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308457

PART-A

University of Vocational Technology (UVT) Rathmalanka

(1)

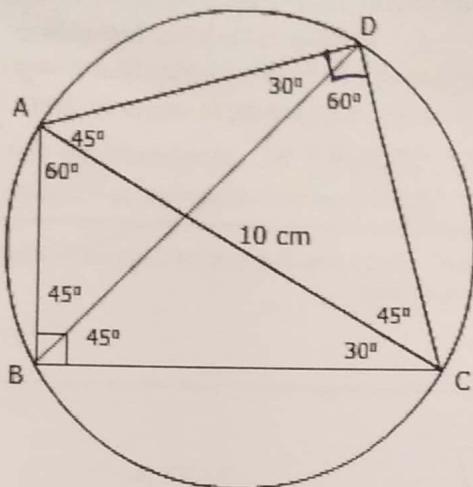
- (a) Simplify $2x^2 - (x - xy) - x(2y - x)$. (05 marks)
(b) Find all the factors of the expression $x^4 - 6x^3y - 2x^2y + 12xy^2$. (06 marks)
(c) The current I in an AC circuit is given by
 $I = \frac{V}{\sqrt{R^2 + X^2}}$. Make V the subject of the formula and evaluate V when $R = 4.8$, $X = 10.5$ and $I = 15$. (09 marks)

173, 10

2.

- (a) In a system of pulleys, the effort P required to raise a load W is given by $P = aW + b$, where a and b are constants. If $W = 40$ when $P = 12$ and $W = 90$ when $P = 22$, find the values of a and b . (10 marks)
(b) The manager of a theater estimates that the profit P in hundreds of dollars per show, can be represented by $P = -(t - 12)^2 + 100$, where t ($t > 0$) is the price of a ticket in dollars.
i. For what price of the ticket the profit will be zero. (03 marks)
ii. What is the price of a ticket that profit is maximum? (04 marks)
iii. Draw the graph of the profit function. (03 marks)

3. ABCD is a quadrilateral enclosed in a circle, AC is a diameter of the circle and its length $AC = 10 \text{ cm}$. Values of the different angles are indicated in the diagram.
 (You can assume $\sin 30^\circ = \cos 60^\circ = 0.50$, $\cos 30^\circ = \sin 60^\circ = 0.87$, $\sin 45^\circ = \cos 45^\circ = 0.71$)



5 8.70 7.10 7.10

- (a) Using basic trigonometric ratios Find the lengths AB, BC, AD and DC to two decimal places. (08 marks)
- (b) Write formula for $\sin(A + B)$ and hence find the value of $\sin 75^\circ$ to two decimal places. 0.96 (04 marks)
- (c) Apply sin rule to BCD triangle and find the length of BD to two decimal places. a. 60 (04 marks)
- (d) Calculate the area of the quadrilateral ABCD to nearest two decimal places. 46.95 (04 marks)

4.

- (a) Find the equation of the straight line passing through the point (2,5) and perpendicular to line $3x + 4y = 9$ (06 marks)
- (b) Solve the equation $2\log x - \log(x-1) = \log(x-2)$. (05 marks)
- (c) Write binomial expansion of $(x-y)^8$. Find the value of the middle term when $x = 2$ and $y = \frac{1}{2}$ (09 marks)

a. 6

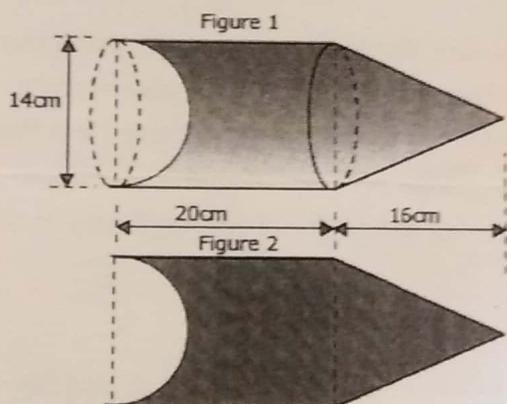
5.

PART-B

- (a) Convert 241.65625_{10} to equivalent Binary, Octal and Hexadecimal number. (06 marks)
- (b) Convert 110101111.01011_2 to Octal then convert it to decimal number. (05 marks)
- (c) Convert 572.6875_{10} to Octal number and then convert it to Binary number. (05 marks)
- (d) Convert Hexadecimal number $3A5.F4_{16}$ to Octal number. (04 marks)

6.

A composite solid object is made by joining a cone to one end of the cylinder and hemispherical part is removed from the other end of the cylinder. Figure 1 shows the image of the composite object and its dimensions. Figure 2 shows the cross-section of the composite object.



- (a) Find the area of the cross-section 315 cm^2 (08 marks)
- (b) Find the volume of the composite object. (12 marks)
- (Hint: Volume of a cylinder = $\pi r^2 h$, Volume of a cone = $\frac{1}{3} \pi r^2 h$, Volume of a hemisphere = $\frac{2}{3} \pi r^3$)

$$3182.67 \text{ cm}^3$$

7.

$$A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix} \text{ and } B = \begin{pmatrix} 1 & 1 \\ 2 & 1 \end{pmatrix}$$

(a) Find $\text{Det}(A)$, A^{-1} , A^2 , B^2 and AB (10 marks)

(b) Solve the following equations using matrices (05 marks)

$$2x + 5y = 3$$

$$x + 3y = 2$$

$$2x = (-1) / y = 1$$

(c) Find $(A + B)^2$ and check whether it is equals to $A^2 + 2AB + B^2$

$$\begin{pmatrix} 1 & 5 & 6 & 0 \\ -2 & 1 & 3 & 4 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 6 & 4 & 7 \\ 2 & 3 & 2 & 5 \end{pmatrix} \quad (05 \text{ marks})$$

8. The following are the lives of 100 electric light bulbs.

Life of Bulbs (hrs)	500-600	600-700	700-800	800-900	900-1000	1000-1100	1100-1200	1200-1300
Frequency f	2	8	10	17	25	19	12	7

- a. Calculate the Mode life of the bulb using formula. (03 marks)
- b. Draw a Histogram to represent above data. (03 marks)
- c. Prepare cumulative frequency table (less than) and draw less than ogive for above data. (04 marks)
- d. Calculate the Mean life of the bulb and its Standard Deviation. (10 marks)

$$\left(\text{If } u = \frac{x-A}{c} \text{ then } \bar{x} = A + c \bar{u} \text{ and } SD = c \sqrt{\frac{\sum f u^2}{\sum f} - \bar{u}^2} \right)$$

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UNIVERSITY OF VOCATIONAL TECHNOLOGY
Faculty of Training Technology
Bachelor of Technology ICT 2019/2020 B1 & B2
Year I - Semester - I Examination - January 2020

IT104031 Software Development Practices

Duration: Three (03) Hours

Instructions

1. This question paper has Seven (07) questions.
2. Answer only Five (05) questions.
3. All questions carry Twenty (20) marks.
4. Start answering each question from a new page of the answer book and write the relevant question number at the top of the page.
5. Use sketches to explain your answers wherever relevant.
6. Delete any material, which does not require the attention of the examiner, by drawing a line over such material.
7. Use only black/blue ink pens to write the answers.
8. Calculators are allowed during this examination.
9. Special consideration is given to neat and tidy work/calculations.
10. Write meaningful concise answers in point form where necessary.
11. State any assumptions that you have made.



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UNIVERSITY OF VOCATIONAL TECHNOLOGY

Faculty of Training Technology

Bachelor of Technology in Information and communication Technology
(Multimedia & Web, Software, Network) 2019 / 2020 (B1 and B2)

IT 103011 Mathematics for ICT-I

Year I - Semester - I Examination - January 2020

Instructions: Answer 05 questions by selecting at least 02 questions from each part
Calculators are allowed.

Duration : 03 hours

PART-A

1.

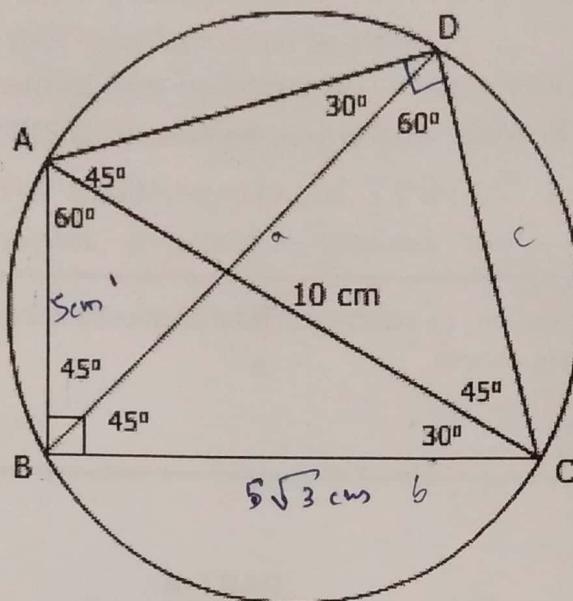
- (a) Simplify $2x^2 - (x - xy) - x(2y - x)$. **(05 marks)**
(b) Find all the factors of the expression $x^4 - 6x^3y - 2x^2y + 12xy^2$. **(06 marks)**
(c) The current I in an AC circuit is given by
$$I = \frac{V}{\sqrt{R^2 + X^2}}$$
. Make V the subject of the formula and evaluate V when $R = 4.8$, $X = 10.5$ and $I = 15$. **(09 marks)**

2.

✗

- (a) In a system of pulleys, the effort P required to raise a load W is given by $P = aW + b$, where a and b are constants. If $W = 40$ when $P = 12$ and $W = 90$ when $P = 22$, find the values of a and b . **(10 marks)**
(b) The manager of a theater estimates that the profit P in hundreds of dollars per show, can be represented by $P = -(t - 12)^2 + 100$, where t ($t > 0$) is the price of a ticket in dollars.
i. For what price of the ticket the profit will be zero. **(03 marks)**
ii. What is the price of a ticket that profit is maximum? **(04 marks)**
iii. Draw the graph of the profit function. **(03 marks)**

3. ABCD is a quadrilateral enclosed in a circle, AC is a diameter of the circle and its length $AC = 10 \text{ cm}$. Values of the different angles are indicated in the diagram.
(You can assume $\sin 30^\circ = \cos 60^\circ = 0.50$, $\cos 30^\circ = \sin 60^\circ = 0.87$, $\sin 45^\circ = \cos 45^\circ = 0.71$)



- (a) Using basic trigonometric ratios find the lengths AB, BC, AD and DC to two decimal places. **(08 marks)**
- (b) Write formula for $\sin(A + B)$ and hence find the value of $\sin 75^\circ$ to two decimal places. **(04 marks)**
- (c) Apply sin rule to BCD triangle and find the length of BD to two decimal places. **(04 marks)**
- (d) Calculate the area of the quadrilateral ABCD to nearest two decimal places. **(04 marks)**

4.

- (a) Find the equation of the straight line passing through the point (2,5) and perpendicular to line $3x + 4y = 9$ **(06 marks)**
- (b) Solve the equation $2\log x - \log(x-1) = \log(x-2)$. **(05 marks)**
- (c) Write binomial expansion of $(x-y)^8$. Find the value of the middle term when $x = 2$ and $y = \frac{1}{2}$ **(09 marks)**

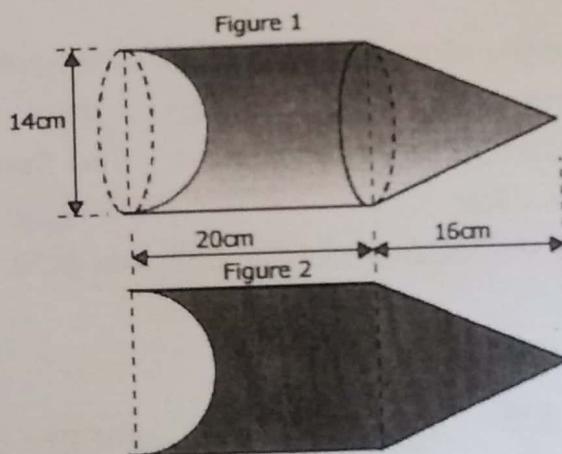
PART-B

5.

- (a) Convert 241.65625_{10} to equivalent Binary, Octal and Hexadecimal number. (06 marks)
- (b) Convert 110101111.01011_2 to Octal then convert it to decimal number. (05 marks)
- (c) Convert 572.6875_{10} to Octal number and then convert it to Binary number. (05 marks)
- (d) Convert Hexadecimal number $3A5.F4_{16}$ to Octal number. (04 marks)

6.

A composite solid object is made by joining a cone to one end of the cylinder and hemispherical part is removed from the other end of the cylinder. Figure 1 shows the image of the composite object and its dimensions. Figure 2 shows the cross-section of the composite object.



- (a) Find the area of the cross-section (08 marks)
- (b) Find the volume of the composite object. (12 marks)
- (Hint: Volume of a cylinder = $\pi r^2 h$, Volume of a cone = $\frac{1}{3} \pi r^2 h$, Volume of a hemisphere = $\frac{2}{3} \pi r^3$)

7.

$$A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix} \text{ and } B = \begin{pmatrix} 1 & 1 \\ 2 & 1 \end{pmatrix}$$

- (a) Find $\text{Det}(A)$, A^{-1} , A^2 , B^2 and AB **(10 marks)**
(b) Solve the following equations using matrices **(05 marks)**
- $2x + 5y = 3$
 $x + 3y = 2$
- (c) Find $(A + B)^2$ and check whether it is equals to $A^2 + 2AB + B^2$ **(05 marks)**

8. The following are the lives of 100 electric light bulbs.

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- a. Calculate the Mode life of the bulb using formula. **(03 marks)**
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c. Prepare cumulative frequency table (less than) and draw less than ogive for above data. **(04 marks)**
d. Calculate the Mean life of the bulb and its Standard Deviation. **(10 marks)**

$$\left(\text{If } u = \frac{x-A}{c} \quad \text{then } \bar{x} = A + c \bar{u} \text{ and } SD = c \sqrt{\frac{\sum f u^2}{\sum f} - \bar{u}^2} \right)$$

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UNIVERSITY OF VOCATIONAL TECHNOLOGY

Faculty of Training Technology

Bachelor of Technology in Information & Communication Technology

(Multimedia & Web, Software, Network) 2019 / 2020 (B1/B2)

Year I – Semester- I Examination - January -2020

Database Design - IT103061

Instructions: Answer 05 Questions.

Duration : 03 Hours

- (01). Database is a large, integrated, shared central source or pool of data meant to be shared by many users for a variety of applications
- (i) In addition to being integrated & shareable, the database must have certain additional technical properties if it is to be acceptable to its users. List four (4) technical requirements of a database. (04 marks)
- (ii) What is DBMS (02 marks)
- (iii) What are four (4) basic components of DBMS (Hardware / software / databases) (04 marks)
- (iv) List five (5) vendors/products of DBMS (05 marks)
- (v) List five (5) functions of DBMS (sharing data) (05 marks)
- [20 marks]

(02).

- (i) Briefly explain following components in an ER Diagram

Entities (2 types of entities) (strong entity / weak entity)

Attributes (4 types of attributes) (simple attr / composite attr / stored attr / derived attr / key attr)

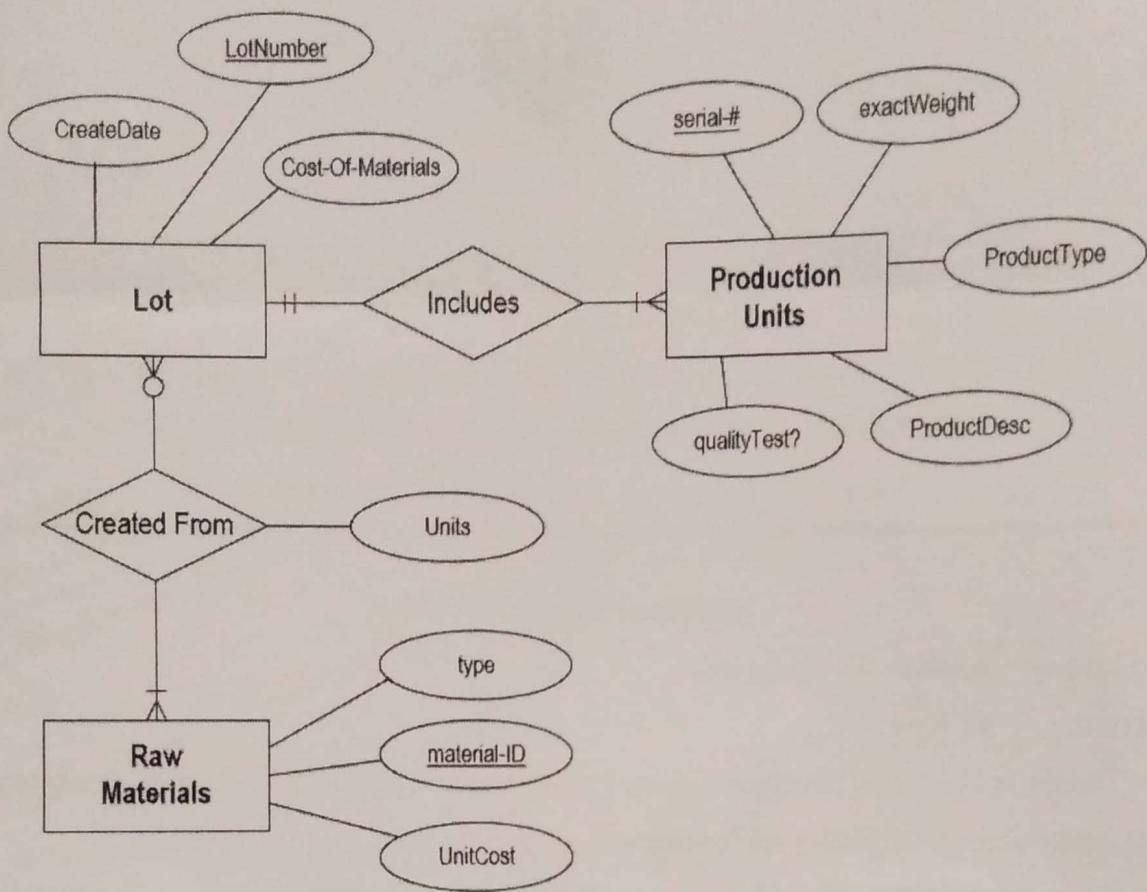
Relationships (3 types degree of relationships) (uni / bin / tri)

Cardinality ratios (3 types of cardinality ratios) (1:n:m)

(ii) Please convert the following ER diagram into a relational database schema.

(12 marks)

(08 marks)



[20 marks]

- (03). The university research symposium committee has decided to use a database to handle the research papers of the annual research symposium. Reviewer's comments, author information also recorded.

The data requirements are summarized as follows.

- The authors of the papers are uniquely identified by an email _ ID. First name, last name, research field and institute are also recorded.
- A paper may have multiple authors. Each paper is assigned a paper ID by the system and is described by a title, keywords of the paper, and the year of the research.
- Each reviewer is uniquely identified by a reviewer's ID. Each reviewer's first name, last name, phone number, affiliation and topics of interest are also recorded.
- Each paper is reviewed by two reviewers. A reviewer marks each paper assigned to him. These marks are stored as a review status along with the paper id and the reviewer's id. Finally, each reviewer provides an overall recommendation regarding each paper.

PET ID	PET NAME	PET TYPE	PET AGE	OWNER	VISIT DATE	PROCEDURE
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- (i) Identify all the **entities, attributes** and then draw the ER (Entity Relationship) diagram for the proposed system. (12 Marks) ($2 \times 4 = 8$ Marks)
- (ii) Briefly define the following terms.
- Ext/Con Mapping [20 marks]
 - Con/Int Mapping

(04)

(i) Briefly explain **partial dependency** and **transitive dependency** with suitable examples (04 marks)

(ii) Briefly explain **primary key, candidate key and foreign key** with suitable examples (06 marks)

(iii) draw a dependency diagram for the following table. Indicate any partial or transitive dependencies on your diagram. (10 marks)

Invoice No.	Product No.	Sale Date	Prod Desc	Vend Code	Vend Name	Qty Sold	Prod Price
211347	AAE33	3/25/98	Drill Bit	211	Black&Decker	3	2.95
211347	AR456	3/25/98	Drill	211	Black&Decker	1	29.99
211348	AR444	4/5/99	Screw	133	Acme	55	.17

(05).

- (i) Define or describe the term Normalization, (02 marks)
- (ii) Define the terms 1NF, 2NF and 3NF. (06 marks)

<u>PET-ID</u>	<u>PET-NAME</u>	<u>PET-TYPE</u>	<u>PET-AGE</u>	<u>OWNER</u>	<u>VISIT DATE</u>	<u>PROCEDURE</u>
246	ROVER	DOG	12	SAM COOK	JAN 13/2002 MAR 27/2002 APR 02/2002	01 - RABIES VACCINATION 10 - EXAMINE and TREAT WOUND 05 - HEART WORM TEST
298	SPOT	DOG	2	TERRY KIM	JAN 21/2002 MAR 10/2002	08 - TETANUS VACCINATION 05 - HEART WORM TEST
341	MORRIS	CAT	4	SAM COOK	JAN 23/2001 JAN 13/2002	01 - RABIES VACCINATION 01 - RABIES VACCINATION
519	TWEEDY	BIRD	2	TERRY KIM	APR 30/2002 JUN 30/2002	20 - ANNUAL CHECK UP 12 - EYE WASH

- (iii). Why is the above table not in 1NF ? (02 marks)
- (iv). Describe the process of normalizing the data shown in the table above to First Normal form (1NF). (03 marks)
- (v). Convert the above relation to 2NF relations (04 marks)
- (vi). Convert the above relation to 3NF relations (03 marks)
- [20 marks]

(06).

- (i) What is SQL? What are the various subdivisions of SQL? (5 marks)
- (ii) Study the following tables DOCTOR and SALARY and write SQL commands for the following questions. (3*5 = 15 marks)
- Display NAME of all doctors who are in "MEDICINE" having more than 10 year experience from the table DOCTOR.
 - Display the average salary of all doctors working in "ENT" department using the tables DOCTOR and SALARY. Salary=BASIC + ALLOWANCE.
 - Display the minimum ALLOWANCE of female doctors.
 - Display the highest consultation fee among all male doctor.
 - Display the count of female doctors.

TABLE: DOCTOR

ID	NAME	DEPT	SEX	EXPERIENCE
101	John	ENT	M	12

104	Smith	ORTHOPEDIC	M	5
107	George	CARDIOLOGY	M	10
114	Lara	SKIN	F	3
109	Georgia	MEDICINE	F	9
105	Johnson	ORTHOPEDIC	M	10
117	Lucy	ENT	F	3
111	Bill	MEDICINE	F	12
130	Morphy	ORTHOPEDIC	M	15

TABLE : SALARY

ID	BASIC	ALLOWANCE	CONSULTATION
101	12000	1000	300
104	23000	2300	500
107	32000	4000	500
114	12000	5200	100
109	42000	1700	200
105	18900	1690	300
130	21700	2600	300

[20 marks]

(07). Write output of following SQL command by referring the given table "section".

ID	course_id	sec_id	semester	year
10101	CS-101	1	Fall	2009
10101	CS-315	1	Spring	2010
10101	CS-347	1	Fall	2009
12121	FIN-201	1	Spring	2010
15151	MU-199	1	Spring	2010
22222	PHY-101	1	Fall	2009

(i) select distinct course_id

from section

where semester = 'Fall' and year = 2009 and

course_id in (select course_id

from section

where semester = 'Spring' and year = 2010);

(5 marks)

course_id
10101

QW

- (ii) ~~select distinct course_id
from section
where semester = 'Fall' and year= 2009 and
course_id not in (select course_id
from section
where semester = 'Spring' and year= 2010);~~ (5 marks)
- (iii) ~~select course_id
from section as S
where semester = 'Fall' and year= 2009 and
exists (select *
from section as T
where semester = 'Spring' and year= 2010
and S.course_id= T.course_id);~~ (5 marks)
- (iv) List five (5) aggregate functions ~~sum | count | avg | max | min~~ (5 marks)
[20 marks]

(08)

- (i) What is database administration? (4 marks)
- (ii) What is a backup? (4 marks)
- (iii) What is a view in a database? (4 marks)
- (v) List four roles of a database administration? (4 marks)
- (vi) List four Approaches for securing a DBMS on the web (4 marks)
[20 marks]



UNIVOTEC

UNIVERSITY OF VOCATIONAL TECHNOLOGY

Faculty of Training Technology

Bachelor of Technology ICT 2019/2020 B1 & B2

Year I – Semester – I Examination - January 2020

Jayd

IT104031 Software Development Practices

Duration: Three (03) Hours

Instructions

1. This question paper has **Seven (07)** questions.
2. Answer only **Five (05)** questions.
3. All questions carry **Twenty (20)** marks.
4. Start answering each question from a new page of the answer book and write the relevant question number at the top of the page.
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7. Use only black/blue ink pens to write the answers.
8. Calculators are allowed during this examination.
9. Special consideration is given to neat and tidy work/calculations.
10. Write meaningful concise answers in point form where necessary.
11. State any assumptions that you have made.

Question 1

Software Requirement Gathering phase is considered as the most important phase in software development.

- i. Describe the term "Software Requirement Gathering" in your own words. (4 Marks)
- ii. Explain briefly why Software Requirement Gathering is very important. (6 Marks)
- iii. What are the possible problems a software developer would face if the software requirement is gathered incorrectly? (4 Marks)
- iv. How could the software developer avoid the problems you mentioned above? Discuss. (6 Marks)

Question 2

Your new client wants you to build software that deals with lots of money-related transactions. The client also wants the system in 6 months.

- i. Name the most suitable software development life cycle you would use with this particular client. Explain why you selected this particular model (4 Marks)
- ii. By using a diagram, briefly describe the software development life cycle you have selected. (6 Marks)
- iii. What are the problems you would face by using the software development life cycle you have selected? (4 Marks)
- iv. How would you overcome the problems mentioned above? (6 Marks)

Question 3

Sometimes specific software requires updates time to time.

- i. Explain the term software updates. (4 Marks)
- ii. During what phase of the software development life cycle, do you get words like "software updates"? Explain your answer. (6 Marks)
- iii. Assume a software that you developed has a critical security problem. What are the correct steps you would follow when you are going to release a software patch? (10 Marks)

Question 4

The use of prototypes is very important in software development.

- i. Describe the concept of "Throw away Prototypes" with an example. (4 Marks)

- ii. What is the role played by "Throw away Prototypes" when designing new software? (6 Marks)
- iii. "Throw away Prototypes" are much better than "Evolutionary Prototypes." Do you agree with this statement? Justify your answer. (10 Marks)

Question 5

Software Testing plays an essential role in the software development life cycles.

- i. Explain the term "Software Testing"? (4 Marks)
- ii. What is the purpose of carrying out "Software Testing" by developers? (6 Marks)
- iii. What is the best time during software development to carry out "Software Testing"? Give reasons for your answer. (10 Marks)

Question 6

"Predictable risks" must be managed during software development.

- i. Describe the concept of "Predictable Risks" with an example. (4 Marks)
- ii. What would happen if you do not manage "Predictable Risks" properly? (6 Marks)
- iii. What is the way to manage "Predictable Risks" in your software project? Explain using a scenario of your choice. (10 Marks)

Question 7

Briefly explain five (5) of the following terms in the context of software development practices (5x4 = 20 Marks)

- i. Secondary Stakeholders
iii. Waterfall model
v. Commercial Off the Shelf Software
vii. In-house development
ii. Environmental feasibility
iv. End-user satisfaction
vi. Programmer
viii. Software Quality

----- End of Paper -----



UNIVERSITY OF VOCATIONAL TECHNOLOGY
Faculty of Training Technology

Bachelor of Technology in Software Technology/ Multimedia
Technology/ Network Technology - 2019 / 2020 (B1 and B2)

Year I – Semester - I Examination - February 2020

290:

60

IT103041 – Digital Electronics

Instructions : Exam Paper has 6 Questions. Answer 5 Questions only.

Duration : 03 hours

Q1:

- 1.1 Draw logic diagram for the given Boolean expression.

$$W = B' \cdot C' + A' \cdot B \cdot C + A \cdot C \cdot D'$$

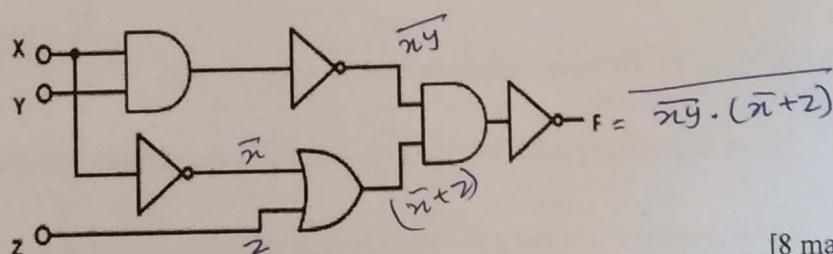
[3 marks]

- 1.2 Simplify below Boolean function.

$$F = A'_z \cdot B'_z \cdot C + A'_z \cdot B_z \cdot C + A_z \cdot B'_z$$

[3 marks]

- 1.3 Find the Boolean equation for following circuit and simplify the Boolean equation.
Draw a logic diagram for the simplified Boolean Equation.



[8 marks]

- 1.4 Prove the following Boolean expressions using truth tables.

$$AB + BC + A'C = AB + A'C$$

[6 marks]

$$(A + C)(A + D)(B + C)(B + D) = AB + CD$$

Q2:

2.1 Draw a K-Map for following Boolean function F together with don't care conditions

d

Obtain a simplified logic expression using the K-Map

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

$$F(A,B,C,D) = \sum_m (1,5,6,12,13,14) + d(2,4)$$

[8 marks]

2.2

- Implement simplified Boolean expression obtained in 2.1 using NAND gates only.
- [4 marks]

2.3

Design and draw logic diagram for 1 bit magnitude comparator.

Hint: One bit magnitude comparator can compare two 1 bit numbers. You can consider two 1-bit numbers as A and B. One bit magnitude has 3 output terminals to test below conditions.

- a. $A = B$
- b. $A > B$
- c. $A < B$

[8 marks]

Q3:

3.1

- What is a multiplexer? With logic circuit and function table explain the working of 8-to-1 line multiplexer.

[6 marks]

3.2

- Implement a 8-to-1 multiplexer using lower order multiplexers. (You can choose any lower order multiplexers)

[6 marks]

3.3

- Implement the Boolean function $F(A,B,C) = \sum_m (1,2,4,7)$ using multiplexers.

[8 marks]

Q4:

4.1

- What is the difference between a latch and a flip flop.

[2 marks]

4.2

- Draw logic diagram for JK flip-flop. (You can use graphical symbol of D flip flop).

[2 marks]

4.3

- Draw graphical symbol and Characteristic table for JK flip-flop.

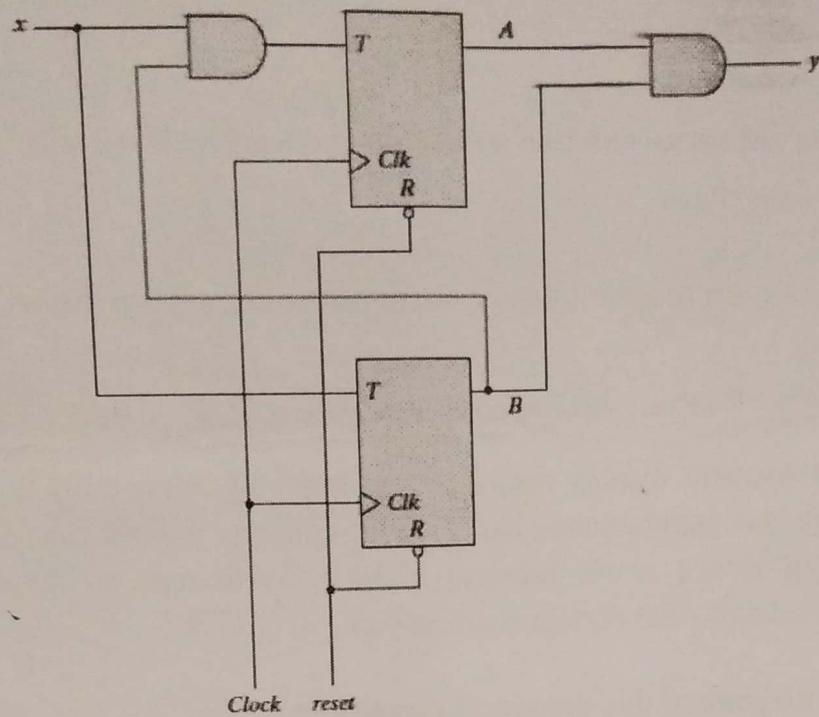
[4 marks]

4

- Obtain the state table and state diagram for below sequential circuit.

[12 marks]

D	clk	Q	Q̄	memory
X	0	0	1	mem
1	1	1	0	0

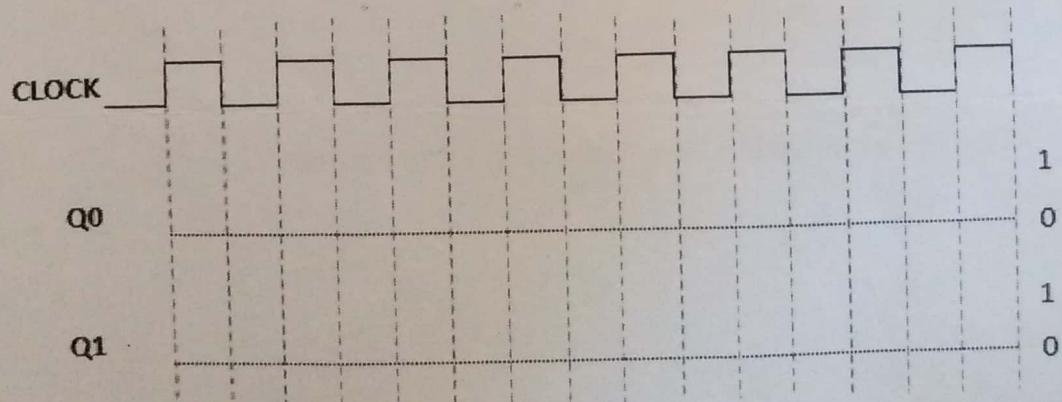
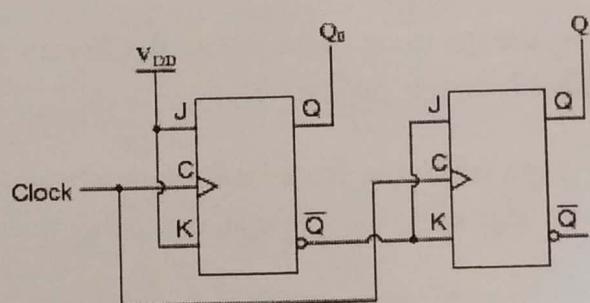


Q5:

5.1 Explain the role of registers and counters. [4 marks]

5.2 What is a shift register? Draw a diagram of a simple shift register and explain the behavior of the circuit. [8 marks]

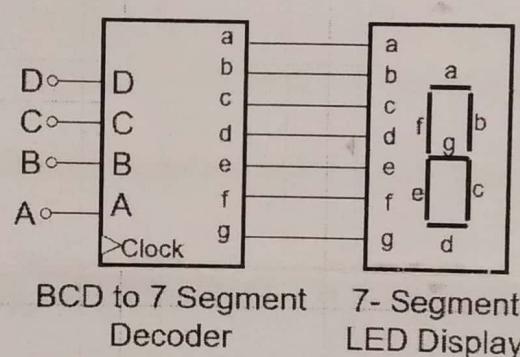
5.3 Complete a timing diagram for this synchronous counter circuit, and identify the direction of its binary count. [8 marks]



Q6:

- 6.1 Explain the difference between sequential and combinational logic circuits using appropriate diagrams. [4 marks]
- 6.2 Draw the diagram of a 4 bit Ripple Carry Adder and explain the operation of the circuit. [6 marks]
- 6.3 The seven segment display decoder is an important digital circuit which is used in many industrial applications. The decoder converts a 4 bit Binary Coded Decimal (BCD) digit into a seven segment code that will turn on the appropriate LED segments to display the correct decimal digit.

The block diagram of this decoder is given below.



You are asked to design a seven segment display to indicate digits from 0-9. Displaying alphabet letters is not required.

- a. Complete the given table that shows the relation between the inputs (A, B, C and D) and the seven segments, i.e. a, b, c, d, e, f and g.

Decimal	Inputs				Seven Segments						
	A	B	C	D	a	b	c	d	e	f	g

- b. Obtain simplified Boolean expression using K-Maps.

[10 marks]

- Physical Layer is responsible for movements of individual bits from one hop (node) to the next.
- * Physical characteristics of interfaces and medium. (also defines the type of transmission medium)
 - * Representation of bits. (define the type of encoding)
 - * Data rate (transmission rate)
 - * Synchronization of bits
 - * Transmission mode (simplex/half duplex/full duplex)
- All Rights Reserved**
- * Physical topology
 - * Line configuration
 - * Flow control
 - * Error control
- Data Link Layer is responsible for moving frames from one hop (node) to the next;
- * Physical addressing
 - * Framing
 - * Access control



UNIVERSITY OF VOCATIONAL TECHNOLOGY

Syed

Faculty of Information Technology

Bachelor of Technology in Software Technology/Network Technology & Web & Multimedia Technology 2019 / 2020 (B1/B2)

Computer Programming IT104021

Year I - Semester - I Examination - January 2020

Instructions: This paper is consist of 3 parts Part A, Part B and Part C. Read the instructions of each part and write the answers in the given answer script.

Duration : 03 hours

Total Marks : 100

Part A

(20 marks)

Answer all the questions. Write the most suitable answer in the given answer sheet.

1. Address of variable month_sal of type float is
 - a. *month_sal
 - b. &month_sal
 - c. float &month_sal
 - d. float month_sal&

Network Layer is responsible for the delivery of individual packets from the source host to the destination host.

- * Logical addressing
- * Routing

2. The output of the following code is

```
char ch[3] = {'a','b','c'};
for (int x=0; x<3; x++)
{
    cout<<ch[x];
}
```

- a. "abc"
- b. 'a','b','c'
- c. abc
- d. a,b,c

Transport Layer is responsible for the delivery of a message from one process to another.

- * Service-point addressing
- * Segmentation and reassembly
- * Connection control
- * Flow control
- * Error control (damage, loss, duplication)

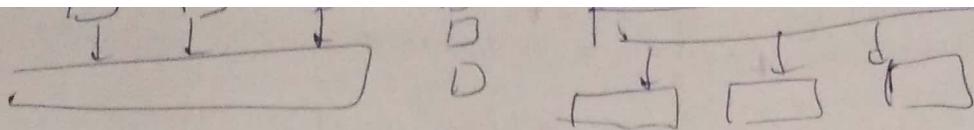
Session Layer is responsible for dialog control and synchronization. It establishes, maintains and synchronizes the interaction among communicating systems.

presentation Layer

is responsible for translation, compression and encryption.

Application Layer is responsible for providing services to the user.

- * Network virtual terminal.
- * File transfer, access, and management.
- * Mail services
- * Directory services



3. The process of building multiple classes from single baseclass is called,
- Multiple Inheritance
 - Multilevel Inheritance
 - Hierarchical Inheritance
 - Virtual Inheritance

- 4) A variable defined within a block is visible
- From the point of definition onward in the program
 - From the point of definition onward in the function
 - From the point of definition onward in the block
 - Throughout the function

5. What is not a valid constructor from followings?
- Book() {}
 - Book(int a, int b=2){}
 - Book(int a, string n){}
 - void Book(){}

6. Consider the following code.

```
Int x=12, y=20;
```

```
x = (x>y) ?x+y : x-y;
```

What will be the output of x after executing above statements?

- 12
- 20
- 8
- 32

7. How many times the string test is printed?

```
int i=0;
lbl:
cout<<"test";
i++;
if(i<5)
{
    goto lbl;
}
```

- Error
- 5 times
- 4 times
- 1 time

8. What should be the output of below program?

```
int a = 1;
switch(a)
{
case 1: cout<<"A";
case 2: cout<<"B";
case 3: cout<<"C";
default: cout<<"Default";
}
```

- a. A
b. Compilation Error
c. Default
d. ABC

9. The data elements in structure are also known as;

- a. Data
b. Members
c. Objects
d. none of these

10. In place of structure which can be used in C++ programming?

- a. int
b. float
c. class
d. manipulator

11. Which of the following gives the memory address of the first element in array?

- a. array[0];
b. array[1];
c. array(0);
d. array; >

12. _____ is a collection of variables of different data types under a single name.

- a. Structure
b. Object
c. Array
d. Class

13. To create an output stream, we must declare the stream to be of class _____

- a. ofstream
b. ifstream
c. iostream
d. None of these

14. ifstream fin; would be used when

- a. Creating a file
b. Reading a file
c. Appending a file
d. Removing a file

15. A string is terminated by a

- a. Null character
b. Boolean expression
c. Semicolon
d. All of them

16. Which is used to return the number of characters in the string?

- a. Length
b. Size
c. both size & length
d. name

17. What will be the output of the following program?

```
int arr1[] = { 4, 5, 6, 7 };
int* pptr = (arr1 + 1);
cout << *arr1 + 10;
```

- a. 12
b. 15
c. 14
d. Error

18. Which of the following is the correct way to declare a pointer?
- a. int *ptr
 - b. int ptr
 - c. int &ptr
 - d. All of the above
19. Choose the right option
string* x, y;
- a. x is a pointer to a string, y is a string
 - b. y is a pointer to a string, x is a string
 - c. Both x and y are pointers to string types
 - d. none of the above
20. Which of the following can be taken as a valid identifier in C++?
- a. first name
 - b. 67bs
 - c. w12
 - d. first-name

Answer ALL questions. Each question carries equal marks.

1. What do you mean by protected access specifier?
data members in member function can be accessed by other function.
2. What are the differences between local variables and global variables?
3. Write a program to calculate the sum of natural numbers using loops
4. Identify the errors in the following code and rewrite it correctly.

```
# include<iostream>
using namespace std;
```

```
int Mul (int a, int b);
```

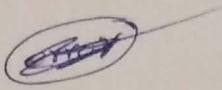
```
int main()
{
    int z, x, y;
    cout<< "Enter x , y";
    cin>> x >> y;
    z = Mul( x, y);
    cout<< "Multiplication of 2 numbersZ=" << z;
    return 0;
}
intMul (int a, int b)
{
    int r;
    r = a*b;
    return r;
}
```

5. What will be the output of following program?

```
#include <iostream>
using namespace std;
int main()
{
    int value = 12;
    int *pointer = &value;
    cout<< "Value lives at: " << value << "\n";
    cout<< "Pointer lives at: " << *pointer;
    cout<< "\n\n";
    return 0;
}
```

12

6. Write the common formula(syntax) for data structures

struct structure-name
{ data members;
methods or functions }


7. Write the output of the following program.

```
#include<iostream>
using namespace std;

void astericks(void);
int main(void)
{
    cout<<"Cloud computing \n";
    astericks();
    cout<<"It sharing of resources\n";
    astericks();
    return 0;
}

void astericks(void)
{
    int i;
    for(i = 1; i<=20; i++)
        cout<<"*";
    cout<<endl;
    return;
}
```

Cloud computing

xxxxx xxxxx xxxx

It sharing of resources

xxxxxx xxxx xxxx

20

20

8. Write a program that will ask the user to input n positive numbers. The program will terminate if one of those number is not positive.

9. Find the errors in the program and rewrite it correctly.

```
#include <iostream>
using namespace ; std;

int main()
{
    int i;
    int n;
    cout<< "Enter a positive integer: ";
    cin>> n;

    cout<< "Factors of " << n << " are: " << endl;
    for(i = 1; i<= n; ++i)
    {
        if(n % i == 0)
            cout<<i<<endl;
    }

    return 0;
}
```

```
#include <iostream>
using namespace std;

int main()
{
    int n;
    for(i=1; i>=1; i++) {
        cout<< "Please enter no: ";
        cin>> n;
        if (n<0)
            break;
        cout<< "You entered no. " << endl;
    }
    return 0;
}
```

10. What is the output of the following program

```
#include <iostream>
using namespace std;

int main () {
    char grade = 'D';

    switch(grade) {
        case 'A':
            cout<< "Excellent!" << endl;
            break;
        case 'B':
            cout<< "Well done" << endl;
            break;
        case 'C':
            cout<< "You passed" << endl;
            break;
        case 'D':
            cout<< "Better try again" << endl;
            break;
        case 'F':
            cout<< "Invalid grade" << endl;
    }
    cout<< "Your grade is " << grade << endl;

    return 0;
}
```

You passed

You passed

Part C

(50 marks)

Answer any 5 questions. Each question carries equal marks.

1. Write a C++ program to read 10 numbers to an array and sort them in descending order.
2. Find the factorial of n by using recursive function.
3. Write a program to print numbers 1-50 except number 20.
4. Write a C++ program to calculate employee salary of ABC Company. Required details are as follows

Define a class Employee with the following specifications:

Private members of the class Employee are

Emp_Id integer
Emp_Name 40 characters
Basic_Salary, Gross_Salary, OT_hours float

GrossSalary() - A function to calculate the gross salary of the employee

$$\text{Gross_Salary} = \text{Basic_Salary} + (\text{OT_hours} * \text{OT_rate})$$

$$\text{OT Rate} = 1000$$

NetSalary() - A function to calculate the net salary of the employee and return it

$$\text{Net Salary} = \text{Gross_Salary} - \text{EPF}$$

$$\text{EPF} = 8\% \text{ from Gross_Salary}$$

Public members of the class Employee are

getDetails() function to read Emp_Id, Emp_Name , Basic_Salary, OT_hours

displayDetails() function to display Employee_Id, Employee_Name . It invokes GrossSalary() and NetSalary() functions to calculate the gross and net salaries and should print only the net salary.

Note : You are also required to give detailed function definitions.

5. Write C++ program to print following pattern.

1
1 2
1 2 3
1 2 3 4
1 2 3 4 5

0 1 2 3, 4

6. Program to store and calculate the sum of 5 numbers entered by the user using an arrays.

7. Write a program to calculate power of a number(Hint: user inputs are base and exponent)