အဆင့်မြင့်ပညာဦးစီးဌာန

ကွန်ပျူတာတက္ကသိုလ်

ပထမနှစ် (B.C.Sc/B.C.Tech)

အတန်းတင်စာမေးပွဲ

မြန်မာစာ

စက်တင်ဘာ၊ ၂၀၁၈

မေးခွန်းအားလုံးဖြေဆိုပါ။ **ခွင့်ပြုချိန်- (၃) နာရီ**

၁။ (က) အောက်ပါနှစ်သက်ရာ **နှစ်ခု** ကိုဖြေဆိုပါ။

ကာ၊ ခါ သည်၊ မှာ မီ၊ မှီ

(ခ) အောက်ပါစာပိုဒ်ကိုအနှစ်ချုပ်ပါ။

အားလပ်သောအချိန်များ၌ လေထဲတွင်တိုက်အိမ်ဆောက်၍နေမည့်အစား အတတ်ပညာတစ်ခုခုကိုကောက်၍သင်လျှင် တစ်နှစ်နှစ်အတွင်း အကျိုးခံစားရနိုင်လေသည်။ လမ်းအခွင့်တို့သည်ဝတ္ထုရိုင်းနှင့်တူကြ၏။ဆီး၍ဖမ်းယူပြုပြင်လျှင် အဖိုးတန်သောဝတ္ထုအစုဖြစ်ရလေသည်။ မိမိထံသို့လာသောထိုဝတ္ထုအရိုင်းတို့ကို မရှုမပြင်မယူမငင်မူ၍ ပူပင်စွာအဝေးကိုပြေးလွှားရှာ၍နေသောသူတို့အတွက် အလှမ်းကျယ်အလယ်လပ်သည်ဟူသောစကားကို ကျွန်ုပ်တို့ဘိုးဘေးများထားခဲ့လေသည်။ တွေ့သမျှသောစာအုပ်သည် ကြီးပွားရန်လမ်းအခွင့်ဖြစ်၏။ဖတ်သမျှသောစာသည် ကြီးပွားရန်လမ်းအခွင့်ဖြစ်၏။သတင်းစာ၌ပါသောသတင်းဟူသမျှသည် ကြီးပွားရန်လမ်းအခွင့်ဖြစ်၏။

၂။ နှစ်သက်ရာ **တစ်ပုဒ်** ကိုဖြေဆိုပါ၊

(က) ဘုရားဖူးသွားခြင်းစကားပြေမှစာရေးသူဦးဖိုးကျား၏စေတနာ

(ခ) နိုင်ငံနှင့်လူမျိုးအပေါ်ထားရှိသောမက္ခရာမင်းသားကြီး၏စေတနာနှင့်ကြိုးပမ်းဆောင်ရွက်ချက်

၃။ နှစ်သက်ရာ **တစ်ပုဒ်** ကိုဆွေးနွေးတင်ပြပါ၊

(က) အမေ့နားကပ်ကလေးကဗျာမှသားကောင်းသမီးကောင်းတို့၏ဝတ္တရား

(ခ) ရွှေဘိုမြင်းကဗျာမှအမျိုးရေးစိတ်ဓာတ်

၄။ နှစ်သက်ရာ **တစ်ပုဒ်** ကိုစီကုံးတင်ပြပါ၊

(က) မိုးစကားပြေမှစာရေးဆရာမောင်အာယု၏သရုပ်ဖော်အရေးအသား

(ခ) သတ္တိအရှိဆုံးအချိန်ကဗျာမှစာဆို၏အရေးအဖွဲ့စွမ်းရည်

၅။ နှစ်သက်ရာ **တစ်ပုဒ်** ·ကိုစီကုံးတင်ပြပါ၊

(က) မြန်မာဝေါဟာရအဓိပ္ပါယ်ကိုဖွင့်ဆိုသူ

(ခ) ယဉ်ကျေးမှုအစစ်လူ့အနှစ်

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Department Of Higher Education

University Of Computer Studies, Hinthada

First Year (B.C.Sc. / B.C.Tech.)

Final Examination

English

September, 2018

Answer all questions. **Time allowed: 3 hours**

QUESTION-I **(30 marks)**

I. Read the article and answer the questions.

Some Facts and Theories about Flu

The flu, more properly known as influenza, takes its name from the fact that it is so easily transmitted from person to person (influenza is the Italian word for 'influence'). Usually, contamination occurs through direct contact with secretions from an infected person. Its spread is also possible from contaminated airborne particles, such as those that occur when someone coughs or sneezes. However, it should be made clear that the risk is not great from simply being in the same room as an infected person, since the flu virus, unlike other respiratory viruses, does not dissolve in the air. Within 4-6 hours of someone catching the flu, the virus multiplies in infected cells and the cells burst, spreading the virus to other cells nearby.

The spread continues for up to 72 hours, the exact length of time depending on the body's immune system response and the strength of the particular strain of flu. The range of human responses to the flu virus has been of interest to scientists for many years. This is because the effect can vary from no infection to a rapid and deadly spread of the virus to many people. One area of study that has received particular attention is the immune system response of the individual. Where a person's immune system is healthy, the virus is attacked as it enters the body, usually in the respiratory tract. This lessens the severity of the illness. In contrast, people with compromised immune systems (typical in the young, where it is not fully developed, or in the old and the sick, where it is not working efficiently), often suffer the worst effects.

One of the body's responses to flu is the creation of antibodies which recognize and destroy that particular strain of flu virus. What fascinates most researchers in the field is that the human body seems capable of storing these antibodies over a whole lifetime in case of future attack from the same or similar strains of flu. It was while researching these antibodies that scientists turned their attention back to what was possibly the worst ever flu pandemic in the world. The actual number of deaths is disputed, but the outbreak in 1918 killed between 20 and 50 million people. It is also estimated that one fifth of the population of the world may have been infected.

Through tests done on some of the survivors of the 1918 outbreak, it was discovered that, 90 years later, they still possessed the antibodies to that strain of flu, and some of them were actually still producing the antibodies. Work is now focused on why these people survived in the first place, with one theory being that they had actually been exposed to an earlier, similar strain, therefore developing immunity to the 1918 strain. It is hoped that, in the near future, we might be able to isolate the antibodies and use them to vaccinate people against further outbreaks.

Yet vaccination against the flu is an imprecise measure. At best, the vaccine protects us from the variations of flu that doctors expect that year. If their predictions are wrong in any particular year, being vaccinated will not prevent us from becoming infected. This is further complicated by the fact that there are two main types of flu, known as influenza A and influenza B. Influenza B causes less concern as its effects are usually less serious. Influenza A, however, has the power to change its genetic make-up. Although these genetic changes are rare, they create entirely new strains of flu against which we have no protection. It has been suggested that this is what had happened immediately prior to the 1918 outbreak, with research indicating that a genetic shift had taken place in China.

In 2005, another genetic shift in an influenza A virus was recorded, giving rise to the H5N1 strain, otherwise known as avian flu, or bird flu. Typical of such new strains, we have no way of fighting it and many people who are infected with it die. Perhaps more worrying is that it is a strain only previously found in birds but which changed its genetic make-up in a way that allowed it to be transmitted to humans. Most of the fear surrounding this virus is that it will change again, developing the ability to pass from human to human. If that change does happen, scientists and doctors can reasonably expect a death rate comparable to that which occurred in 1918 and, given that we can now travel more quickly and more easily between countries, infecting many more people than was previously possible, it could be several times worse.

Questions 1-7

Do the following statements agree with the information given in Reading Passage? Write.

TRUE	if the statement agrees with the information
FALSE	if the statement contradicts the information
NOT GIVEN	if there is no information on this

1. The only way to catch flu is if someone coughs or sneezes near you.
2. You become aware of the symptoms of flu within 4-6 hours of infection.
3. The effect of a flu infection can depend on how strong the strain is.
4. Those who are more likely to suffer badly with the flu include very young or very old people.
5. Although antibodies last a lifetime, scientists have found they get weaker with age.
6. Vaccination is largely ineffective against flu.
7. Another change in the genetic make-up of the H5N1 strain could kill more people than the 1918 epidemic.

Questions 8-11 Classify the following statements as characterizing.

A something known by scientists to be true
B something believed by scientists to be true
C something known by scientists to be false

Write the correct letter, **A, B** or **C**

8. Sharing a room with a flu sufferer presents a very high risk to your health.
9. One fifth of the people in the world caught the flu in 1918.
10. Influenza A viruses do not change their genetic make-up frequently.
11. The H5N1 strain evolved in or before 2005.

Questions 12-15 Answer the questions below.

Write **NO MORE THAN THREE WORDS** for each answer.

12. How long is a person catching with the flu?
13. Which is worse influenza A or B?
14. In which part of the body do antibodies normally attack the flu virus?
15. What kind of transmission of the H5N1 strain are people afraid might become reality?

QUESTION-II

(20 marks)

(A) Put the verbs in brackets into the correct tenses to make conditional sentences.

1. What would you do if you (see) a snake?
2. If Steven opens the windows, the air in the room (be) better.
3. Susan (work) as a model if she had been taller.
4. If you heat ice, it (melt).
5. We (walk) into down town if the sun shines.

(B)Correct one mistake in each sentence and underline the word that you change.

1. When we moved, we packed up all of our furnitures.
2. There is too many traffic today!
3. My group came up with a lot of great idea.
4. These news rejoiced everyone in my family.
5. The old pond was full of fishes and weed.

(C) Classify each of the statement as *prediction* or *intention*?

1. Do you think you will pass the driving test?
2. I hope to improve my English gradually.
3. What are you going to wear for the party?
4. I think I might be late for school.
5. Susan is seeing the doctor tomorrow.

(D) Choose the correct word or words to complete each sentence.

1. Every year millions of people (*is treated/are treated/ treated*) for cancer.
2. The government, (*who/which/that*) is facing corruption charges, handled the diplomatic crisis badly.
3. I (*have had/ had/ had have*) a couple of toasts for breakfast this morning.
4. German (*speaks/ is speaking/ is spoken*) in Germany, Austria and Switzerland.
5. She loves Paris. She (*was/ had been/ has been*) there many times.

QUESTION-III

(20 marks)

(A) Fill in the blank with the words from the box.

neck	funds	customer	hand	incomes

1. A sale is being held to raise _____ for the school.
2. People on higher _____ should pay more tax.
3. Wave your _____ and say 'Goodbye'.

4. Jean wore a string of pearls around her _____.
5. _____ is a person who buys something or use services.

(B) Fill in the blanks with common prexies .

1. ____regular, ____relevant, ____responsible
2. ____all, ____coat, ____act
3. ____meter, ____scope, ____wave
4. ____ title, ____marine, ____committe
5. ____form, ____gender, ____action

(C)Choose the correct spelling of these words.

1. David watched her car until it (*dissappeared/ disappeared/ disapeared*) from view.
2. The managing director made an important (*announcement/ anuouncement/ anouncement*).
3. That sounds (*intesting/ interesting/ intresting*)! I would like to try it.
4. If you take IELTS writing test, you need to care your (*panctuation/ paunctuation/ punctuation).*
5. Give me some (*advice/advise/avdise*), please! I need your help!

(D)Choose the correct words from the brackets.

1. A synonym of 'create' is (*design/invent/develop*).
2. People may suffer (*of/for/ from*) allergy symptoms for several months of the year.
3. She doesn't (*earn/ get/take*) much money, but she enjoys the work.
4. Things are (*developed/manufactured/ created*) in factories.
5. I don't believe (*on/of/ in*) ghosts. It is a silly idea.

QUESTION-IV **(10 marks)**

Describe something you own which is very important to you. You should say:

- What it is
- Where you got it from
- How long you have had it

And explain why it is important to you.

QUESTION-V **(20 marks)**

Write an **ESSAY** on the following topic. Write at least 250 words.

Should wealthy nations be required to share their wealth among poorer nations by providing such things as food and education? Or is the responsibility of the governments of poorer nations to look after their citizens themselves?

What are your opinions on this topic?

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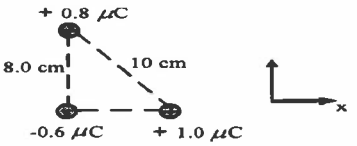
Department of Higher Education
University of Computer Studies, Hinthada
First Year (B.C.Sc./B.C.Tech.)
Final Examination
Physics
September, 2018

Answer All Questions. **Time Allowed: 3 Hours**

1.(a)Two charged particles attract each other with a force of magnitude F acting on each. If the charge of one is doubled and the distance separating the particles is also doubled, what is the magnitude of the new force acting on each of the two particles? (3 Marks)

Three point charges are fixed in place in a right triangle as shown in Figure. What is the electric force on the – 0.60 μC charge due to the other two charges?



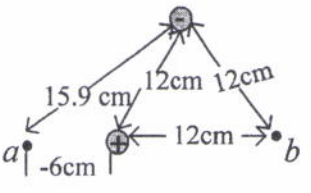
(7 Marks)

(b)Illustrate electric field lines due to two spheres with equal and opposite charges. (2 Marks)

What are the magnitude and direction of the electric field midway between two point charges, −15μC and +12μC, which are 8 cm apart? (8 Marks)

2.(a)For a positive charge, how about the direction of electric field with the direction of force on it? (2 Marks)

(i) Find the electric potential at point ***a*** and ***b*** for charges of +4.2 nC and −6.4 nC located as shown in Figure. (ii) What is the potential difference ΔV for a trip from ***a*** to ***b*** ? (iii) How much work must be done by an external agent to move a point charge of + 1.5 nC from ***a*** to ***b***?



(8 Marks)

(b) For a negative charge, what does lower potential energy mean? What do you understand a capacitor? Write down the unit of capacitance. (3 Marks)

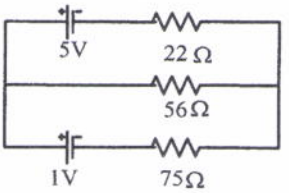
An electron is accelerated from rest through a potential difference ΔV. If the electron reaches a speed of 7.26×10^6 m/s. What is the potential difference? Be sure to include the correct sign (does the electron move through an increase or a decrease in potential?) (7 Marks)

3.(a) Does the resistivity depend on temperature? If so, how does resistivity depend on temperature? (2 Marks)

(i)If 0.32 mA of current flow through a calculator, how many electrons pass through per second?(ii) How long does it take for 1.0 μC of charge to pass through the calculator?(8 Marks)

(b)Mg Mg needs a 100 kΩ resistor for a circuit, but he only has ten 10 kΩ resistors. What can he do? (2 Marks)

Find the current in each branch of the circuit of Figure.



(8 Marks)

4.(a) Two identical bar magnets lie next to one another on a table. Sketch the magnetic field lines if the north poles are at the same end. (2 Marks)

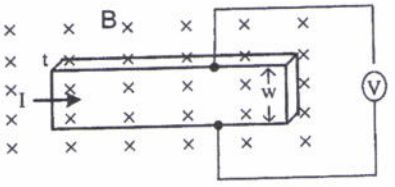
At a certain place, the Earth's magnetic field has magnitude 0.5 mT. The field direction is 70° below horizontal; it is horizontal components point due north. (i) Find the magnetic force on an electron moving straight up at 3×10^3 m/s. (ii) Compare the magnitude of the magnetic force to the electron's weight and the electric force on it due the Earth's fair weather electric field 150 V/m . (8 Marks)

(b) Which is velocity dependent, the electric force or the magnetic force? (2 Marks)

An electron moves with speed 2×10^5 m/s in a uniform magnetic field of 1.4 T, pointing south. At one instant, the electron experiences an upward magnetic force of 1.6×10^{-14}N. In what direction is the electron moving at that instant? Be specific: give the angles with respect to N, S, E, W, up, down. (8 Marks)

5.(a)A velocity selector is constructed to select ions moving at 8 km/s. If a particle enters this velocity selector with a speed greater than 8 km/s, in what direction is it deflected out of the beam? (2 Marks)

A flat slab of semiconductor has thickness t = 0.5 mm,width w = 1 cm and length L = 30 cm. A current I = 2 A flows along its length to the right shown in Figure. A magnetic field B = 0.25 T is directed into the page, perpendicular to the flat surface of the slab. Assume that the carriers are electrons. There are 7×10^{24} mobile electrons per m^3. (i) What is the magnitude of the Hall voltage across the slab? (ii) Which edge (top or bottom) is at the higher potential?



(8 Marks)

(b)How are electromagnetic wave produced? What can be used as a receiver or detector of EM waves. (2 Marks)

The solar panels on the roof of a house measure 2 m by 6 m. Assume they convert 35% of the incident EM wave's energy to electrical energy. (i) What average power do the panels supply when the incident intensity is 1 kW/m^2 and the panels are perpendicular to the incident light? (ii) What average power do the panels supply when the incident intensity is 0.4 kW/m^2 and the light is incident at an angle of 60° from the normal? (iii) Take the average daytime power requirement of a house to be about 2 kW. How do your answer to (i) and (ii) compare? What are the implications for the use of solar panels? (8 Marks)

Useful data

$\mu_0 = 4\pi \times 10^{-7}$ Tm/A

$\varepsilon_0 = 8.85 \times 10^{-12}$ C^2/Nm^2

$k = 8.99 \times 10^9$ Nm^2/C^2

$m_e = 9.109 \times 10^{-31}$ kg

$m_p = 1.673 \times 10^{-27}$ kg

$q_e = -1.6 \times 10^{-19}$ C

$c = 3 \times 10^8$ m/s

Department of Higher Education
University of Computer Studies, Hinthada
First Year (B.C.Sc / B.C.Tech.)
Final Examination
Digital Fundamentals I (CST-101)
September, 2018

Answer All Questions. **Time Allowed: 3 Hours**

1. Choose the correct answer. (20 Marks)

(i). The time interval between the 50% points on the rising and falling edges is
(a) rise time (b) fall time
(c) pulse width (d) period

(ii). The decimal number +122 is expressed in the 2's complement form as
(a) 01111010 (b) 11111010
(c) 01000101 (d) 10000101

(iii). The binary number 10110011100101010000 1 can be written in octal as
(a) 5471230_8 (b) 5471241_8
(c) 2634521_8 (d) 23162501_8

(iv). The output of an Negative-OR gate with inputs A, B and C is 0 (LOW) when
(a) A = 0, B = 0, C = 0 (b) A = 0, B = 1, C = 1
(c) A = 1, B = 1, C = 1 (d) both answers (a) and (b)

(v). According to the associative law of addition,
(a) A + B = B + A (b) A = A + A
(c) (A + B) + C = A + (B + C) (d) A + 0 = A

(vi). Which of the following rules states that if one input of an AND gate is always 1, the output is equal to the other input?
(a) A + 1 = 1 (b) A + A = A
(c) A . A = A (d) A . 1 = A

(vii). The output expression for an AND-OR circuit having one AND gate with inputs A, B and C and one AND gate with inputs D, E and F is
(a) ABCDEF (b) A + B + C + D + E + F
(c) ABC + DEF (d) (A + B + C)(D + E + F)

(viii). The expression $\overline{A}BCD + ABC\overline{D} + A\overline{B}\,\overline{C}D$
(a) cannot be simplified (b) can be simplified to $\overline{A}BC + A\overline{B}$
(c) can be simplified to $ABC\overline{D} + \overline{A}B\overline{C}$ (d) None of these answers is correct.

(ix). A half-adder is characterized by
(a) two inputs and two outputs (b) three inputs and two outputs
(c) two inputs and three outputs (d) two inputs and one output

(x). A 3-bit parallel adder can add
(a) three 2-bit binary numbers (b) two 3-bit binary numbers
(c) three bits at a time (d) three bits in sequence

2. (a)(i)Determine the total time required to serially transfer the eight bits contained in waveform A of Figure-2(a.i). The left-most bit is the first to be transferred. The 1 MHz clock is used as reference. What is the total time to transfer the same eight bits in parallel? (5 Marks)

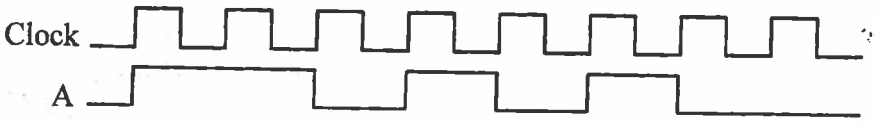


Figure-2(a.i)

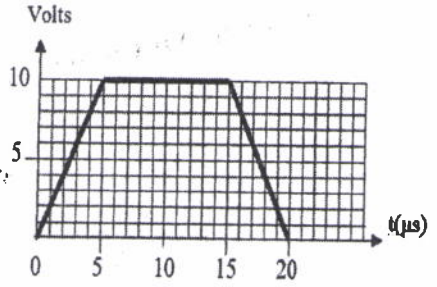


Figure-2(a.ii)

(ii)Define the pulse width of digital waveforms. For the pulse shown in Figure-2(a.ii) graphically, determine the pulse width and amplitude. (5 Marks)

(b)(i) Determine the decimal values of the signed binary numbers expressed in 1's complement:

(a) 00010111 (b) 11101000 (5 marks)

(ii) Determine the binary value of the following floating-point binary number: (6 marks)

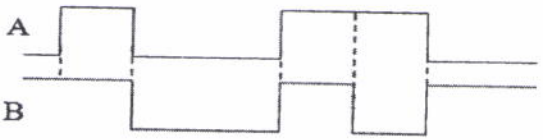
0 10011000 10000100010100110000000

(iii) Add the following BCD numbers: (4 marks)

01100111 + 01010011

3. (a) Two tanks store certain liquid chemicals that are required in a manufacturing process. Each tank has a sensor that detects when the chemical level drops to 25% of full. The sensors produce a HIGH level of 5V when the tanks are more than one-quarter full. When the volume of chemical in a tank drops to one-quarter full, the sensor puts out a LOW level of 0V. It is required that a single green light-emitting diode (LED) on an indicator panel show when both tanks are more than one-quarter full. Show how to implement this function using appropriate logic gates. (5 Marks)

(b) Determine the output waveforms for the XOR gate and for the XNOR gate, given the input waveforms, A and B, in Figure-3(b). (5 marks)



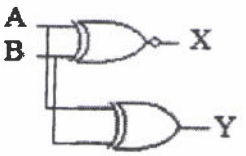


Figure-3(b)

4. (a) Use a Karnaugh map to convert the following expression to minimum SOP form: (8 marks)

$(W + \bar{X} + Y + \bar{Z})(\bar{W} + X + \bar{Y} + \bar{Z})(\bar{W} + \bar{X} + \bar{Y} + Z)(\bar{W} + \bar{X} + \bar{Z})$

(b) From the truth table in Table-4(b), determine the standard SOP expression and the equivalent standard POS expression. (7 marks)

Inputs			Outputs
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

Table-4(b)

5. (a) Minimize the combinational logic circuit in Figure-5(a) using a Karnaugh map. (10 Marks)

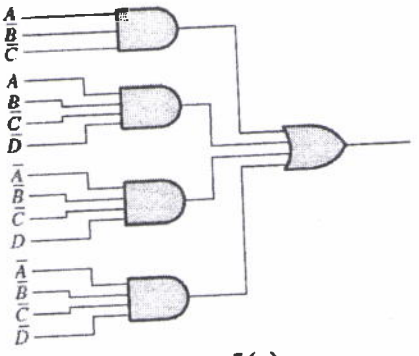


Figure-5(a)

(b) Show how the following expressions can be implemented as stated using only NOR gates. (5 Marks)

$$X=\overline{AB}+\overline{CD}$$

6. (a) Use 74HC151s as shown in Figure-6(a) and any other logic necessary to multiplex 16 data lines onto a single data-output line. (10Marks)

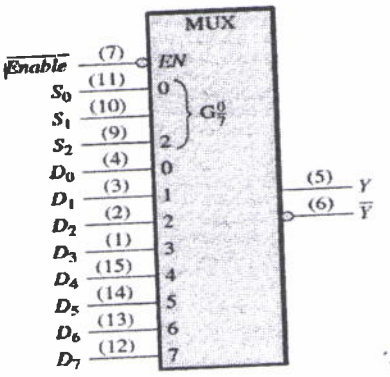


Figure-6(a)

(b) BCD numbers are applied sequentially to the BCD-to-decimal decoder in Figure-6(b). Draw a timing diagram, showing each output in the proper relationship with the others and with the inputs. (5 Marks)

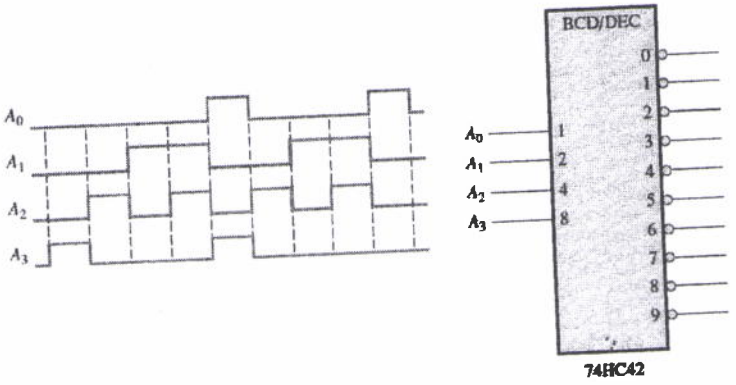


Figure-6(b)

**********END**********

Department of Higher Education

University of Computer Studies, Hinthada

First Year (B.C.Sc /B.C.Tech.)

Final Examination

Mathematics of Computing I (CST-102)

September, 2018

Answer All Questions **Times Allowed:3 Hours**

1.(a) (i) Find the length of the curve of $x = \int_0^y \sqrt{sec^4 t - 1}\,dt, \quad -\frac{\pi}{4} \le y \le \frac{\pi}{4}$.

(ii) Find the areas of the surfaces generated by revolving the curves $y = \sqrt{x}, \frac{3}{4} \le x \le \frac{15}{4}$ about X-axis.

(b) (i) Use logarithmic differentiation to find the derivative of y with respect to x, $y = \sqrt{\frac{(x+1)^{10}}{(2x+1)^5}}$.

(ii) Find $\frac{dy}{dx}$ if $\ln y = e^y \sin x$.

2.(a) (i) Solve the differential equation $\frac{dy}{dx} = e^{x-y}$ and $y(x+1)\frac{dy}{dx} = x(y^2+1)$ (by separable).

(ii) Evaluate the integral $\int \frac{dx}{9+3x^2}$.

(b) (i) Find the $\lim_{x\to 0}\left(\frac{1}{\sin x} - \frac{1}{x}\right)$ using L'Hopital's Rule.

(ii) Find the angles $tan^{-1}\left(\frac{-1}{\sqrt{3}}\right)$ and $cos^{-1}\left(\frac{1}{2}\right)$.

3. Evaluate the following integrations

(a) $\int x \ln x\, dx$ by using integration by parts formula, (b) $\int sin^3 x\, cos^3 x\, dx$ (c) $\int \frac{100}{36+25x^2} dx$.

(d) $\int \frac{9x^3-3x+1}{x^3-x^2}\, dx$, write the proper fraction as a sum of partial fractions.

4.(a) Construct a truth table to verify

(i) the distributive law $p \wedge (q \vee r) \Leftrightarrow (p \wedge q) \vee (p \wedge r)$ and (ii)the implication $\neg(p \to q) \to \neg q$ is tatology.

(b) Suppose A, B and C are sets, then show that $\overline{A \cap B \cap C} = \bar{A} \cup \bar{B} \cup \bar{C}$

(i) by showing each side is a subset of the other side. (ii) using a membership table.

5.(a) (i) Use the Euclidean algorithm to find gcd (123,277).

(ii) Convert the integer from binary notation to decimal notation (101010101).

(b) Find an inverse of 7 modulo 26.

(c) Use mathematical induction to prove that $1 + 3 + 5 + \cdots + (2n-1) = n^2$ for all nonnegative integers.

Department of Higher Education
University of Computer Studies, Hinthada
First Year (B.C.Sc. / B.C.Tech.)
Data Structures (CST- 103)
Final Examination
October 2018

Time Allowed: 3 Hours

Answer ALL questions. **(20 Marks)**

1. Choose the correct answer for each of the following questions.

(i) In data structure, data may be of _____ types.
A. 3 B.2 C. 4 D. 1

(ii) A variable which can be accessed by all modules of the program is called _____.
A. global variable B. static variable C. dynamic variable D. local variable

(iii) An array is a _____ data structure.
A. complex B. non-linear C. non-homogeneous D. linear

(iv) The largest element of an array's index is called its _____.
A. lower bound B. pointer C. extraction D. upper bound

(v) What is the value of the postfix expression 6 8 2 2 */-.
A. Something between 3 and 10 B. Something between 5 and -5
C. Something between -3 and -10 D. Something between 15 and 100

(vi) _____recursion occurs when a base case is omitted or cannot reach to it.
A. Tail B. Tree C. Infinite D. Finite

(vii) The number of recursive calls is limited to the _____ of the _____.
A. size, queue B. number, variable
C. ability, program D. size, stack

(viii) In recursion, the condition for which the function will stop calling itself is _____.
A. best case B. base case C. worst case D. infinite case

(ix) Two or more functions, which invoke (call) each other, are called _____ recursive functions.
A. combined B. indirect C. mutually D. double

(x) The initial configuration of a queue is c, d, e. To get the configuration e, d, c, one needs a minimum of _____.
A. 2 deletions and 2 additions B. 1 deletions and 2 additions
C. 2 deletions and 3 additions D. 3 deletions and 3 additions

(xi) When is the push operation on stack considered to be an error?
A. Only when the stack is empty. B. Only when the stack is full.
C. When the stack is neither empty nor full. D. Cannot be predicted.

(xii) The element indices of an array can compute at _____.
A. run time B. compile time
C. execution D. all of them

(xiii) What should be the value of rear if the queue is full (elements are completely occupied)?
A. 1 B. -1 C. Max +1 D. Max – 1

(xiv) Which among the below specified condition is applicable if the queue is non-empty?
A. rear > front B. rear < front C. rear = front D.front = rear + 1

(xv) Which expressions are also regarded as "Reverse Polish Notation"?

A. Prefix B. Postfix C. Infix D.All of them

(xvi) What will be the value of top, if there is a size of stack is 5?

A. 5 B. 6 C. 4 D. 0

(xvii) A linear collection of data elements where the linear node is given by means of pointer is called _____.

A. linked list B. node list C. primitive list D. link

(xviii) A doubly linked list has _____ pointers with each node.

A. 0 B. 1 C. 2 D. 3

(xix) Which type of linked list comprises the adjacently placed first and the last elements?

A. Singly Linked List B. Doubly Linked List

C. Circular Linked List D. All of them

(xx) Traversal of a linked list always starts from the _____.

A. first node B. last node C. middle node D.second node

2. Define **short notes** of the following. **(10 Marks)**

(a) Data Object
(b) Array
(c) Binary Recursion
(d) FIFO
(e) Linear Linked List

3. (a) What is the formal definition of algorithm? Write the essential properties and performance measures of an algorithm? **(4 Marks)**

3. (b) Draw a flowchart for an algorithm that finds the largest number among N numbers. **(6 Marks)**

4. (a) The array A[15,20] is stored in memory. If the base address is 250 and element size is 5, calculate the address of the element A[7, 10] for row-major and column-major order. **(5 Marks)**

4. (b) Write a C++ program to find the maximum and second maximum numbers from an array of integers. **(5 Marks)**

5. (a) Consider the following stack of integers, where stack is allocated N=8 memory cells.

STACK: 1 , 1 , 2 , 3 , 5 , 8 , _____, _____

Find the output and describe the stack as the following operations take place. The return type of IsEmpty( ) and IsFull( ) is integer. **(5 Marks)**

(i) Push(STACK,13)
(ii) IsFull( )
(iii) Push(STACK,21)
(iv) IsFull( )
(v) Pop( )
(vi) IsEmpty( )
(vii) Pop( )
(viii) GetTop( )
(ix) Pop( )
(x) GetTop( )

5. (b) Using the following algorithm, transform the infix expression A+(B*C-(D/E^F)*G)*H to the equivalent prefix expression. **(6 Marks)**

1. Scan expression E, character by character from right to left
   ch = get_next_token(E)
2. while(ch != '#') do
   if (ch = operand) then push(ch) in display Stack
   if (ch = ')') then
   ch = pop()from operator Stack
   while(ch != '(')
   push(ch) in display Stack
   ch = pop()
   end while
   if(ch = operator) then
   if ICP(op) >= ISP(op) then
   push ch in operator Stack
   else
   ch = pop()
   while(ICP < ISP)
   ch = pop() from operator Stack and push 'ch' in display Stack
   end while
   ch = get_next_token(E)
   end while
3. if (ch = '#') then
   while(!emptystack(operator))
   ch = pop(operator)
   push ch on display stack
   end while
4. while(!emptystack(display))
   ch = pop(operator)
   display ch
   end while
5. stop

5. (c) Evaluate each of the following parenthesis-free arithmetic expression. **(4 Marks)**

(i) 6 + 2 ^ 3 ^ 2 - 4 * 5

(ii) 3 , 5 , + , 6 , 4, -, * , 4 , 1 , - , 2 , ^ , +

6. (a) Let a and b are integers and suppose Q(a , b) is recursively defined as follow.

$$Q(a, b) = \begin{cases} 0 & \text{if } a < b \\ Q(a - b, b) + 1 & \text{if } b \geq a \end{cases}$$

Find the value of Q(2, 3) and Q(14, 3). **(5 Marks)**

6. (b) Find the outputs of the following code. **(5 Marks)**

```
void main( )
{       int a=7432, sum = 0;
        result =funA(a,sum);
        printf("%n",sum);
}
public static int funA (int n, int sum)
{       int k=0, j=0;
        if(n = = 0) return n;
        k=n%10; j=n/10;
        sum = sum +k;
        funA(j,sum);
        printf("%d",k);
}
```

7. (a) Complete the following table for implementation of circular queue. **(8 Marks)**

Action	Front	Rear	0	1	2	3	4
Q_Empty	0	0					
Insert E							
Insert F							
Insert G							
Insert H							
Delete							
Delete							
Insert I							
Delete							

7. (b) Solve for the jobs with profits(750, 500, 480, 370, 350, 320, 280) and delays(1,1,3,2,3,4,4). **(7 Marks)**

8. (a) What is tail pointer? What are the fields of a node in a linked list? **(3 Marks)**

8. (b) A linked organization of a list is shown as following.

Head: 5

	Data	Link
1	E	2
2	L	4
3		
4	C	10
5	W	1
6		
7	M	9
8		
9	E	0
10	O	7

Write the sequence of the data in the list.

Suppose **T** is inserted at the end of the list, **O** is inserted at the beginning of the list and **L** is deleted from the list. Draw a link list for each step. **(7 Marks)**

**********END**********

Department of Higher Education
University of Computer Studies, Hinthada
First Year (B.C.Sc. / B.C.Tech.)
Final Examination
Computer Programming Techniques (CST-104)
October 2018

Answer All Questions. **Time Allowed: 3 Hours**

Part I

1. Choose the correct answer of the followings: **(10 marks)**

(i) Within a switch statement _____.
(A) continue can be used but break cannot be used
(B) continue cannot be used but break can be used
(C) both continue and break can be used
(D) neither continue nor break can be used

(ii) The output of the following code segment is _____.

```
{
    int a = 5;
    int b = 10;
    cout<< (a>b?a:b);
}
```

(A) 5 (B) 10 (C) syntax error (D) none of them

(iii) If a is an integer variable, a=7/3; will return a value _____.
(A) 2.5 (B) 3 (C) 0 (D) 2

(iv) Which of the following declarations are illegal?
(A) void *ptr; (B) char *str = "hello"; (C) char str = "hello"; (D) const *int p1;

(v) Which of the following cannot be legitimately passed to a function?
(A) A constant. (B) A variable. (C) A structure. (D) A header file.

(vi) A(n) _____ selection structure contains only one set of instructions, which are processed when the condition is true.
(A) if (B) if/else (C) switch (D) case

(vii) What is the index number of the last element of an array with 9 elements?
(A) 9 (B) 8 (C) 0 (D) Programmer-defined

(viii) You can read input that consists of multiple lines of text using _____.
(A) the normal cout<< combination.
(B) the cin.get( ) function with one argument.
(C) the cin.get( ) function with two arguments.
(D) the cin.get( ) function with three arguments.

(ix) Which reference modifier is used to define reference variable?
(A) & (B) $ (C) # (D) *

(x) If an array is declared as int a[4] = {3, 0, 1, 2}, then values assigned to a[0] & a[4] will be _____.
(A) 3, 2 (B) 0, 2 (C) 3, 0 (D) 0, 4

2. (a) Describe the complete header file for the following code segments. **(5 marks)**

(i) strrev(st1);

(ii) if(num==999) exit(0);

(iii) cout<<setiosflags(ios::left)<<"Name";

(iv) fclose(fp);

(v) result = log (param);

(b) What is the output of the following program? **(5 marks)**

```
#include <iostream>
#include <cstring>
using namespace std;
int main()
{
   char *ptr;
   char Str[] = "Cprogramming";
   ptr = Str;
   ptr += 1;
   cout<<ptr<<endl;
   cout<<strupr(ptr)<<endl;

   ptr += 3;
   cout<<ptr;
   return 0;
}
```

(c) What will be the output of the following program? **(5 marks)**

```
#include <iostream>
using namespace std;
void square (int *x)
{
    *x = (*x + 1) * (*x);
    cout<<*x<<endl;
}
int main ( )
{   int num = 10;
    cout<<num<<endl;
    square(&num);
    num++;
    cout  <<num;
    return 0;
}
```

3. Detect Errors and Correct them. **(each for 5 marks *2 = 10 marks)**

(a) Which of the following lines have error and correct them?

```
Line 1.   #include <cstring>
Line 2.   using namespace std;
Line 3.   int main()
Line 4.   {
Line 5.      float number; sum = 0.0;
Line 6.      // test expression is always true
Line 7.      while (true);
Line 8.      {
Line 9.         cout<< "Enter a number: ";
Line 10.        cin>> number;
Line 11.        if (number != 0.0)
Line 12.        {   sum += number;   }
Line 13.        else
Line 14.        {
Line 15.           // terminates the loop if number equals 0.0
Line 16.           continue;
Line 17.        }
Line 18.     }
Line 19.     cout<< "Sum = " << sum;
Line 20.     return 1;
Line 21.  }
```

(b) Which of the following lines have error and correct them?

```
Line 1.   #include<iostream>
Line 2.   using namespace;
Line 3.   int main ()
Line 4.   {
Line 5.      int array ={0,2,4,6,7,5,3};
Line 6.      int n, result =0;
Line 7.      for(n =0;  n<7; n--)
Line 8.      {
Line 9.         result += array[];
Line 10.     }
Line 11.     cout<< res;
Line 12.     return 0;
Line 13.  }
```

4(a) Write a program in C++ to print 15 terms of 1, 2, 4, 7, 11, 16,..... **(7 marks)**

4(b) Write a C++ program to check whether the string is palindrome or not. **(8 marks)**

Part II

5(a) Create a structure called **Record** encapsulation rno, mark1, mark2 and average. Write a program that creates three student records and accepts the marks and calculate average for each student and then print out the result with corresponding Grade. (Assume that Grade is A of average is greater than 80, B if average is between 60 and 80 and C if average is less than 60). **(7 marks)**

The sample output for displaying result is as follows:

Rno	Grade
1	A
2	B
3	C

5(b) Write a function called getAverage(double arr[]) which takes a double array and size of this array (type int) as arguments and then return an average value of this array. Write a main( ) function that gets 10 number of double value from the user and store them in double type array, call the function and display average result. **(8 marks)**

6(a) Write a C++ program to create a file "odd.txt" to store all odd numbers between 1 and n.

(7 marks)

6(b) Write a program to input a string from the user and copy this input string to another string variable, and then combine this two strings and display them with their length. **(8 marks)**

Some sample interaction with the program is:

Enter a string: Myanmar
String 1 is Myanmar and their length is 7
String 2 is MyanmarMyanmar and their length is 14

7(a) Write a program that accepts 10 integers from keyboard and stores in an array and then search a number in that array sequentially. If the number is found, display the message "FOUND", otherwise display "NOT FOUND". **(10 marks)**

7(b) Write a main() program with three local arrays, all the same size and type (say int). The first two are already initialized to values. Write a function called **mularrays()** that accepts the addresses of the three arrays as arguments; multiply the contents of the first two arrays together, element by element; and places the results in the third array before returning. A fourth argument to this function can carry the size of the arrays. (**use pointer notation**) **(10 marks)**

********** END**********