤
20.	①	②	③	④	⑤	45.	①	②	③	④	⑤
21.	①	②	③	④	⑤	46.	①	②	③	④	⑤
22.	①	②	③	④	⑤	47.	①	②	③	④	⑤
23.	①	②	③	④	⑤	48.	①	②	③	④	⑤
24.	①	②	③	④	⑤	49.	①	②	③	④	⑤
25.	①	②	③	④	⑤	50.	①	②	③	④	⑤

(02 × 50 = 100 marks)

++++

Part A - Structured Essay

1. (*a*)

Designation	Contact Telephone Numbers
Principal	061-2223211
	067-5557772
Vice Principal	061-5557771
Common Phone Number: 019-2233445	

(0.5 marks)
(0.5 marks)
(0.5 marks)
(0.5 marks)

Note -

* Row 1 content has to be in boldface.
* The phone numbers need not be exact but must contain ten digits.

(*b*)

```
<html>
  <head>
    <title>Cascading Style Sheets</title>

    <style>
      h1,h2 {color:blue;}
      h1  {text-align:center;}
    </style>

  </head>
  <body>
    <h1> Introduction to Cascading Style Sheets </h1>
    <h2> CSS can be applied to html documents in three different ways.</h2>
  </body>
</html>
```

A (0.5 marks)
B (0.5 marks)
C (0.5 marks)
D (0.5 marks)

Alternative:

```
<html>
  <head>
    <title>Cascading Style Sheets</title>

    <style>
      h1 {color:blue; text-align:center;}
      h2 {color:blue;}
    </style>

  </head>
  <body>
    <h1> Introduction to Cascading Style Sheets </h1>
    <h2> CSS can be applied to html documents in three different ways.</h2>
  </body>
</html>
```

A (0.5 marks)
B (0.5 marks)
C (0.5 marks)
D (0.5 marks)

Note -

* For either A or B to be given credit, each must be induded within <style> and </style> which in turn must be within <head> and </head>
* For either C or D to be given credit, each must be included within <body> and </body>
* Reduce a maximum of 0.5 marks for all other mistakes

(c)

```
<html>
<head>Registration Form</head>
<body>
<h3> Registration for Examination </h3>

<form action="process.php" method="post">                                   (A - 0.5 mark)

<div> Student Name <input type ='text' name="name"> </div>                  (B - 0.5 mark)

<p>

  <div>
  Select Examination Module: <p>

  <input type="checkbox" name="module[]" value="ICT" /> ICT <br>
  <input type="checkbox" name="module[]" value="English" /> English <br>   (C - 1 mark)
  <input type="checkbox" name="module[]" value="IQ" /> IQ <br>
  </div>
  <br>
  <div>

  Preferred Medium:                                                         (E - 0.5 mark)

  <input type="radio" name="language" value="Sinhala" checked> Sinhala
  <input type="radio" name="language" value="Tamil" /> Tamil
  <input type="radio" name="language" value="English" /> English
  </div>
  <div>                                  (D - 0.5 mark)
  <br>
  Select Test Center:

  <select name="Center">
    <option value="Colombo" selected> Colombo</option>
    <option value="Matara"> Matara</option>
    <option value="Jaffna"> Jaffna</option>
  </select>
  </div>     (F - 0.5 mark)                (G - 0.5 mark)
  <br>
  <input type="submit" name="submit" value="submit">
</form>
</body>
</html>
```

Note -

- ✱ Exact spelling required for all answers.
- ✱ In addition, exact case is required for the following.
  - Student Name (in B)
  - ICT, English, IQ (in C)
  - Colombo, Matara, Jaffna (in G)

(d)

```
<?php
if ($_SERVER["REQUEST_METHOD"] == "POST") {
    $name = $_POST["name"];
    $medium = $_POST["language"];
    $center = $_POST["Center"];
}
echo "<h2> Your Input:</h2>";
echo $name; echo "<br>";
echo $medium; echo "<br>";
echo $center; echo "<br>";
?>
```

(2 marks)

Note - ✱ Exact case and spelling required.

(Total Marks - 10)

2. (*a*) (i) preliminary investigation (1 mark)
(ii) economic feasibility (1 mark)
(iii) operational feasibility (1 mark)

(*b*) (i) **P** - Customer
Q - Copy of payment receipt / payment receipt
R - Item details / Inventory
S - Generate reports

Note - ✱ Exact spelling needed (4 marks)

(ii) No of Processes :- 4
No of External entities :- 2
No of Data stores :- 2 (1 mark)

(*c*) (i) In parallel deployment, both the existing and the new systems are running simultaneously for some time covering the entire set of users. In a pilot deployment, the system is implemented initially only for a selected set of users.

One of the following differences is also acceptable.

Parallel	Pilot
Old and the new systems are run alongside each other for a period of time	Usually only the new system is run.
Usually run covering the full set of users.	Covers only a limited set of users.
Cost is usually more as two systems need to be running.	Cost is usually lesser.
Less riskier as if the new system fails, the old system still exists.	More risky.
Data could be different in the old and the new systems due to mistakes in data entry.	No such risky.

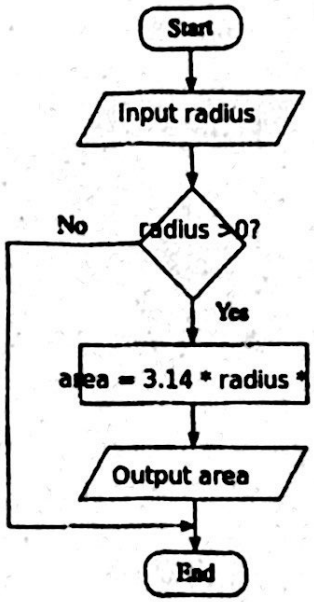
(1 mark)

(ii) Write one of the following
- convenience
- reduced implementation / development time
- faster / easier insertion of technology
- possibly lower comparative cost
- ongoing support / updates
- readily available training resources
- existing customer bases / communities
- availability of trial versions
- can access reviews / advice from existing users
- offer more functionality
- more configurable
- no / lower upgrade costs

(1 mark)

(Total Marks - 10)

3. (*a*)



(0.5 mark)
(0.5 mark)
(0.5 mark)
(0.5 mark)

Note - ✱ Instead of "Input" "get" or "read" can be used.
✱ Instead of "Output", "display", "print", "show" "Write" can be used.
✱ For computation area = $\frac{22}{7}$ × radius^2 is also acceptable
✱ Use of the symbol "π" is also acceptable. (2 marks)

(*b*) Advncd |v|
✱ 1 mark for - "Advncd" part
✱ 0.5 marks for the space
✱ 0.5 marks for "|v |" part (2 marks)

(*c*)
```
    pass
else :
```
(2 marks)

(*d*)
```
A = input("Enter the name of text file A")
B = input("Enter the name of text file B")

f1 = .open... (A, ..r../r+.)

f2 = ..open... (B, 'w'/a'/r+)

for line in ...f1..... :

    f2.write (..line....)

f1. close()

f2. .close().
```
(0.5 mark for each - 4 marks)
(Total Marks - 10)

4. (*a*) (i) Online reverse auctions
(ii) e-marketplace (0.5 mark for each - 1 mark)

(*b*) (i) resources will be underutilized most of the time (1 mark)
(ii) use of cloud computing (1 mark)

(*c*) **P** - Program counter
Q - Functional unit (0.5 mark for each - 1 mark)

(*d*) (i)

A	B	X	Y	Q
0	0	1	1	0
0	1	1	0	1
1	0	0	1	1
1	1	0	0	1

* 1 - mark for X column
* 1 - mark for Y column
* 0.5 marks for Q column

(2.5 marks)

(ii) OR gate

(0.5 mark)

(*e*) P - Application Layer
Q - Network Layer
R - Datalink Layer
S - Application Layer
T - Transport Layer
U - Internet Layer / Network Layer

(0.5 mark for each - 3 marks)

(Total Marks - 10)

++++

Part B

5. (*a*) (i)

P	Q	R	Z
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

(Marks allocated as follows)
3 marks for all 8 rows correct
2.5 marks for maximum 6, 7 rows correct
2 marks for maximum 3, 4, 5 rows correct
1 mark for maximum 1, 2 rows correct

(3 marks)

(ii)

R \ PQ	00	01	11	10
0	0	1	0	0
1	1	1	1	0

(0.25 marks for each correct cell)

(2 marks)

(iii)

R \ PQ	00	01	11	10
0	0	1	0	0
1	1	1	1	0

$Z = \bar{P}Q + \bar{P}R + QR$

1.5 marks for marking the three loops on the correct Karnaugh map (0.5 mark for each)
0.5 mark for correct, simplified final SOP expression

$Z = \bar{P}Q + \bar{P}R + QR$

(2 marks)

(*b*) (i) (Method I)

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

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

$BC(\bar{A} + A) + A\bar{B}C + AB\bar{C}$

$BC + A\bar{B}C + AB\bar{C}$ $(A + \bar{A} = 1$ / Complement law) (1 mark)

$C(B + A\bar{B}) + AB\bar{C}$

$C(A + B) + AB\bar{C}$ $(A + \bar{A}B = A + B$ / Redundancy law)

$CA + CB + AB\bar{C}$

$BC + AC + AB\bar{C}$

$BC + A(C + B\bar{C})$ $(A + \bar{A}B = A + B$ / Redundancy law) (1 mark)

$BC + A(C + B)$

$\therefore BC + AC + AB$

(Method II)

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

$\bar{A}BC + A\bar{B}C + AB\bar{C} + ABC + ABC + ABC$ $(A + A = A$ Idempotent law) (1 mark)

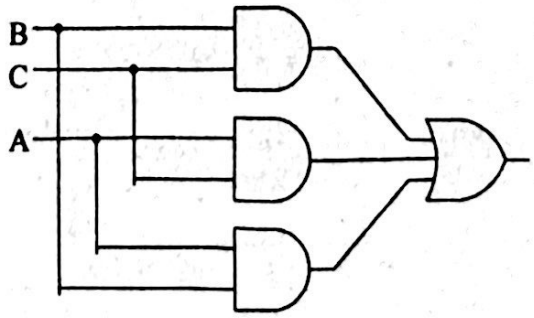
$ABC + \bar{A}BC + ABC + AB\bar{C} + ABC + A\bar{B}C$

$BC(A + \bar{A}) + AB(C + \bar{C}) + AC(B + \bar{B})$ (1 mark)

$BC + AB + AC$ $(A + \bar{A} = 1$ / Complement law)

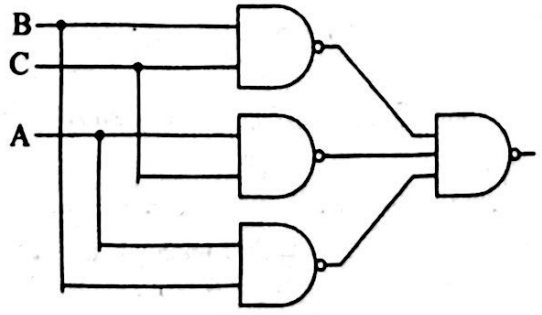
$\therefore BC + AC + AB$

(ii)



(If on a correct circuit, the wire connections are not clearly indicated only 2 marks) (3 marks)

(iii)

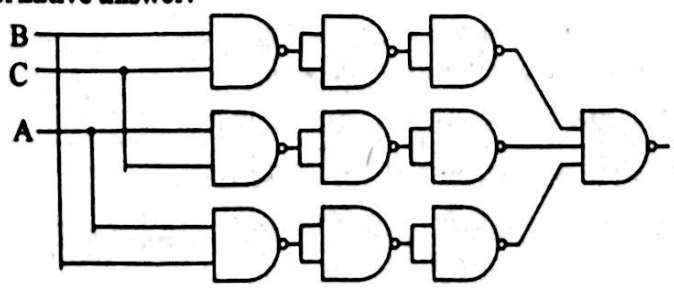


Note

$$\overline{AB + BC + AC} = \overline{\bar{A}B + B\bar{C} + A\bar{C}} = \overline{(\bar{A}B)(B\bar{C})(A\bar{C})}$$

(If on a correct circuit, the wire connections are not clearly indicated only 2 marks) (3 marks)

Alternative answer:-



(If the final circuit is as above only 2 marks)

(Total Marks - 15)

6. (*a*) P - Symmetric
Q - Common
R - Asymmetric / public
S - Public
T - Private
U - Cipher text

or

P - Symmetric
Q - Common
R - Asymmetric / Public
S - Private
T - Public
U - Cipher text

(0.5 mark for each)

(3 marks)

(*b*) (i) First address - 192.248.154.0
Last address - 192.248.154.127 (0.5 mark for each)

(1 mark)

Note - ✱ ABC Company received 192.248.154.0/25.
Each department can have at most 32 IP addresses.
There are four departments. Therefore two bits are enough to identify them. We can extend / 25 to 27
Balance five bits (32 - 27) would be sufficient to assign 32 different IP addresses in each subnet.

(ii) 255. 255. 255. 128 (1 mark)

(iii) 2 bits (1 mark)

(iv)

Subnet No	Network Address	Subnet Mask	First usable IP address	Last usable IP address	Broadcast address
S001	192.248.154.0	255.255.255.224	192.248.154.1	192.248.154.30	192.248.154.31
S002	192.248.154.32	255.255.255.224	192.248.154.33	192.248.154.62	192.248.154.63
S003	192.248.154.64	255.255.255.224	192.248.154.65	192.248.154.94	192.248.154.95
S004	192.248.154.96	255.255.255.224	192.248.154.97	192.248.154.126	192.248.154.127

(1 mark for each row) (4 marks)

(*c*) (i) Write any one of the following

- TCP offers reliability (uses sequence numbers, sequenced acknowledgements, retransmissions) whereas UDP does not offer such.
- TCP is a connection oriented transport protocol whereas UDP is connectionless
- TCP is a complex protocol (uses sequence numbers, sequenced acknowledgements, retransmission) whereas UDP is a simple protocol
- TCP is suitable for client server type of communication and UDP is suitable for query based communications (DNS, SNMP)
- TCP guarantees ordered delivery whereas UDP does not
- TCP provides congestion control whereas UDP does not
- TCP is slower due to all added functionality whereas UDP is faster.

(Underlined parts of the sentence is also accepted as a full answer) (1 mark)

(ii) Write two out of the following
- routing data from source to destination / forwarding data
- finding paths for arriving data / packets
- communicating and collaborating with other routers
- maintaining a table (routing table) of reachable destinations through them
- exchanging routing tables with other routers from time to time
- updating routing tables from the information received from other routers
- interconnecting different networks

(1 mark for each) (2 marks)

(*d*) (i) Write any one of the following
- DNS provides directory lookup service for given domain names and the web addresses.
- The HTTP, SMTP protocols use the services of the DNS to identify the matching web addresses to given URLs. (1 mark)

(ii) Write any one of the following
- DHCP is a protocol used to assign IP addresses to arriving hosts in a network/LAN
- The DHCP server will assign IP addresses automatically to arriving hosts.
- Providing IP addresses for a certain period. (1 mark)

(Total Marks - 15)

7. (*a*) (i) A - Controller
B - Microcontroller / Arduino Board
C - Sensor
(1 mark for each) (3 marks)

(ii) Sensor can only feed data to the system / microcontroller (1 mark)

(*b*) X - M_L < 8
Y - open tap
Z - close tap
(1 mark for each) (3 marks)

(*c*) Luminosity level / Light intensity level (1 mark)

(*d*) (i) Agent 2 and Search Agent (1 mark)

(ii) Q - Agent 1 triggers / activates Agent 2 to process images;
Agent 2 informs Agent 1 if an anomaly is detected

S - Agent 2 triggers / activates Search Agent if necessary;
Search Agent feeds the results of the search to Agent 2
(1 mark for each) (2 marks)

(iii) The system gets isolated from the latest updates of the relevant information / system becomes an outdated knowledge repository / static data (1 mark)

(*e*) (i) Answer could be any one of the following
- Easy management of perishable products
- Reduced delivery costs
- Easier to maintain produce quality / freshness (1 mark)

(ii) Write one of the following
- Cash on delivery (preferred answer)
- bank transfer
- deposit on account (1 mark)

(iii) Write one of the following
- Extended perishability / shelf life of the product
  [ability to reach far away customers]
- Better delivery and logistical use
- Gain more control over market demand and supply situation (1 mark)

(Total Marks - 15)

8. (*a*) (i) 3 (2 marks)

(ii) B = B * 10 + C (2 marks)

(*b*) (Method 1) Write one of the following

Method 1:
```
def Party(studentName, foodItem):
    if ((studentName[0]==foodItem[0]) and
            (studentName[len(studentName)-1] == foodItem[len(foodItem)-1])):
        return "True"
    else:
        return "False"
```

Method 2:
```
def Party(name, food):
    if name[0] ==food[0] and name[-1] == food[-1]:
        a = "True"
    else:
        a = "False"
    return a
```

Method 3:
```
def Party(name, food):
    a = "False"
    if name[0] ==food[0]:
        if name[-1] == food[-1]:
            a = "True"
    return a
```

Method 4:
```
def Party(studentName, foodItem):

    return studentName[0] == foodItem[0] and
            studentName[len(studentName)-1] == foodItem[len(foodItem)-1]:
```

Method 5:
```
def Party(studentName, foodItem):

    return studentName[0] == foodItem[0] and
            studentName[-1] == foodItem[-1]:
```

Allocate marks as follows:

1 mark for def party StudentName, foodItem):
1 mark for the first letter check.
1 mark for the last letter check
1 mark for correct logic / use of / indentation
1 mark for correct return / print statement

(5 marks)

(c) Method 1

Label	Answer	Marks
A	Start / Begin	0.5
B	Read / Input / Get *n*	0.5
C	*i* = 1 *fac* = 1	1
D	*i* <=*n* ?	1
E	*fac* = *fac* **i* (in Yes branch)	1
F	*i* = *i* + 1	1
G	Print / Display / Write / Show fac (in No branch)	0.5
H	Stop / End / Finish	0.5

Method 2

Label	Answer	Marks
A	Start / Begin	0.5
B	Read / Input / Get *n*	0.5
C	*fac* = 1	1
D	*n* > 0 ?	1
E	*fac* = *fac* **n* (in Yes branch)	1
F	*n* = *n* - 1	1
G	Print / Display / Write / Show fac (in No branch)	0.5
H	Stop / End / Finish	0.5

Method 3

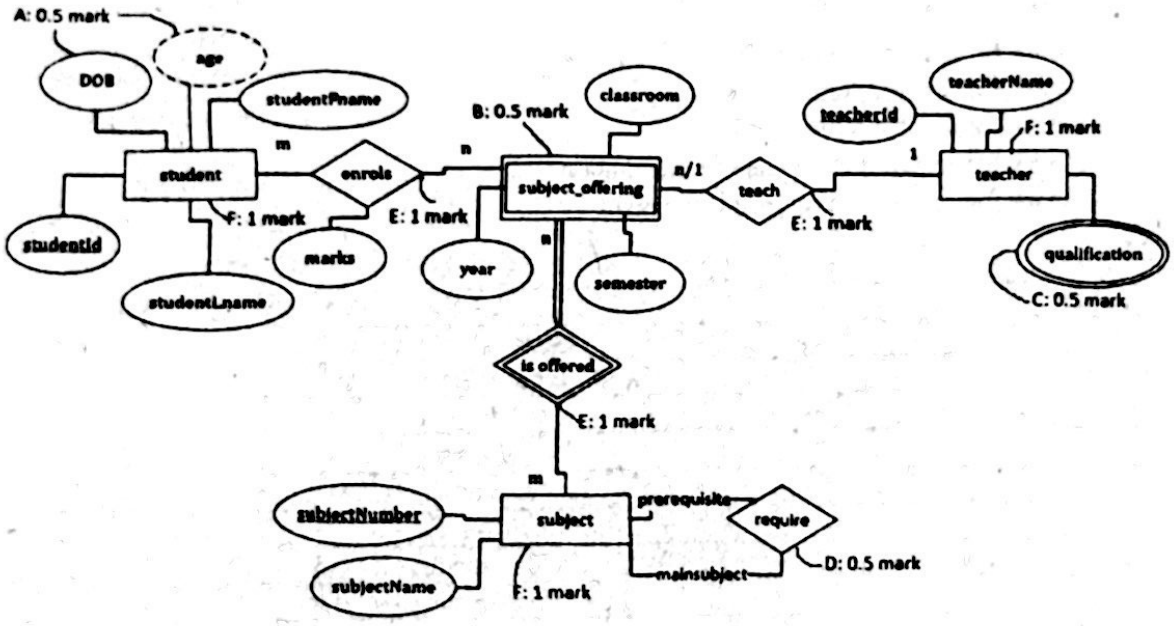
Label	Answer	Marks
A	Start / Begin	0.5
B	Read / Input / Get *n*	0.5
C	*i* = 1 *fac* = 1	1
D	*i* > *n* ?	1
E	*fac* = *fac** *i* (in No branch)	1
F	*i* = *i* + 1	1
G	Print / Display / Write / Show fac (in Yes branch)	0.5
H	Stop / End / Finish	0.5

Method 4

Label	Answer	Marks
A	Start / Begin	0.5
B	Read / Input / Get *n*	0.5
C	*fac* = 1	1
D	*n* <= 0 ?	1
E	*fac* = *fac** *n* (in No branch)	1
F	*n* = *n* - 1	1
G	Print / Display / Write / Show fac (in Yes branch)	0.5
H	Stop / End / Finish	0.5

(6 marks)
(Total Marks - 15)

9. (a)



Marks allocated as follows:

A - 0.5 marks for identifying DOB as an attribute and age as a derived attribute of student entity.
B - 0.5 marks for subject_offering as a weak entity
C - 0.5 marks for qualification as a multi-valued attribute
D - 0.5 marks for identifiying correctly the prerequisite subject relationship
E - 3 marks for identifying relationship with correct cardinality (1 mark for each relationship)
F - 3 marks for identifying entities with correct sets of student, teacher and subject entity)

(8 marks)

(b) (i)

FullName	Salary
Upul Fernando	44000
Sunil Perera	115000
Kamala Gamage	52000
Upul Fernando	44000
Saman Perera	140000
Kamala Gamage	52000

* Rows and order of the records are important (1 mark)

(ii) Write One of the following

```
SELECT Employee.FullName
FROM Employee, Assign_Project
WHERE Employee.EmployeeId = Assign_Project.EmployeeId AND ProjectId = ' P04';
OR

SELECT Employee.FullName
FROM Employee INNER JOIN Assign_Project ON Employee.EmployeeId =
Assign_Project.Employee_Id
WHERE Assign_Project.Project_Id="P04";

OR
SELECT E.FullName
FROM Employee as E INNER JOIN Assign_Project as A ON E.EmployeeId = A.Employee_Id
WHERE A.Project_Id="P04";
```

(2 marks)

(iii) First normal form /1NF (1 mark)

(iv) Need to remove PName and Description attributes (0.5 mark)
because these attributes are partially dependent on the primary key (0.5 mark)

(v) Write one of the following examples

```
UPDATE Employee
SET EmployeeId = 'E003'
WHERE EmployeeId = 'E002';
```

Note: EmployeeId can be any valid EmployeeId from the Employee table.

OR

Update only some rows in the Assign_Project table, that leads to the inconsistency of the table

```
UPDATE Assign_Project
SET PName = 'SalesSys'
WHERE EmployeeId = 'E008';
```

OR

```
UPDATE Assign_Project
SET Description = 'Inventory System'
WHERE EmployeeId = 'E008';
```

Note: Different EmployeeId values can be considered based on the values given in the Assign_Project table.

* 1 mark for correct UPDATE and SET clauses
* 1 mark for correct WHERE clauses (2 marks)

(Total Marks - 15)

10. (*a*) 2 marks for any one of the following
- Interrupt Web browser (P_w)
- Save the processor state with respect to web browser (P_W) into its PCB
- Change its state to READY

2 marks for any one of the following
- Load text editor (P_T) from PCB
- Load the relevant page of text editor (P_T) into memory
- Set the state of text editor (P_T) to RUNNING (4 marks)

(*b*) It is blocked for an event (leg: Input/Output) (1 mark)

(*c*) If answer is 'Yes' (1 mark)
Physical address = 101 0000 0000 0011 (3 marks)

OR

If the answer is 'No' (2 marks)
2 marks for an answer containing the following

(i) The OS picks either
- a free frame or
- a little used page frame and writes its contents back to disk (if needed)

- Fetches the page just referenced into the page frame just freed
- Changes the page table
- Restarts the instruction (0.5 marks each)

(d) (1 mark for each)

- Page is called in the program for the very first time.
- Page was in physical memory before it has been taken off to make room for another page / the page has been swapped out (2 marks)

(e) (i) Contiguous allocation :

- The directory entry contains the starting block of the file
- The blocks are contiguous / Directory entry also contains the number of blocks in file (2 marks)

(ii) Indexed allocation :

- The directory entry contains the address of the index block.
- This block contains the addresses of other blocks. (2 marks)

(Total Marks - 15)

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