# B.Sc (HONS.) IN CSE PART-1, FIRST SEMESTER EXAMINATION, 2018

## STRUCTURAL PROGRAMMING LANGUAGE

**CSE-510201**

**Examination Code : 611**

Time—3 hours

Full marks—80

*[N.B.—The figures in the right margin indicate full marks. Answer any four questions. Each part of a question must be answered sequentially.]*

| | | | Marks |
|---|---|---|---|
| ১. | (a) | What is structured programming? Write down the importance of C language. | 1+4=5 |
| | (b) | What is pseudo code? Distinguish between algorithm and flow-chart. | 1+4=5 |
| | (c) | Describe the four basic data types used in C language. | 5 |
| | (d) | Draw the flow-chart that shows the process of compiling and running a C program. | 5 |
| ২. | (a) | Write down the difference between Local and Global variables. | 5 |
| | (b) | Define operator and expression. Distinguish between—— a and a——. | 2+3=5 |
| | (c) | What do you mean by looping? Explain entry control loop and exit control loop. | 1+4=5 |
| | (d) | Write down general form and flow-chart of the following statement :<br>*(i)* Nested IF-ELSE<br>*(ii)* SWITCH<br>*(iii)* FOR | 5 |
| ৩. | (a) | What are the different types of operators used in C language? Explain the logical and relational operators with example. | 6 |
| | (b) | Write down the difference between switch and its statement. | 4 |
| | (c) | What are the rules for declaring variables? | 5 |
| | (d) | Write a C program that takes an integer as input and display it in reverse order. | 5 |

*[Please turn over*

Marks

4. (a) Mention some string handling functions and describe them with example. 5

(b) What are the differences between structure and union? 5

(c) What do you mean by recursion function? Explain it with example. 1+4=5

(d) How can you declare and initialization of one-dimensional and two-dimensional array? 5

5. (a) What do you mean by function in C program? Write down the differences between actual and formal parameters in C language. 5

(b) Describe different types of storage classes with example. 5

(c) What do you mean by library function? 4

(d) Write a program to find the nth fibonacci series using function. 6

6. (a) What do you mean by call by value and call by reference? Explain with example. 5

(b) What do you mean by dynamic memory allocation? What are the advantages of using linked list over array? 5

(c) Write a program to append the contents of one file to another file. 5

(d) What are the errors that could occur during file operation and how could you solve them? 5

**B.Sc (HONS.) IN CSE PART-1, FIRST SEMESTER EXAMINATION, 2018**

ELECTRICAL AND ELECTRONIC CIRCUIT

**CSE-510203**

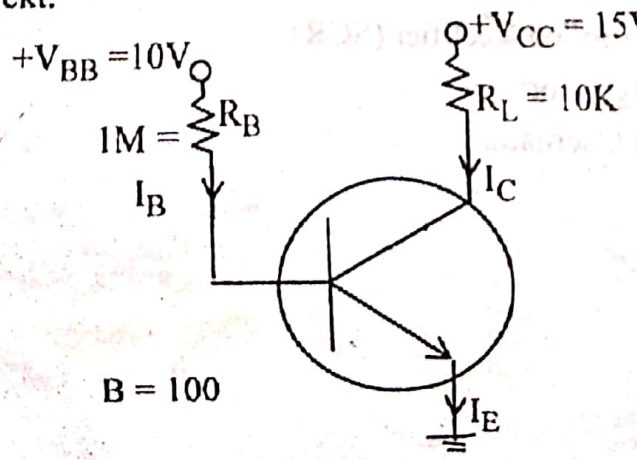
**Examination Code : 611**

Time—3 hours

Full marks—80

*[N.B.—The figures in the right margin indicate full marks. Answer any four questions. Each part of a question must be answered sequentially.]*

| | | | Marks |
|---|---|---|---|
| 1. | (a) | Define conductor and semiconductor. Explain them interms of energy level. | 6 |
| | (b) | Describe how P-type and N-type materials are formed. | 5 |
| | (c) | What is P-N junction? Describe I-V characteristics of a forward biased P-N junction. | 5 |
| | (d) | Define clipper and clamper circuit. | 4 |
| 2. | (a) | Describe the basic principles of operation of an AC generator. | 6 |
| | (b) | Explain with diagrams, what will happen when AC voltage is applied to a capacitor. | 5 |
| | (c) | Define frequency, phase and phase difference. | 5 |
| | (d) | A series resonance circuit consists of R = 2Ω, $X_L$ = 10Ω and $X_C$ = 10Ω. If the supply voltage is E = 10V < 0° and the resonant frequency is 5000Hz, calculate current I, quality factor Qs and Bandwidth BW. | 4 |
| 3. | (a) | Explain the working principle of a BJT. | 5 |
| | (b) | Describe the input and output characteristics of CE of BJT configuration. | 6 |
| | (c) | Explain how a transistor acts as an amplifier? | 3 |
| | (d) | What is load line and operating point? Draw a load line of the given ckt. | 6 |



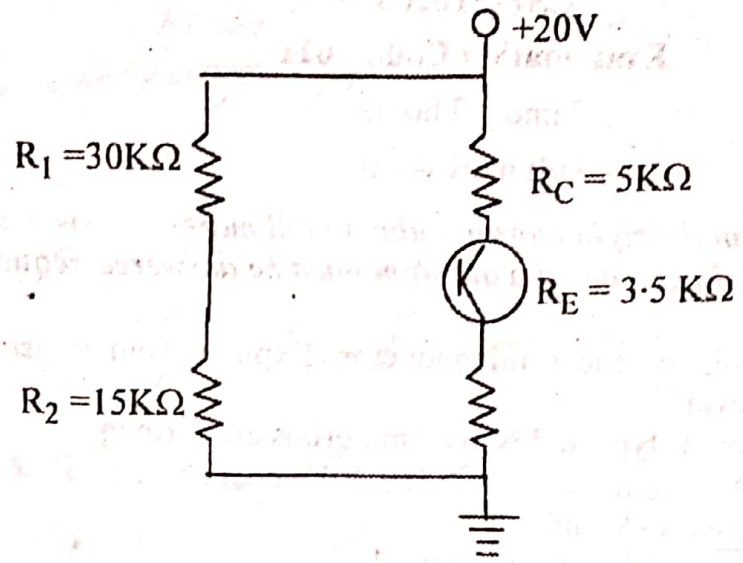

*[Please turn over*

Marks

4. (a) Explain the transistor action of a transistor. 4

(b) Explain the working principles of LED and Zener Diode. 6

(c) Using exact analysis determine the Q-point of the following circuit. Assume $\beta = 120$. 6




(d) Find out the relation between $\alpha$ and $\beta$. 4

5. (a) What is an operational amplifier? Write down the characteristics of an ideal operational amplifier. 5

(b) How an operational amplifier can be used as *(i)* Differentiator *(ii)* Summing amplifier. Explain with circuit digram and equation. 5

(c) Define feedback. What are the advantages and disadvantages of negative feedback? 6

(d) What is an oscillator? Discuss in briefly the working principle of Hertley Oscillator. 4

Write short notes on the following (any **four**) :— 5×4=20

(a) Resonance

(b) Field Effect Transistor (FET)

(c) Silicon Controlled Rectifier (SCR)

(d) Voltage Regulator;

(e) Phase Shift Oscillator;

(f) L-C Filter.

# B.Sc (HONS.) IN CSE PART-I, FIRST SEMESTER EXAMINATION, 2018

## CALCULUS

## CSE-510205

**Examination Code : 611**

Time—3 hours

Full marks—80

*[N.B.—The figures in the right margin indicate full marks. Answer any **four** questions. Each part of a question must be answered sequentially.]*

### Group A—Differential Calculus

Marks

1. (a) Define function and algebraic function with examples. 4

(b) Define limit of a function. By $(\delta, \in)$ definition, prove that $\lim_{x\to 2} \frac{x^2-16}{x-4} = 6$. 4+2=6

(c) A function $f(x)$ defined as follows :— 8+2=10

$$f(x) = \begin{cases} 3+2x & \text{when } -\frac{3}{2} \le x < 0 \\ 3-2x & \text{when } 0 \le x < \frac{3}{2} \\ -3-2x & \text{when } \frac{3}{2} \le x. \end{cases}$$

Test the continuity of $f(x)$ at $x = 0$ and $x = \frac{3}{2}$. Also draw the graph of $f(x)$.

2. (a) State and prove Leibnitz's theorem. 7

(b) Find the differential co-efficients of $x^y + y^x = a^b$ with respect to $x$. 3

(c) Find $\frac{dy}{dx}$ (any **two**) of :— 3×2=6

(i) $y = x^{\cos^{-1}x} + (\sin x)^{\ln x}$

(ii) $y = \log_a x + \log_x a$

(iii) $y = \tan^{-1}\left(\frac{1-\cos x}{1+\cos x}\right)^{\frac{1}{2}}$

(d) Evaluate : $\lim_{x\to 0} (\cos x)^{\cot^2 x}$. 4

*[Please turn over*

Marks

3. (a) Define : Concave up, concave down and inflection point. 3

(b) State and prove Cauchy's mean value theorem. 6

(c) Prove that, $x^x$ has a minimum value for $x = \frac{1}{e}$. 5

(d) Find the maximum and minimum value of the function— 6
$f(x) = x^5 - 5x^4 + 5x^3 - 1$.

## Group B—Integral Calculus

4. Evaluate (any **five**) :— $4\times5=20$

(i) $\int \cos 2\cot^{-1}\sqrt{\left(\frac{1-x}{1+x}\right)}dx$ (ii) $\int \frac{dx}{\sqrt[3]{x}\,\sqrt[3]{(1+x)^5}}$

(iii) $\int \frac{\sin^3 x}{\cos^9 x}dx$ (iv) $\int_0^a \frac{a^2 - x^2}{(a^2+x^2)^2}dx$

(v) $\int_0^{16} \frac{x^4}{1+\sqrt{x}}dx$ (vi) $\int \frac{dx}{(1+x^2)\sqrt{1-x^2}}$

5. (a) State and prove Fundamental theorem of integral calculus. 8

(b) Evaluate (any **two**) :— $4\times2=8$

(i) $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}dx$

(ii) $\int_0^{\pi} \frac{x\sin x}{1+\cos^2 x}dx$

(iii) $\int_0^{\frac{\pi}{4}} \ln(1+\tan\theta)\,d\theta$

(c) If $I_n = \int_0^{\frac{\pi}{4}} \tan^n\theta\, d\theta$ then show that, $n(I_{n+1}+I_{n-1}) = 1$. 4

6. (a) Find the length of the perimeter of the cardiode $r = 8(1+\cos\theta)$. 6

(b) Find the area between the parabola $y^2 = 4ax$ and the straight line $y = x$. 7

(c) Find the volume of the solid generated by the revolution of the curve $y^2(a+x) = x^2(a-x)$ about $x$–axis. 7

**B.Sc (HONS.) IN CSE PART-I, FIRST SEMESTER EXAMINATION, 2018**

PHYSICS

**CSE-510207**

**Examination Code : 611**

Time—3 hours

Full marks—80

*[N.B.—The figures in the right margin indicate full marks. Answer any four questions. Each part of a question must be answered sequentially.]*

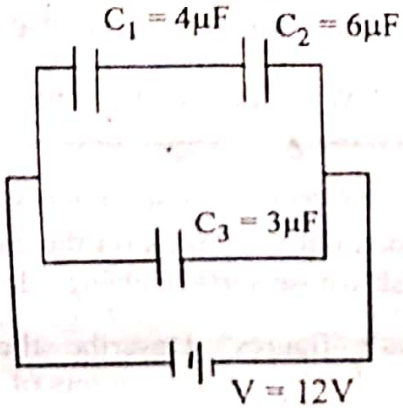
Marks

1. (a) Define : Electric dipole, charge density, potential difference. 6

(b) Deduce an expression for torque and potential energy by an electric dipole placed in a uniform electric field. 6

(c) Calculate the capacitance of earth, viewed as a spherical conductor of radius 6400 km. 4

(d) Calculate the equivalent capacitance of the following group capacitors :— 4




2. (a) What is simple harmonic oscillator? Give some examples. Define equilibrium state and restoring force. 6

(b) An ideal spring mass system with single mass is allowed to oscillate in horizontal position. Find the differential equation of motion of this oscillator and the tentative solution for displacement. Verify the solution to find its angular frequency, period, frequency, potential energy, kinetic energy and total energy. 8

(c) A certain spring hangs vertically. When a mass M = 1.65kg is suspended from it, its length increases by 7·33cm. The spring is then mounted horizontally and a new mass M = 2·43 kg is attached to the spring after removing the previous. The block of mass is free to slide along a frictionless surface and an oscillation is started with Xm = 11·6cm. Now find : *(i)* Period of oscillation, *(ii)* Maximum restoring force, *(iii)* Total energy. 6

*[Please turn over*

Marks

3. (a) Describe the patterns of light intensity or a point in screen, if one slit is covered with red filter and the other with a blue filter, the incident light being white. 6

(b) In the Newton's ring experiment is the central spot, as seen by reflection, dark or light? Explain. 6

(c) What is interference? Write the characteristics of interference. 3

(d) Distinguish between self-inductance and mutual inductance. 5

4. (a) A damping force is introduced in an ideal spring mass system. What is going to happen to its amplitude of oscillation and its total energy? 4

(b) Write down the differential equation of motion of a damped harmonic oscillator and find its solution for displacement. Verify the solution and find its changed angular frequency due to the introduction of damping force. 8

(c) What is critical damping? What happens when a demped oscillator is critically damped? 3

(d) Define reverberation of sound and reverberation time. Mention and explain Sabine's formula for reverberation time. 5

5. (a) What is diffraction? Write down the types of diffraction and differentiate between them. 6

(b) What is the relation between mass and energy? Explain. 8

(c) Find the electric potential for points on the axis of a uniformly charged circular disk whose surface change density is $\sigma$. 6

6. (a) What are Lissajou's figures? Describe the experiment by Jules Antoine Lissagion to obtain these sets of figures. 5

(b) Mention the uses of Lissajou's figures. 4

(c) Find the general expression for the resultant vibration of a particle simultaneously acted upon (combination) by two initially perpendicular simple harmonic motion, having the same frequency but different amplitudes and phase angles. What happens when their phase difference is *(i)* 0, *(ii)* $\frac{\pi}{4}$, *(iii)* $\frac{\pi}{2}$, *(iv)* $\pi$. 8

(d) Derive the differential equation of a plane progressive wave. 3

# B.Sc (HONS.) IN CSE PART-I, FIRST SEMESTER EXAMINATION, 2018

ENGLISH

**GED-510209**

**Examination Code : 611**

Time—3 hours

Full marks—80

*[N.B.—The figures in the right margin indicate full marks. Answer any **four** questions. Each part of a question must be answered sequentially.]*

Marks

1. Read the following passage and answer the questions below :—

Listening, speaking, reading and writing are the four skills which should be developed separately by a person wishing to bring about full command over a language. But in Bangladesh, the courses followed in different levels emphasise on 'writing' and 'reading' but 'speaking' and 'listening' do not receive even minimum focus. But everybody knows that every language is basically spoken. If one cannot produce sentences verbally, it is thought that his/her language learning has not completed, of course, all the prescribed texts contain instruction, encouraging the students to hold conversation in English on a wide variety of topics. But the interesting fact is that the students need not face any test which can fathom their ability to speak or listen. That means, development of verbal skill (listening and speaking) is a matter of voluntary task in all levels of language learning. As most of the students in our country are highly examination centred, they don't feel any urge to improve these two vital language skills. They think that they are not getting any credit in the examinations, though they have excellence in these skills. So the absence of tests or evaluating verbal competence is thus directly responsible for the student's poor speaking and listening skills. So the absence of tests or evaluating verbal competence is thus directly responsible for the student's poor speaking and listening skills. It is actually the reason for which a student obtaining A+(80+) in both S.S.C and H.S.C examinations cannot show a remarkable practical performance in English.

**Questions :**

(a) (i) Why can't the Bangladeshi students show remarkable verbal competence? 5

(ii) What is the fault of language evaluation system?

(b) Write down the meaning of the following words in English and make your own sentences with them (any **five**) : command, emphasis, produce, prescribed fathom, voluntary. 5

(c) What is the main idea and what are the supporting ideas of the passage? 5

(d) Write a summary of the passage. 5

*[Please turn over*

Marks

2. (a) Complete the following sentences :— 5

(i) He will not shine unless ..... .

(ii) We eat food so that ..... .

(iii) Read diligently lest ..... .

(iv) If she had tried, ..... .

(v) If you play in the rain, ..... .

(b) Correct the following sentences :— 5

(i) The family does their best to make a living.

(ii) The number of students seeking admission have increased.

(iii) Two third of it is true.

(iv) The committee has met and have approved the budget.

(v) Ten miles are a long distance.

(c) Use the right form of verbs in the following sentences :— 5

(i) Two and two (make) four.

(ii) No one (be) free from error.

(iii) Neither of us (be) present.

(iv) The thickness of the books (vary).

(v) Twenty dollars a week (not go) far.

(d) Combine each of the following groups of sentences into one sentence :— 5

(i) I with some of my friends arraged a picnic. We selected kuakata for the picnic spot because it is the only sea beach in the world where both sun rise and the sun set can be seen.

(ii) I have a garden in front of my study room. I grow here many kinds of flowers.

3. Amplify the following :— 10

(a) Cleanliness is next to Godliness.

(b) Translate into English. 10

দারিদ্র্য দূরীকরণে বাংলাদেশের সাফল্য অসাধারণ দুই কোটিরও বেশি মানুষ চরম দরিদ্র অবস্থা থেকে বের হয়ে এসেছে। এছাড়া আরও অনেক ক্ষেত্রে বাংলাদেশ তার প্রতিবেশী দেশগুলোর তুলনায় বেশি সাফল্য পেয়েছে। বিশেষ করে স্বাস্থ্য, শিক্ষা, কর্মক্ষেত্রে নারীর অংশগ্রহণ বৃদ্ধিতেও বাংলাদেশ ভালো এগিয়েছে। তবে বাংলাদেশে প্রত্যক্ষ বিদেশি বিনিয়োগ এখনো খুব কম। এখানে বাংলাদেশের আরও উন্নতি করার সুযোগ আছে।

4. Write an essay any one of the following :— 20

(a) Effects of social networking sites

(b) Female education

(c) Illiteracy

(d) Democracy

5. (a) Suppose, you are the senior vice-president of System and Operation Department of National Bank LTD. Your bank wants to renovate and decorate some of your offices. Now, write a tender notice about it. 10

(b) An accident took place on a highway. You are a reporter of a daily. Now, write a short report on it. 10

6. (a) Write a paragraph any one of the following :— 10

(i) Global warming.

(ii) Patriotism.

(b) Write an application to the director of an Information Technology Company for the post of a System Analyst. 10