Premier University
Department of Computer Science and Engineering
2nd Semester (B.Sc. in CSE) Final Examination, December 2018
Course Title: Engineering Math II
Course Code: MAT 107

Time: 3 Hours **Full Marks: 50**

Questions (Answer any five from the following seven questions):

1. a. Evaluate the integral $\int_c^3 \frac{x^5+2}{x^2-1}dx$ by using the Method of decomposition into polynomial and partial fractions; and — 5

   b. Evaluate the convolution $(f * g)(t)$ of the functions 'f' and 'g', where $f(t) = t$, and $g(t) = t^2$. — 5

2. a. Evaluate $\int_0^y \int_0^x \int_0^1 (x - y^2 - z^3)\,dxdydz$, this definite integral; and — 5

   b. For any $x > 0$, $\Gamma(x)$ ("gamma of x") is defined by: $\Gamma(x) = \int_0^\infty (t^{x-1}e^{-t})\,dt$: Show that for any $x > 0$, $\Gamma(x+1) = x\Gamma(x)$. — 5

3. a. Solve $\frac{dy}{dx} = 3x^2 + 1$, if $y(1) = 4$; and — 5

   b. Solve $x\frac{dy}{dx} = \frac{y^2}{x} + y$, $y(1) = 2$. — 5

4. Given $(e^x + y)\,dx + xdy = 0$:
   a. Determine (by exhibiting a method) if it is exact, — 2
   b. Find general solution, — 5
   c. Check your solution by implicit differentiation, and — 2
   d. Find particular solution if $y(1) = 1$. — 1

5. a. Solve: $\frac{dy}{dx} + y = y^4$, and — 5

   b. Solve $\frac{dy}{dx} + y = \sin x$. — 5

6. a. Solve $y'' + y' - 2y = 2e^{2x}\cos 2x$ by using the Method of Undetermined Co-efficient (for y_p) or by the Method of Variation of Parameters ; and — 5

   b. Solve the linear system by elimination (by using differential operators): — 5
   $x' - 7x + y = 0$ .... (i)
   $y' - 2x - 5y = 0$ ... (ii)

7. Solve $x^2y'' + x\left(\frac{1}{2} + 2x\right)y' + \left(x - \frac{1}{2}\right)y = 0 : x > 0$ by using Method of Frobenius. — 10

Premier University

Department of Computer Science & Engineering

2nd Semester Final Exam, December'2018

Course Title: Discrete Mathematics

Course Code: CSE 103

Total Marks: 50 **Time: 3 Hours**

Answer any five questions.

1 a) Let R be the relation on the set {1,2,3,4,5} containing the ordered pairs (1,1),(1,2),(1,3),(2,3),(2,4),(3,1),(3,4),(3,5),(4,2),(4,5),(5,1),(5,2) and (5,4) 6
Find (i) R^4
(ii) $R_1 = \{(a,b) \in R^4 / a > b\}$
$R_2 = \{(a,b) \in R^4 / a < b\}$
Find $R_1 \circ R_2$ and $R_1 \cup R_2$

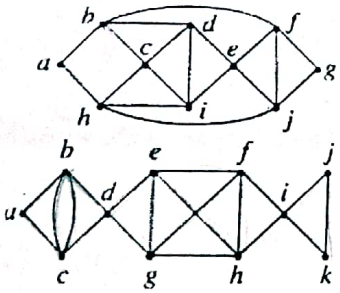
b) Prove that a simple connected graph is a tree. 4

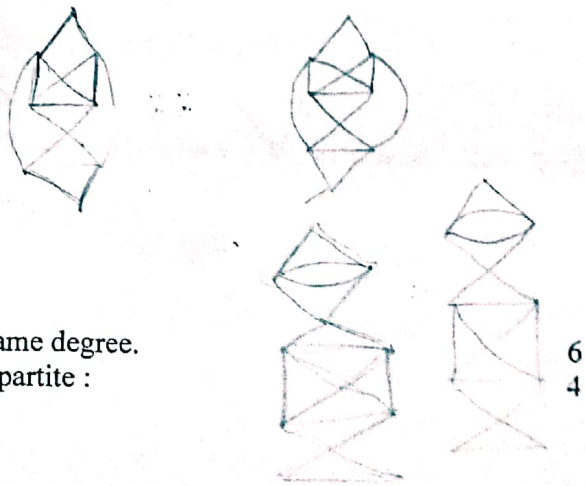
2 a) Let $A = \{n: n \in \mathbb{N} \text{ and } n = 3k + 2 \text{ for some } k \epsilon \mathbb{N}\}, B = \{n: n \epsilon \mathbb{N} \text{ and } n = 5k - 1 \text{ for some } k \epsilon \mathbb{N} \text{ such that } k \geq 5\}, \text{and } C = \{m \in \mathbb{N}: m = 6k - 4 \text{ and } k \in \mathbb{N} \text{ and } k \geq 1\}$. Prove the following: 6
(i) $A \neq B$
(ii) $B \neq C$

b) Let $U = \{1,2, \ldots ,10\}$, be a universal set. Let $A, B, C \subseteq U$ such that A={1,3,4,8}, B={2,3,4,5,9,10} and C={3,5,7,9,10}. Show the following using truth table: 4
(i) $(A \cap B) \oplus (A \cap C)$
(ii) $A \cap (B - (C \cap B))$

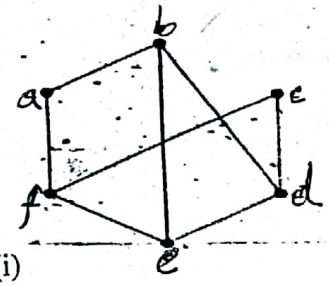
3 a) Define Symmetric Difference. Prove that $(A \oplus B) \oplus C = A \oplus (B \oplus C)$ 6

b) Determine whether the following graphs have an Euler circuit/cycle: 4

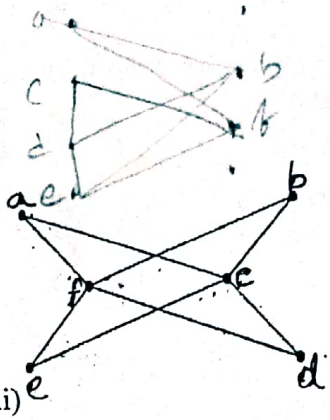




4 a) Prove that at least two vertices of G have the same degree. 6
b) Determine whether the following graphs are bipartite : 4



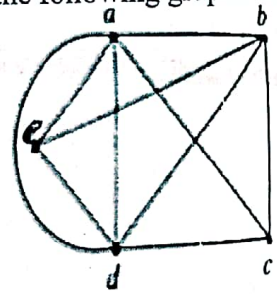
(i)



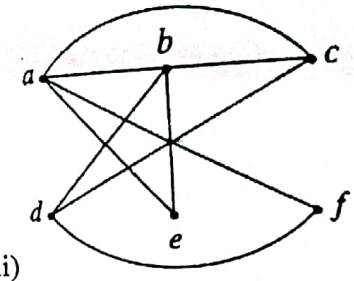
(ii)

(5) a) State and prove Euler's formula. 6

b) Show that the following graphs are planar and then prove Euler's formula: 4

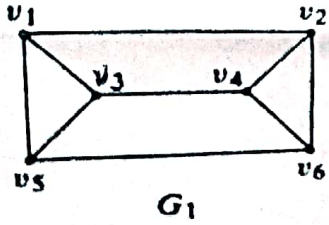


(i)

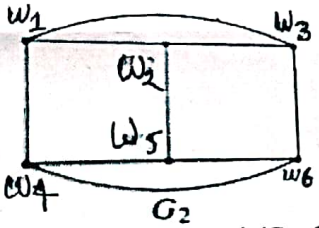


.(ii)

6 a) Determine whether the following graphs are Isomorphic: 4

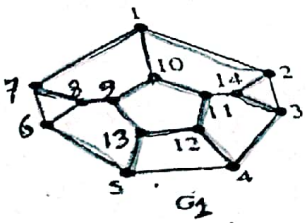


G_1

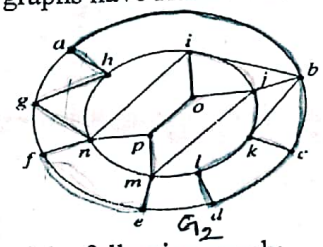


G_2

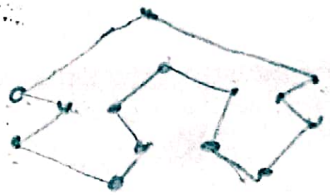
(b) Determine whether the given graphs have Hamiltonian Circuit/Cycle: 6



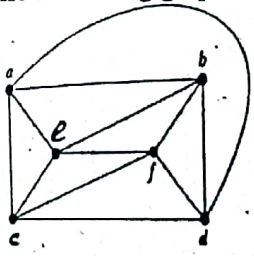
G_1

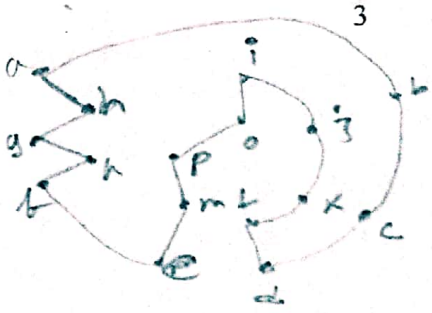


G_2

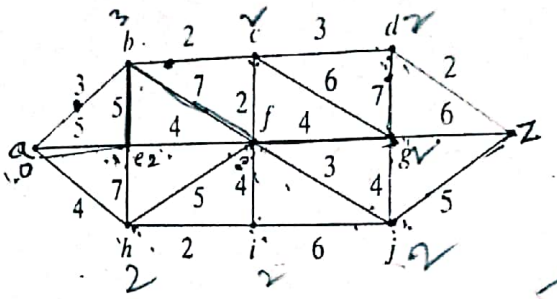


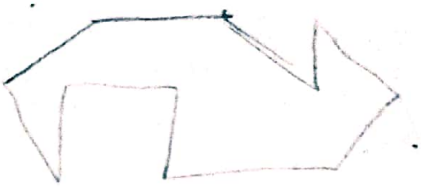
7 (a) Determine chromatic number of the following graph: 3





b) Find the length of the shortest path between a to z of the following graph: 7





Premier University

Department of Computer Science & Engineering

B.Sc. in CSE (2nd) Semester Final Exam, December 2018

Course Title: Developing English Skill

Course Code: ENG-103

Time: 3 Hours **Total Marks: 50**

Read the passage and answer any five of the following questions including question no. 6 & 7.

Taslim was rather looking forward to his first journey by Tube, as the underground railway in London is called. He had heard a great deal about it from his friends who had already been to England. They all advised him not to travel alone the first time. But Taslim is the kind of person who never listens to anyone's advice. It is not surprising; therefore, that his first journey by Tube was not a great success.

Taslim entered the station shortly after five o'clock in the afternoon. This is a bad time to travel in London, both by bus and train, because crowds of people go home from work at this hour. He had to join a long queue of people who were waiting for tickets. When at last his turn came, he had some difficulty in making the man understand the name of the station he wanted to go to. The people in the queue behind him began to grumble impatiently at the delay. However, he got the right ticket in the end and, by asking several people the way, he also found the right platform. This was packed tight with people. He did not manage to get on the first train, but he was able to move nearer the edge of the platform so as to be in a better position to get on the next one. When this came in, emerging from the tunnel with a terrifying roar, Taslim was swept forward on to the train by the rush of people from behind. The doors closed and the train moved off before he was able to get his breath back. He was unable to see the names of the stations where the train stopped, but he had taken the precaution of counting the number of stops so that he knew exactly where to get off. His station was the sixth along the line.

When the train reached the sixth station, Taslim got off, feeling relieved that his journey had been so easy. But he was alarmed to see that he had got off at a station that he had never heard of! He did not know what to do. He explained his difficulty to a man who was standing on the platform. With a look of amusement on his face the man told Taslim that he had travelled on a train going in the wrong direction.

Q.1 **Say whether the following sentences are true or false and give the phrases or sentences which indicate this:** 10

a. It is a waste of time telling Taslim what to do.

b. Taslim was not the only person who was waiting to buy a ticket.

c. The platform was not teeming with people.

d. The train came out of the tunnel with a muffled sound.

e. Taslim thought at first that he had arrived at the right station without any difficulty.

Q.2 **Answer the following questions briefly, in your own words as far as possible. Use one complete sentence for each answer.** 10

a. Why does the writer say that Taslim's first journey by Tube was not a great success?

b. What is tube?

c. What was the time of Taslim's entrance to the station like?

d. Why did the people in the queue behind Taslim begin to grumble?

e. How did Taslim find the right platform?

f. What unexpectedly helped Taslim to get on the train easily?

g. How did Taslim know where to get off the train?

h. What made Taslim realize that he had got off at the wrong station?

i. Why was the man on the platform amused?

j. What precaution should Taslim have taken before getting on the wrong train?

Q.3 **Complete the following sentences. Your answer must be related to the ideas contained in the passage:** **10**

a. All Taslim's friends advised him: "_____".

b. Taslim had to ask several people the way in order to _____.

c. Taslim was in a better position to get on the second train because _____.

d. Taslim was out of breath when he got on the train because_____.

e. "_____", the man on the platform told Taslim.

Q.4 **Explain the meaning of the following words and phrases as they are used in the passage and then make your own sentences without using the ideas contained in the passage:** **10**

a) Called b) Shortly c) Grumble d) Emerging e) Swept f) Moved off g) Precaution h) Relieved i) Got off j) Amusement.

Q.5 **Complete the following passage by supplying the correct form of the verb given within bracket:** **10**

When Taslim decided to go on a holiday to England, he ___ (write) to a friend of his who ___ (be) ___ (live) in London and ____ (ask) if he ___(can) ___(meet) him at the airport. The friend ___ (write) back to say that he ___ (will) be true. So Taslim ___ (be) rather ___ (surprise) when he ___ (reach) the airport to find that his friend ___ (have) not ___ (turn) up. He ___ (walk) around for a short while and then, because he ___ (be) a slight headache, ____ (go) into the restaurant and ____ (have) a cup of strong, black coffee. After that he ___ (feel) much better. But later he ___ (be) ___ (begin) to get worried.

Q.6 **Combine the following pairs of sentences to form one sentence, omitting the relative pronoun as in the example below. The key word around which the sentence can be built is given for you.** **10**

Example: In the newspaper (that) he had bought from the bookstall there were very few advertisements.

a. I bought some apple juice. It tested like ink.

Ans: The apple juice _____.

b. He made a promise. He didn't keep it.

Ans: _____ the promise _____.

c. You heard a noise. It must have been the wind.

Ans: The noise _____.

d. I waved to a man just now. He's my bank manager.
Ans: The man _____.

e. We saw an actor on TV last night. What's his name?
Ans: _____ of the actor_____?

f. You lent me a pen. I'm afraid I've lost it.
Ans: _____ the pen _____.

g. He tells jokes. We don't like them.
Ans: _____ the jokes _____.

h. You wrote a letter. It never arrived.
Ans: The letter_____.

i. John sent Mary some flowers. She liked them.
Ans: _____ the flowers _____.

j. She met a man at a dance. She fell in love with him.
Ans: _____ a man _____.

Q.7 **Imagine that you were Taslim. Write a letter about 100 words long relating what happened to you the first time you travelled by Tube. Include your own ideas which may not be in the passage. Use your own words as far as possible.** 10

Premier University

Department of Computer Science & Engineering

2nd Semester Final Exam, December 2018

Course Title: Structured Programming

Course Code: CSE 111

Total Marks: 50 **Time: 3 Hours**

Answer any five questions from the followings:

Q.1 **a.** What is Structured Programming? Why C is called a structured programming language? **3**

b. What will be the output of the following C program? **3**

```
#include<stdio.h>
main() {
int gender=0, balance=5000, bonus;
if(gender==0){
        if(balance>5000)
                bonus=balance*0.2;
        else
                bonus=balance*0.5;
}
else
        bonus=balance*0.5;
balance=balance+bonus;
printf("%d",balance);
}
```

c. How can you define Symbolic Constants in C? Explain with example. **2**

d. Is there any error in the following declaration? If yes, How can you solve it? **2**

```
char city[10] = "Chittagong";
```

Q.2 **a.** Write a C program to find out maximum and minimum value from a set of values. **4**

b. Describe the output that will be generated by the following C program. **3**

```
#include<stdio.h>
int main(){
        inti, j, x = 0;
        for(i= 0; i<5;i++)
                for(j =0;j<i; j++){
                        x+= (i+j-1);
                        printf("%d\t", x);
                }
        printf("\nx = %d\n", x);
}
```

c. What is the purpose of the *continue* statement? Mention the control statement in which continue statement can be used. Compare the *break* statement with *continue* statement. 3

Q.3 a. Write a program to determine and print the value of following harmonic series for a given value of n: 4
1+1/2+1/3+.....+1/n

b. What will be the output of the following C program? Assume the base address is 6000 and integer occupies **4 bytes** in memory. 4

```
#include<stdio.h>
int main()
{
static int num[5]={11,22,33,44,55};
int *ptr;
ptr=num+1;
printf("the address is: %X\n",num);
printf("the value is: %d\n",*ptr);
ptr=num+2;
   *ptr=*ptr-2;
printf("the address is: %X\n",(num+2));
printf("the value is: %d\n",*ptr);
ptr=ptr-1;
   *ptr=*ptr+2;
printf("the value is: %d\n",*(num+1));
printf("the value is: %d",*(num+4));
return 0;
}
```

c. What is the difference between *while* and *do-while* loop? Rewrite the following code using **`for`** loop : 2

```
while(1)
{
        printf("Hello\n");
}
```

Q.4 a. Compare *local* and *global* variable with an example 3

b. Write a program to print the following: [**Hints:** your program should print n lines.] 4

```
1
3 3
5 5 5
7 7 7 7
9 9 9 9 9
```

c. Write a function to find the length of a given string without using library function. 3

Q.5 a. Explain the scenario of passing an array to a function and passing a single-valued data item to a function with examples. 3

b. Write a single line statement to take input a line of string including whitespace. 2

c. Rewrite the following code fragment using ternary operator: 2

```
if(i%2 !=0)
        sum +=i;
```

d. What is the use of calloc(), malloc() and free()? 3

Q.6 a. What is *recursion*? Write a recursive function to determine the factorial of a number. 1+4

b. What is a File? Write a C program to create a data file *data.txt* and write the integers from 1 to 20 to this file. Then read the numbers from that file to write the squares of the stored numbers in another file named *square.txt*. 5

Q.7 a. Define a structure called **Student** with the following three members: 2+3

StudentID
StudentName
SP_Mark

Using **Student**, declare an array **mark** with 50 elements and write a C program to read the information about all the 50 students and print the **SP_Mark** with corresponding **StudentID** and **StudentName**.

b. What is the key difference between *Structure* and *Union*? 2

c. Identify the *formal arguments* and *actual arguments* in the following C program and write the output. 3

```
#include<stdio.h>
int add(int x,int y){
return x+y;
}
int main(){
int a = 10, b=20, c;
   c = add(a,b);
printf("C= %d\n",c);
return 0;
}
```

Premier University
Department of Computer Science & Engineering
B.Sc. in CSE (2nd Semester) Final Examination, December 2018
Course Title: Electronics I
Course No. : EEE 211

Time : 3 Hours **Marks : 50**

Answer any Five (5) from following Seven (7) questions.

Q1 a) Define Energy Band. Briefly describe 4
i) Valence Band
ii) Conduction Band
iii) Forbidden Energy Gap

b) Write short note on 2
i) P-type semiconductor
ii) N-type semiconductor

c) Describe how depletion region is formed in pn junction. 2

d) Draw the VI characteristic curve of pn junction. 2

Q2 a) Show that, maximum efficiency of a full wave bridge rectifier is 81.2% 5

b) Determine the currents I1, I2, and ID2 for the network of Fig. 2(b) 3

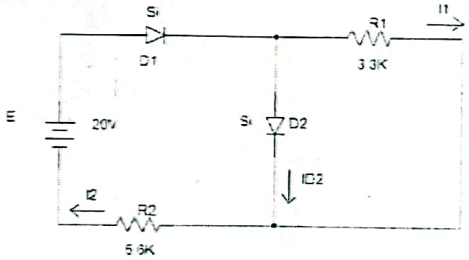


Fig. 2(b)

c) Sketch diode equivalent circuit model and characteristic curve under different approximation. 2

Q3 a) An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10 : 1 5
Find (i) the output d.c. voltage and (ii) the peak inverse voltage.
Assume the diode to be ideal.

b) Determine V_0 for the network in Fig. 3(b) 5

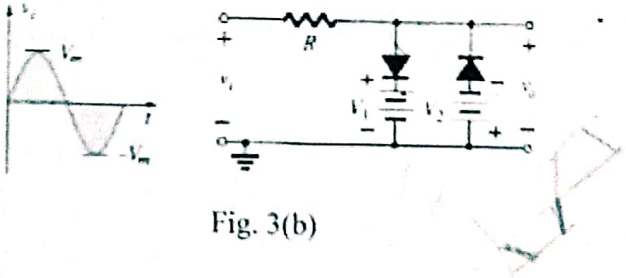


Fig. 3(b)

Q4 a) How can transistor be used as an amplifier? Explain with proper circuit diagram. 4

b) Draw the common emitter connection diagram and 6

i) Show that, $\beta = \frac{\alpha}{1-\alpha}$, where α and β convey usual meanings.

ii) Show that $I_c = \beta I_B + I_{CEO}$, where the symbols convey their usual meanings

Q5 a) For the common base circuit shown in Fig. 5(a) determine I_c and V_{CB}. Assume the transistor to be of silicon. 3

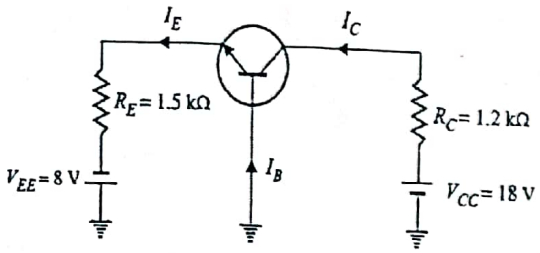


Fig. 5(a)

b) Explain the Cut off, Active and Saturation region by drawing output characteristics curve of common emitter configuration. 2

c) i)For the network of Fig. 5(c), determine the Range of R_L and I_L that will result in V_{RL} being maintained at 10 V 5

ii) Determine the maximum wattage rating of the diode in Fig. 5(c)

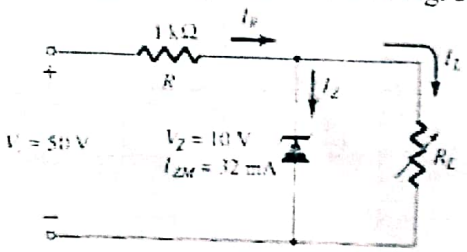


Fig. 5(c)

Q6 a) For faithful amplification "Proper zero signal collector current is needed" Justify it. 2

b) Draw the circuit diagram of different transistor biasing methods. 4

c) Describe the following mode of operations of a MOSFET. 4
i) Depletion mode ii) Enhancement mode

Q7 a) Why negative-feedback is used in operational amplifier. 2

b) Derive the mathematical expression for inverting amplifier. 3

c) Draw the circuit diagram of 3
i) Summing Amplifier ii) Integrator Amplifier iii) Differentiator Amplifier

d) Write down the difference between Bipolar Transistor& JFET. 2

Premier University
Department of Computer Science and Engineering
CSE 2nd Semester Final Examination, December 2018
Course Title : Engineering Physics - II
Course No. : PHY-103

Time : 3 Hours **Marks : 50**

Answer any Five (5) questions.

Q1. a) State the Faraday's laws of electromagnetic induction. 2

b) Give the analytical treatment of the coefficient of self inductance L in the case of a long solenoid. 5

c) Two coils, a primary of 450 turns and a secondary of 25 turns are wound on an iron ring of mean diameter 20 cm and cross-section 2 cm radius. Calculate the mutual inductance. 3

Q2. Deduce the following Maxwell's electromagnetic equations: 10

$$\nabla X B = \mu_o \varepsilon_o \frac{\partial E}{\partial t} + \mu_o j$$

Q3. a) Define coherent sources? 1

b) Give the analytical treatment of interference of light. 6

c) In Young's double slit experiment the separation of the slits is 1.9mm and the fringes spacing is 0.31mm at a distance of 1m from the slits. Calculate the wavelength of light? 3

Q4. a) Describe Newton's ring experiment for the determination of the wavelength of light. 7

b) In a Newton's ring experiment the diameter of the 7th ring was 0.493 cm and the diameter of 17th ring was 0.623 cm. Find the radius of the Plano-convex lens if the wavelength of light used is 5890 Å. 3

Q5. a) Write the basic postulates of special theory of relativity. 2

b) According to special theory of relativity, show that $L = L_0\sqrt{1 - v^2/c^2}$,where the symbols represent their usual meaning, 5

c) At what speed should a clock be move so that it may appear to lose one minute in each hour? 3

Q6. a) What is Work function? 1

b) From photoelectric effect, Show that $E = 1/2mv^2_{max} + h\upsilon_0$, where the symbols have their

usual meaning. 5

c) The work function of potassium is 5.0 eV. When ultraviolet light of wavelength 3500 falls on a potassium surface, what is the maximum energy in electron volts of the photoelectrons? 4

Q7. a) Derive an expression of Lorentz transformation from special theory of relativity. 8

b) Write the equation of inverse Lorentz transformation? 2