

Khulna University of Engineering & Technology  
B. Sc. Engineering 1<sup>st</sup> Year 2<sup>nd</sup> Term Examination, 2020  
Department of Biomedical Engineering

**BME 1201**  
**Biochemistry**

**Time: 1 Hour 30 Minutes**

**Full Marks: 120**

- N.B.** i) Answer **ANY TWO** questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.

**Section A**

(Answer **ANY TWO** questions from this section in Script A)

1. a) Write down the characteristics of life. Briefly explain about cellular design and blueprint of life. (08)
- b) List the name of Bio-macromolecules. Why lipids are considered as Bio-macromolecules? (07)
- c) Where does a working cell get its energy? What is the process where a cell harvest this chemical energy from food molecules? (06)
- d) What is enzyme Isolation? How do you purify enzyme? (09)
2. a) What is DNA, RNA and Genome? Write down the methods of DNA sequencing. (08)
- b) What is ELISA? Write down the types of ELISA. Explain the indirect ELISA with proper diagram. (12)
- c) Explain the 2<sup>nd</sup> law of thermodynamics in details. (10)
3. a) What is Spectrophotometer? Which law is applied in the spectrophotometer? Write down the Spectrophotometer measurement technique. (15)
- b) What is Ergogenetics of life? How entropy and enthalpy are related? (08)
- c) Write a short note on PCR. (07)

**Section B**

(Answer **ANY TWO** questions from this section in Script B)

4. a) Define carbohydrate. Mention some properties of carbohydrate. (10)
- b) What is glycolysis? Mention different phases of glycolysis with net ATP generation. (15)
- c) Write a short note on Benedict test (05)
5. a) What is TCA cycle? Discuss about different steps of TCA cycle. (15)
- b) Define and classify protein. Mention the steps of urea cycle. (10)
- c) Write a short note on Oxidative Phosphorylation. (05)
6. a) Mention the classification of lipid with example. Give some examples of saturated and unsaturated fatty acid. (15)
- b) Discuss about digestion and absorption of lipid. (12)
- c) Write a short note on Keton bodies (03)

**CSE 1215**  
**Computer Programming**

**Time: 1 Hour 30 Minutes**

**Full Marks: 120**

- N.B.** i) Answer **ANY TWO** questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.

**Section A**

(Answer **ANY TWO** questions from this section in Script A)

1. a) Write the structure of C program and explain. (10)  
b) What are the rules for naming a variable in C? (05)  
c) What will be the output of the following code? Give explanation behind your answer. (15)

i) <pre>int main() {   int a,b;   a=10;   b=a+ + + 10   printf("%d", num 2) }</pre>	ii) <pre>int main() {   printf("%d", 'a') }</pre>	iii) <pre>int main() {   int i i   for(i=1;i&lt;10;i++)   {     printf("%d", i);     if (i == 5)       continue;     if (i == 8)       break   } }</pre>
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2. a) Write a program in C to display the following pattern: (11)

```
* * * * *
* * * *
* * *
* *
*
```

- b) Write down the differences between `getch()` and `getche()`. Explain the functionality of `sizeof()` operator. (08)
- c) Write down the basic syntax of `structure` and `union`. Why using `union` is advantageous in case of memory allocation? Explain. (11)
3. a) Write down the differences between `switch-case` and `if-elseif` (08)  
b) Write a C program to copy the contents of one file to another. (12)  
c) Write short notes on: (10)  
    i) `typedef`      ii) `type casting`

## Section B

(Answer **ANY TWO** questions from this section in Script B)

4. a) What is array? Why array is used in program? How can we declare and initialize two-dimensional array? (10)
- b) Write short notes with C program: (12)
  - i) strcpy()
  - ii) strcmp()
  - iii) strlen()
- c) Develop a C program which features all the string handling functions. (08)
5. a) What is file? Describe how to open a file in different modes. (15)
- b) How to use pointer to access the elements of an array? Show with example. (10)
- c) What are the basic concepts of OOPs? (05)
6. a) Write down the advantages of using a function. (08)
- b) Write a program which will find the largest and smallest numbers within an array of data. (12)
- c) Write a program in C to find SUM and AVERAGE of two integer numbers using user define functions. (10)

**EEE 1215**  
**Analog Electronics**

**Time: 1 Hour 30 Minutes**

**Full Marks: 120**

- N.B.** i) Answer ANY TWO questions from each section in separate scripts.  
 ii) Figures in the right margin indicate full marks.

**Section A**

(Answer ANY TWO questions from this section in Script A)

1. a) Define doping process of semiconductor. Classify semiconductor on the basis of purity. Mention the significance of doping process. (05)
- b) “Zener diode can act as a voltage stabilizer in its reversed bias” Justify the statement. (10)
- c) Design and explain the operation of a regulated DC power supply using full-wave bridge rectifier circuit and 7805 IC. Also show that the rectification efficiency of a bridge rectifier is 81.2%. (15)
2. a) Mention the region of operations of a transistor. Show that the stability factor of a voltage divider bias circuit is minimum. (08)
- b) How can we bias a transistor in active region? Prove that  $\frac{1}{\alpha} = 1 + \frac{1}{\beta}$  (10)  
 for transistor, where symbols bear their usual meanings.
- c) Draw the DC load line and determine the Q point of the transistor biasing circuit shown in Fig. 2(c). Assume the transistor to be of silicon. (12)
3. a) Mention the differences between BJT and FET. Classify FET with their specific symbols. (08)
- b) Show that CMOS can acts as an inverter. Draw the transfer characteristics of a n channel D-MOSFET and E-MOSFET. (12)
- c) Determine the following for the network shown in Fig. 3(c) (10)  
 i)  $V_{GSQ}$  ii)  $I_{DQ}$  iii)  $V_{DS}$  iv)  $V_D$  v)  $V_G$  vi)  $V_S$

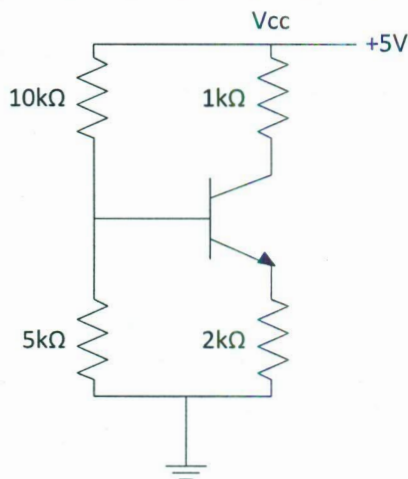


Fig. 2(c)

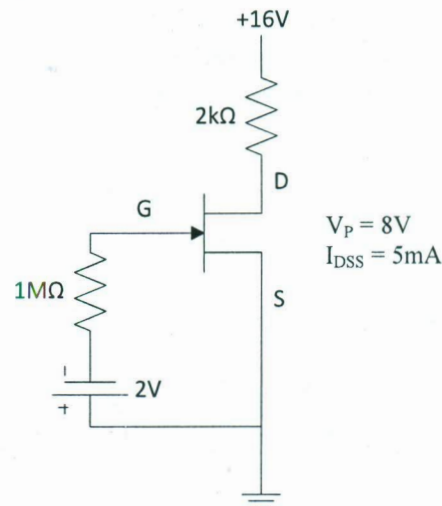


Fig. 3(c)

## Section B

(Answer ANY TWO questions from this section in Script B)

4. a) Draw the two transistor model of an SCR with net sketch. Briefly explain the working principle of SCR half-wave rectifier. (10)
- b) Draw the characteristics curve of a DIAC, TRIAC and UJT mentioning all significant regions. (09)
- c) Given the relaxation oscillator of Fig. 4(c). (11)
  - (i) Find  $R_{B1}$  and  $R_{B2}$  at  $I_E = 0$  A.
  - (ii) Determine  $V_P$ , the voltage necessary to turn on the UJT.
  - (ii) Determine whether  $R_1$  is within the permissible range.

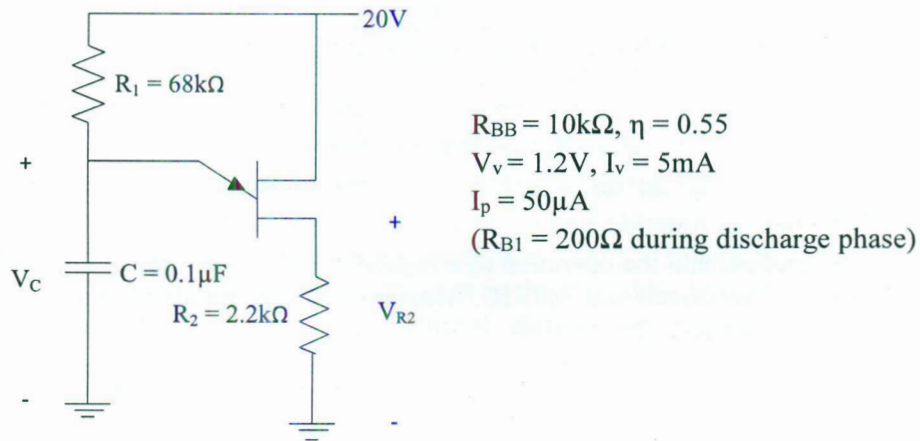


Fig. 4(c)

5. a) Write down the significance of CMRR. Design an Op-Amp circuit which acts as a differential amplifier and instrumentation amplifier. (10)
- b) Write down the differences between small signal and large signal analysis. Design a second order high pass active filter with net sketch. (12)
- c) What is slew rate? Determine  $V_o$  of Fig. 5(c). (08)
6. a) Define and classify power amplifiers. Explain the operation of transformer coupled push-pull amplifier. (12)
- b) What are the applications of sinusoidal oscillator? Briefly explain the operating principle of Colpitt's oscillator. (10)
- c) Why negative feedback is frequently used in amplifiers? Fig. 6(c) shows the negative voltage feedback amplifier. If the gain of the amplifier without feedback is 12000, find (i) feedback fraction and (ii) overall voltage gain. (08)

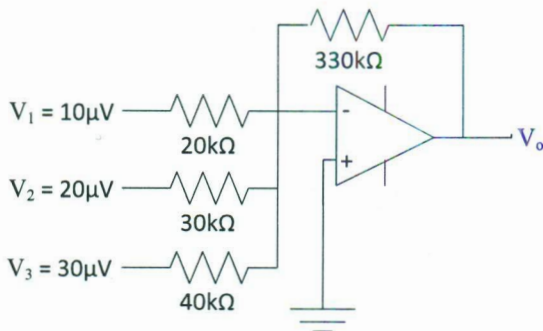


Fig. 5(c)

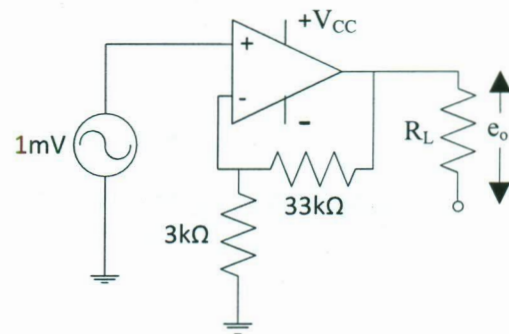


Fig. 6(c)

**Hum 1215**  
**Technical English**

**Time: 1 Hour 30 Minutes**

**Full Marks: 120**

- N.B.** i) Answer **ANY TWO** questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.

**Section A**

(Answer **ANY TWO** questions from this section in Script A)

1. a) Make sentence with the following structures using the words given in brackets. (10)
- i. Subj. + Linking verb + Adj. complement. (Appear as verb)
  - ii. Subj. + Transitive verb + Direct object. (Write as verb)
  - iii. That + Subj. + Verb + Adv. + Verb + Adj. complement. (Work and is as verb)
  - iv. Subj. + Verb + as + Subj. + Verb + Obj.. (Complete and suggest as verb)
  - v. Neither + Subj. + nor + Subj. + Verb + Obj.. (Answer as verb)
- b) Change the following words as asked in brackets and make sentence with the change forms: (10)  
Abhorrence (into adj.), Kindness (into adj.), Attention (into verb), Resumption (into verb), Massage (into verb).
- c) Make use of the following modals in sentence as asked in brackets: (10)
- i. can. (To express approval for someone else)
  - ii. could. (To express past ability)
  - iii. could + have + past participle of verb. (To express an action which was not implemented)
  - iv. should. (To express propriety)
  - v. need. (To express no necessity)
2. a) Make wh question with the underlined words of the following sentences: (10)
- i. The people of a country will abide by the rules of the country.
  - ii. Mim has been living in this town for three years.
  - iii. She is five feet and two inches tall.
  - iv. Nasima reads with a great eagerness.
  - v. He reads few books.
- b) Make use of the following words in sentence as asked in brackets: (10)  
Access (as adj.), Tea (as adj.), Date (as verb), Baby (as verb), Cloud (as verb)
- c) Complete the following sentences with clauses as asked in brackets: (10)
- i. .... is known to all. (Noun clause)
  - ii. ...., he can cut a good figure in exam. (Adv. clause)
  - iii. Habib, ....., is a hardworking man. (Adj. clause)
  - iv. We like ..... (Noun clause)
  - v. They walk fast ..... (Adv. clause)
3. a) Transform the sentences according to the instructions given within brackets: (10)
- i. Being a cripple, he cannot ride a horse. (Compound)
  - ii. His silence proves his guilty. (Complex)
  - iii. Does he know the consequences if he refuses? (Simple)

- iv. He is rich but honest. (Negative Complex)
  - v. Though he is honest, nobody likes him. (Simple)
- b) Correct the following sentences: (10)
- i. Green arrow will arrive in time.
  - ii. Listen to what your elder says.
  - iii. They until come, wait will we.
  - iv. The doctor saw his pulse.
  - v. He always tells the truth.
- c) Express the following notions/functions in sentence: (10)
- i. sympathy, ii. Courage, iii. Intention, iv. Love, v. distaste

### Section B

(Answer ANY TWO questions from this section in Script B)

4. a) Read the following passage carefully and answer the questions: (18)

A teacher from Western country recently visited an elementary school in an Asian country. In one class, she watched sixty young children as they learned to draw a cat. She remembered that each education system is a mirror that reflects the culture of a society. In a Western society such as the United States or Canada, which has many national, religious, and cultural differences, people highly value individualism- the difference among people- and independent thinking. Teachers place a lot of importance on the qualities that make each student special. The education system in these countries show these values. Students do not often memorize information. Instead, they work individually and find answers themselves and they express their ideas in class discussions. At an early age, students learn to form their own ideas and opinions.

In most Asian societies, by contrast, the people have the same language, history, and culture. Perhaps for this reason, the education system in much of Asia reflects society's belief in group goals and traditions rather individualism. Children in China, Japan, and Korea often work together and help one another on assignments. In the classroom, the teaching methods are often very formal. The teacher lectures and the students listen. There is not much discussion. Instead, the students recite rules or information that they have memorized.

Questions:

- i. What is this passage about?
  - ii. What are the differences between Eastern and Western education system?
  - iii. Which educational approach interests you? Why?
- b) Write a brief summary of the above mentioned passages (Question 4(a)) within 100 words and give it a suitable title. (12)
5. a) Write a paragraph on peace. (18)
- b) Prepare a C.V. along with a job application. (12)
6. a) Write an email to the bookstore manager complaining about two damaged books that you have received from them with the last order of ten books. (15)
- b) Write a letter to your friend proposing an idea for the joined research paper that you and your friend are planning despite being the students of different universities. (15)
- OR
6. c) Write a free composition on the freedom of life from evils of self. (30)

**Math 1215**  
**Coordinate Geometry and Differential Equations**

**Time: 1 Hour 30 Minutes**

**Full Marks: 120**

- N.B.** i) Answer **ANY TWO** questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.

**Section A**

(Answer **ANY TWO** questions from this section in Script A)

1. a) If the direction of axes is turned through an angle  $45^\circ$  and the origin remains unchanged then find the transformation equation of  $x^2 + 2xy - 3y^2 - 6 = 0$ . (15)
- b) Define direction cosine and direction ratio. Show that the angle between the lines whose direction cosines are given by  $al + bm + cn = 0$  and  $a^2l^2 + b^2m^2 + c^2n^2$  is

$$\cos^{-1} \frac{ca}{\sqrt{a^2 + b^2} \sqrt{b^2 + c^2}}$$

2. a) Two system of rectangular axes have the same origin if a plane cuts at  $a, b, c$  and  $a_1, b_1, c_1$  respectively from the origin, prove that (15)

$$\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{c_1^2} + \frac{1}{b_1^2} + \frac{1}{a_1^2}$$

- b) Find the coordinates of the center and radius of the circle  $x + 2y + 2z = 15$ ,  $x^2 + y^2 + z^2 - 2y - 4z = 11$ . (15)

3. a) Find the shortest distance between the lines (15)

$$\frac{x}{2} = \frac{y}{-3} = \frac{z}{1} \quad \text{and} \quad \frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$$

- b) Define right-circular cone. Measure the semi-vertical angle of the right-circular cone represented by  $2(y^2 + z^2) - x^2 = 0$  and also find its axis. (15)

**Section B**

(Answer **ANY TWO** questions from this section in Script B)

4. a) Define order and degree of the differential equation. Show that  $Ax^2 + By^2 = 1$  is the solution of (10)

$$x \left\{ y \frac{d^2y}{dx^2} + \left( \frac{dy}{dx} \right)^2 \right\} = y \frac{dy}{dx}$$

- b) Solve,  $\frac{dy}{dx} = \frac{y}{x} + \tan \frac{y}{x}$  (10)

- c) Solve,  $(x + 2y^3) \frac{dy}{dx} = y$  (10)



5. a) Solve the initial value problem  $(2x\cos y + 3x^2y)dx + (x^3 - x^2\sin y - y)dy = 0$ ;  $y(0) = 2$ . (12)
- b) Find the general solution of the differential equation  $\frac{d^2y}{dx^2} + y = \tan x$  by variation of parameter. (18)
6. a) Solve,  $\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} - y = 0$  in power of  $x$ . (14)
- b) Obtain the general solution of the heat flow equation  $\frac{\partial^2 u}{\partial x^2} = \frac{1}{K} \frac{\partial u}{\partial t}$  by the method of variation of separation. (16)