Heaven's Light Is Our Guide

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
1st Year Odd Semester Examination 2019
COURSE NO: EEE 1151 COURSE TITLE: Basic Electrical Engineering
FULL MARKS: 72 TIME: 3 HRS

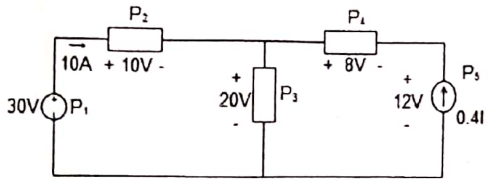
N.B. (i) Answer any SIX questions taking any THREE from each section.
(ii) Figures in the right margin indicate full marks.
(iii) Use separate answer script for each section.

SECTION : A

Marks

Q.1. (a) Define power and energy. A 1.2 KW toaster takes roughly 4 minutes to heat four slices of bread. Find the cost of operating the toaster once per day for one month (30 days). Assume energy costs 4TK/KWh. 4

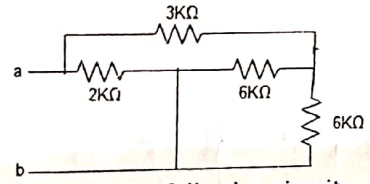
(b) Find the power absorbed by each of the elements in the following figure. 4



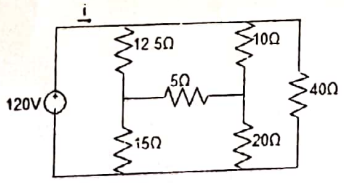
(c) Define voltage source and current source. Draw the terminal characteristics of ideal voltage source and current source. 4

Q.2. (a) For a circuit with N equal resistors of R are parallelly connected. Prove that equivalent resistance of the circuit, $R_{eq}=R/N$. 3

(b) Evaluate R_{eq} looking into terminals a-b. 4

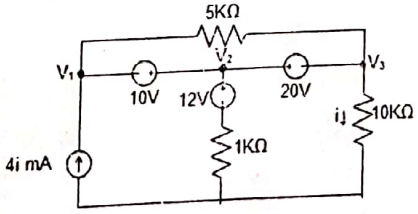


(c) Obtain i of the following circuit. 5

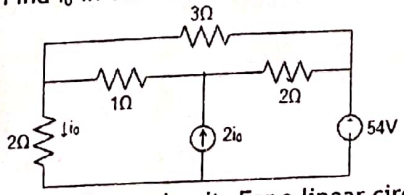


Q.3. (a) State and explain Kirchhoff's laws. 3

(b) Using nodal analysis, obtain the node voltages V_1, V_2 and V_3 of the following circuit. 4

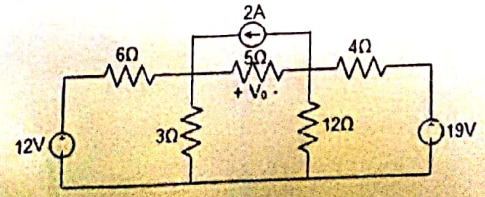


(c) Find i_0 in the following circuit using mesh analysis. 5

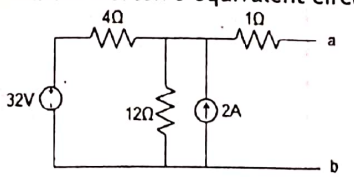


Q.4. (a) Define linear circuit. For a linear circuit, state and explain Thevenin's theorem. 3

(b) Determine v_0 in the following circuit using superposition principle. 5



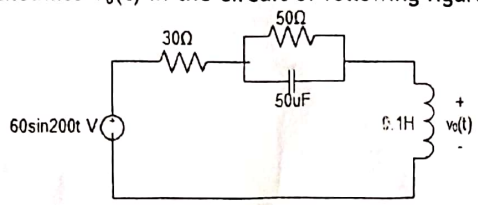
(c) Find the Norton's equivalent circuit of the circuit shown in the following figure. 4



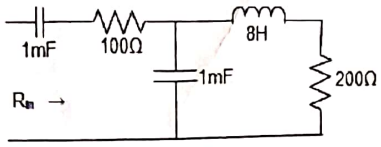
SECTION : B

Q.5. (a) What is phasor? Why phasor is used for ac analysis? 3

(b) Calculate $V_0(t)$ in the circuit of following figure using phasor. 5

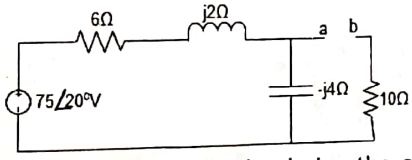


(c) Determine the input impedance of the following circuit at ω=20 rad/s. 4



Q.6. (a) Prove that for maximum average power transfer the load impedance Z_L must be equal to the complex conjugate of the Thevenin impedance Z_{th}. 5

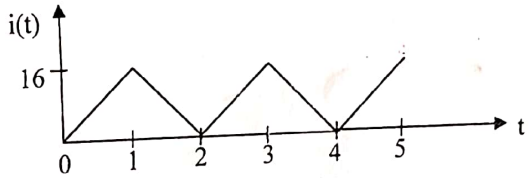
(b) Find the Thevenin equivalent at terminals a-b of the following circuit. 5



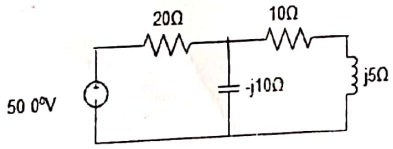
(c) For a series RLC circuit, derive the expression of frequency for which the circuit shows resonance. 2

4

Q.7. (a) Find the rms value of the following waveform.



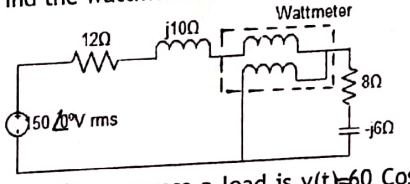
(b) Find the average power absorbed by each of the elements of the following circuit. 4



(c) Define instantaneous power. Derive the expression of instantaneous power absorbed by a load. 4

Q.8. (a) What is power factor? Write the physical significance of power factor. 2

(b) Find the wattmeter reading of the following circuit. 6



(c) The voltage across a load is $v(t)=60\ Cos(wt-10^0)V$ rms and the current through the element in the direction of the voltage drop is $i(t) = 1.5Cos(wt+60^0)A$ rms. 4

Find, (i) Complex and apparent powers
(ii) the real and reactive powers and
(iii) the power factor and load impedance.

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RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
1st Year Odd Semester Examination 2019

COURSE NO: Math 1113 COURSE TITLE: Differential and Integral Calculus

FULL MARKS: 72 TIME: 3 HRS

N.B. (i) Answer any SIX questions taking any THREE from each section.
(ii) Figures in the right margin indicate full marks.
(iii) Use separate answer script for each section.

Marks

SECTION : A

Q.1. (a) Find from first principles the derivative of logcosx. 4

(b) A function is given as: 5

$$f(x)=\begin{cases} 3+2x & for \quad -\frac{3}{2}\le x<0 \\ 3-2x & for \quad 0\le x<\frac{3}{2} \\ -3-2x & for \quad x\ge\frac{3}{2} \end{cases}$$

Is it continuous at x=0 and x=3/2? Justify your answer.

(c) Differentiate $x^{Sin^{-1}x}$ with respect to $Sin^{-1}x$. 3

Q.2. (a) State and prove Rolle's theorem. 6

(b) If $y=x^{n-1}\log x$ then prove that $y_n=\frac{(n-1)!}{x}$. 6

Q.3. (a) Find the extremum values of (i) xy and (ii) x^2+y^2 under the condition $\frac{x}{a}+\frac{y}{b}=1$, a>0, b>0. 6

(b) State Euler's theorem. If $u=\tan^{-1}\frac{x^3+y^3}{x-y}$ then show that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=Sin2u$. 6

Q.4. (a) Find the condition that the conics $ax^2+by^2=1$ and $a_1x^2+b_1y^2=1$ shall cut orthogonally. 6

(b) What is the radius of curvature? 6
Find the radius of curvature of $3x^4-2y^4+5x^2y+2xy-2y^2+4x=0$ at x=0

SECTION : B

Q.5. Integrate any three 12

(i) $\int\frac{2x^2+1}{\sqrt{3x^2+12x+27}}dx$ (ii) $\int Sin^{-1}\sqrt{\frac{x}{a+x}}dx$

(iii) $\int\frac{dx}{p+q\cos x}$ (iv) $\int\frac{dx}{(1+x)\sqrt{1-x+x^2}}$

Q.6. Evaluate

(i) $\lim_{n\to\infty}\left[\left(1+\frac{1^2}{n^2}\right)\left(1+\frac{2^2}{n^2}\right).....\left(1+\frac{n^2}{n^2}\right)\right]^{\frac{1}{n}}$ 6

(ii) $\int_0^1\frac{\log(1+x)}{1+x^2}dx$ 6

Q.7. (a) What are the Beta and Gamma functions? Obtain the relation between Beta and Gamma functions. 6

(b) Show that

(i) $\Gamma(n+1)=n!$ 3

(ii) $\int_0^\infty e^{-\frac{x^2}{2}}dx=\sqrt{\frac{\pi}{2}}$ 3

Q.8. (a) Find the area above the x-axis, included between the curves $y^2=ax$ and $x^2+y^2=2ax$. 6

(b) Find the volume of the solid generated by revolving the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about the major axis. 6

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RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
1st Year Odd Semester Examination 2019

COURSE NO: Hum 1113 COURSE TITLE: Functional English

FULL MARKS: 72 TIME: 3 HRS

N.B. (i) Answer any SIX questions taking any THREE from each section.
(ii) Figures in the right margin indicate full marks.
(iii) Use separate answer script for each section.

SECTION : A

Marks

Q.1. Plastic shopping bags contribute to the pollution of land and the sea. Some people think there should be banned. Do you agree or disagree? Write at least 350 words to justify your answer. 12

Q.2. (a) What is a complaint letter? When do you think a complaint letter is needed? 4
(b) Suppose you bought an item from a store and it turns out to be defective. Now, write a letter to the supplier for adjustment of the faulty product you received. 8

Q.3. (a) What is paragraph? Define a particular technique of developing a paragraph. 4
(b) Write a paragraph on "Women Empowerment in Bangladesh" or "Brain Drain". 8

Q.4. D. H. Lawrence was highly critical of modern civilization and industrialization of the society. Discuss with references from the text, "Tickets, please!" 12

OR

Lawrence's Annie in the "Ticket, please!" struggles to alter the gender roles of the contemporary male dominated society. Discuss.

SECTION : B

Q.5. (a) What is a sentence? Define different types of structural sentences. 6
(b) Transform the following sentences as detected: 6
(i) When he was six, he left his home. (make it simple)
(ii) Take physical exercise regularly to keep fit. (make it complex)
(iii) Though he worked hard, he missed the opportunity. (make it compound)
(iv) Rabindranath is the best short story writer. (make it positive)
(v) Humayun Ahmed is the most popular writer in Bangladesh. (make it comparative)

Q.6. Why do we write a press release? What are the chief features of an effective press release? 12

Q.7. Write an amplification on any of the following topics: 12
(i) Justice delayed is justice denied.
(ii) If winter comes, can spring be far behind?

Q.8. (a) What is a conditional sentence? Discuss different kinds of conditional sentences. 6
(b) Write down the meaning of the following phrases and idioms and make appropriate sentences with them: 6
(i) Maiden speech
(ii) Out and out
(iii) Bad blood
(iv) Red handed
(v) Bring to book
(vi) Big bug.

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Heaven's Light Is Our Guide

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
1st Year Odd Semester Examination 2019
COURSE NO: CSE 1101 COURSE TITLE: Computer Programming
FULL MARKS: 72 TIME: 3 HRS

N.B. (i) Answer any SIX questions taking any THREE from each section.
(ii) Figures in the right margin indicate full marks.
(iii) Use separate answer script for each section.

SECTION : A

Marks

Q.1. (a) What are the key features of C programming language? 3

(b) Find the value of the following expression: 3

```
50%4+2>16/5+1
```

(c) Explain the difference between = and == symbols in C programming. 3

(d) Find out the output if following code is executed. 3

```
a=10;  b=20;
a=++b;
b=a++;
printf("%d %d", a, b);
```

Q.2. (a) What is the syntax of switch statement? Can it be avoided in programming? 3

(b) What are the differences between 'break' and 'continue' keywords? Write the output of the following code segments: 5

(i)
```
#include <stdio.h>
int main( ) {
int i;
for (i=1; i<10; i++) {
if (i%3==0||i%5==0) {
break;
}
printf("value i=%d \n",i);
}
return 0;
}
```

(ii)
```
#include <stdio.h>
int main( ) {
int i;
for (i=0; i<6; i++) {
if (i%2==0||i%3==0) {
continue;
}
printf("value i=%d",i);
printf("\n");
}
return 0;
}
```

(c) Write a C program to compute and display remainder and quotient using only two variables. 2

(d) Compare the use of if-else statement with the use of ?: operator. 2

Q.3. (a) "In any case do while loop must be executed at least once"- Explain this statement with example. 3

(b) Evaluate the value of n if a=10 and b=5. 3

(i) n= (a>b)?a:b (ii) n=(a++)+(--b)
(ii) n=--a*b++ (iv) n=a>>2
(v) n=(b<<2)+(a>b)

(c) What will be the output of the following program? 2

```
void main() {
int i;
for (i=0; i<10; i++) {
printf("%d",i++);
}}
```

(d) Write a C program that find prime numbers of a given range. 4

Q.4. (a) What are header files and what are its uses in C programming. 3

(b) Write a C program to produce the following output using nested loop. 5

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

(c) Find out the value of k if the following code is executed. 4

```
K=0;
for(i=0; i<6; i++) {
k+=i;
if(i<3) continue;
```

```
if(i>4) break;
k++;
}
printf("k=%d,k);
```

SECTION : B

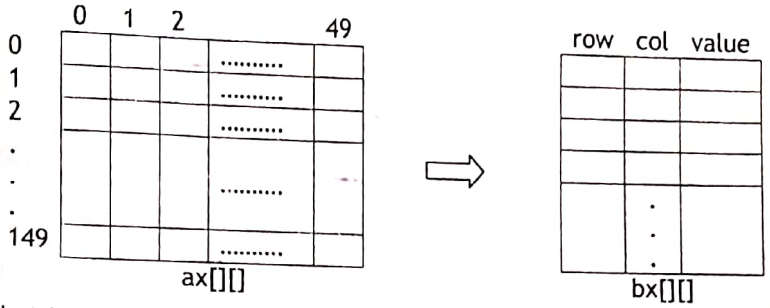
Q.5. (a) What is wrong in the following statement and why? 2

```
scanf("%d", wrong);
```

(b) Find out the output of the following code: 4

```
float ax[5]={1.5, 2.8, 1.8, 1.0, 2.5};
float *p1=&ax[0];
float *p2=p1+3;
printf("%f", *p2+1);
printf("%d", *p2-p1);
```

(c) Suppose a 150x150 matrix is saved in array ax. Then write a program to copy only the non-zero elements of ax to another 2D array bx[][] along with its row and column. 6



Q.6. (a) What is pointer to array in C? 2

(b) Find the output of the following program if the address of the first element of array ax is 3001_H. 4

```
float ax[5]={1.2, 2.3, 3.4, 4.5, 5.6};
float *p=&ax[3];
printf("%f %f %x %x", *p, *p+1, p-1, p+3);
```

(c) Write a C program that will show the following output: 4

Sample input=5

Sample output=

```
0 0 1 0 0
0 1 2 0
0 1 2 3 0
1 2 3 4 0
1 2 3 4 5
```

(d) Between 'for' loop and 'while' loop, which is better in what situation? 2

Q.7. (a) Differentiate between string and stream. 2

(b) Suppose there are 100 strings are stored in a character array ax[][]. Write a program that takes a string from keyboard and searches in ax. If it is found then print "login ok". 5

(c) Write a program in C that reads 500^{th} and 750^{th} positioned integers stored in a file named "input.dat" and prints their average. 5

Q.8. (a) Write a program to store roll, name and GPA of 120 students using structures. Then write functions to find the following: 5

(i) List of student(s) who got the highest GPA.

(ii) Search a particular student's GPA with roll number.

(b) Explain the following function with an example. 4

(i) isalpha() (ii) isupper()

(ii) getchar() (iv) puts()

(c) Find the size of variable student1 of the following declaration: 3

```
struct student {
        int roll;
        char name [6];
        float gpa;
        } student1;
```

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Science is Light is Our Guide

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
1st Year Odd Semester Examination 2019
COURSE NO: Chem 1113 COURSE TITLE: Inorganic and Physical Chemistry
FULL MARKS: 72 TIME: 3 HRS

N.B. (i) Answer any SIX questions taking any THREE from each section.
(ii) Figures in the right margin indicate full marks.
(iii) Use separate answer script for each section.

SECTION : A

Marks

Q.1. (a) State and explain the laws of thermo chemistry. 5
(b) Define the terms: 4
(i) Integral heat of solution.
(ii) Differential heat of solution.
(c) The heat of combustion of ethylene, hydrogen and ethane are -1410KJ, -286.2 KJ and -1560.2 KJ respectively at 25°C. Calculate the enthalpy of $C_2H_4(g) + H_2(g) \Longleftrightarrow C_2H_6(g)$ at 25°C. 3

Q.2. (a) What is meant by polar covalent bond? Explain the conditions of formation of ionic bond 4
(b) Discuss metallic bond with the help of electron sea model. Based on it why metals are: 5
(i) Malleable and ductile.
(ii) Good conductor of heat and electricity.
(c) Indicate the different types of bonds that are present in the following compounds: 3
(i) $[Cu(NH_3)_4]cl_2$
(ii) $(H_20)_x$

Q.3. (a) What is meant by chemical equilibrium? Discuss the various factors which influence the equilibrium constant of a reaction. 6
(b) State and explain Le-chaterlier principle. Derive a relation between K_p and K_c for the $2SO_2(g) + O_2(g) \Longleftrightarrow 2SO_3(g)$ reaction. 6

Q.4. (a) What do you mean by equivalent conductance and molar conductance? 4
(b) Discuss the effect of dilution on equivalent conductance of weak and strong electrolyte. 4
(c) Write short notes on transport numbers. 4

SECTION : B

Q.5. (a) Define dispersed phase and dispersion medium with reference colloidal system. Apply these terms to the following systems: 7
(i) Aerosol
(ii) Emulsion
(iii) Smoke
(iv) Gel
(v) Foam
(b) Describe a method for the purification colloidal solution. 5

Q.6. (a) What is activated complex? Derive the equation $k = K^{\ddagger}\frac{RT}{Nh}$ 6
(b) Explain the equation for the rate constant of a first order reaction and derive the expression for half change. 4
(c) State the laws of mass action. 2

Q.7. (a) Define ebullioscopic constant. Derive an equation which correlates the elevation of boiling point of a solution and the molecular weight of its solute. 5
(b) A solution contains 0.9g glucose (M.W=180) in 100g water. The freezing point of the solution is -0.5°C. Calculate the cryoscopic constant of water. 4
(c) What are colligative properties? Why they are so called? 3

Q.8. (a) What is azeotropic mixture? Give examples. Why the compounds of azeotropic mixture cannot be separated by fractional distillation? 4
(b) Write down the characteristics of ideal solution and non ideal solution. 5
(c) What is the molarity of a solution prepared by dissolving 75.5g of pure KOH in 540 ml of solution? 3

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