



University Teaching Department, CSVTU, Bhilai (C.G.)
B.Tech (Honours) (Data Science/ Artificial Intelligence)
Re-Class Test, April, 2022
Environmental Science

Time Allowed: 2 hours

*Maximum Marks: 60
Minimum Pass Marks: 21*

Roll No - 29

- Note: (i) Each question contains four parts. Part (a) of each question is compulsory.
Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

- I. (a) State a difference between endemic and exotic species. [4]
(b) What do you understand by nutrient cycling? Explain carbon cycle, sulphur cycle. [8]
(c) What are the major threats to biodiversity? [8]
(d) Write short Note on:-
 1. Rainwater harvesting
 2. Soil erosion. [8]
- II. (a) What is population Explosion? [4]
(b) What are the stages of HIV infection? Draw and explain the transmission cycle of HIV. [8]
(c) Write a brief note on solid waste management & explain what is the 3-R strategy for waste management? [8]
(d) What is Women and Child Welfare programme? Give its importance. [8]
- III. (a) Write down the objectives of environmental management system. [4]
(b) What do you mean by Mineral resources? Explain the measures taken for conserving Mineral resources. [8]
(c) What is EIA? Explain the key elements of an EIA process. [8]
(d) Write short notes on:-
 1. Environmental Protection Act 1986
 2. Air (prevention and control of pollution) act 1981 [8]



University Teaching Department, CCSVTU, Bhilai (C.G.)

B.Tech (Honours) (Data Science/ Artificial Intelligence)

Re-Class Test, April, 2022

<Fundamentals of Computational Biology>

Time Allowed: 2 hours

Maximum Marks: 60

Minimum Pass Marks: 21

Roll No. 29

Note: (i) Each question contains four parts. Part (a) of each question is compulsory.

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(iii) Draw neat labelled diagrams wherever necessary

- I. (a) Write a brief note on graph theory. [4]
(b) Write short notes on different graphical representation for biological data. Plot Line-weaver burk plot for the following data:

Substrate (mM)	0	0.2	0.4	0.6	0.8	1
Velocity (mM/min)	0	0.08	0.16	0.22	0.28	0.29

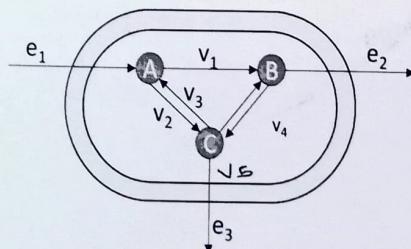
[4+4]

- (c) Write MATLAB script for plotting a graph of Michaelis-Menten equation. [8]
(d) Explain briefly Monod model and its mathematical expression.

A bacteria is incubated overnight on two different media, find out the final Cell concentration after 24 hours of incubation, considering following conditions:

- a. Doubling time in Media 1 and Media 2: 30 minutes, 45 minutes respectively
b. Initial cell concentration: 1×10^4 [8]

- II. (a) What are the different components of blood? [4]
(b) Discuss the different models of blood rheology in context of Newtonian and Non-Newtonian properties. [8]
(c) Write the ODE equation for first order, second order and third order reaction kinetics. Draw the simulink block diagram for Fick's law of diffusion. [8]
(d) Write MATLAB script for creating and calling a function file for solving ODE of Lotka Volterra model. [8]
- III. (a) Define molecular switches with suitable examples. [4]
(b) Write ODE expression and stoichiometric matrix for following network: [8]



- (c) Explain in detail about mutational studies in a population with suitable examples. [8]
- (d) What is flux balance analysis? What is the application of FBA in biology? Write detailed steps involved in FBA. [2+2+4]



University Teaching Department, CSVTU, Bhilai (C.G.)
B.Tech (Honours) (Data Science/ Artificial Intelligence)

Re-Class Test, April, 2022

Learning Programming Concepts with C

Time Allowed: 2 hours

Maximum Marks: 60

Minimum Pass Marks: 21

Roll No - 29

- Note: (i) Each question contains four parts. Part (a) of each question is compulsory.
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(ii) The figure in the right-hand margin indicates marks.

- I. (a) What will be output of the following [4]

```
int test(int a) {
    int b = 10;
    a=2;
    a=a*b;
    return a;
}
int main() {
    int a = 100;
    int b = 500;
    a = test(b);
    printf("\n %d %d", a, b);
    return 0;
}
```

- (b) What is recursion? Write a program that calculates factorial for a given [8] number using recursive function.

- (c) Write a function to calculate the trace of a matrix. [Trace of a matrix is defined as the sum of the main diagonal elements.] [8]

- (d) Write a program to write a recursive function for Fibonacci sequence. [8]

- II. (a) What is Dangling Pointer? [4]

- (b) Explain with suitable examples the concept of call by value and call by reference and differentiate between them. [8]

- (c) Explain Dynamic Memory Allocation using malloc(), calloc(), free(), and [8] realloc().

- (d) Write a program to calculate length of string using pointer. [8]

- III. (a) Explain the difference between structure and union. [4]

- (b) Declare a structure named class with student id, name, and marks as members. Write a program to declare two class variables and compare them. [8]

- (c) Write a program in C to copy the content of a file to another file. [8]

- (d) Explain command-line argument with an example. [8]



University Teaching Department, CSVTU, Bhilai (C.G.)
B.Tech (Honours) (Data Science/ Artificial Intelligence)

Re-Class Test, April, 2022
Engineering Mathematics-I

Time Allowed: 2 hours

Maximum Marks: 60

Minimum Pass Marks: 21

Roll No - 29

- Note: (i) Each question contains four parts. Part (a) of each question is compulsory.
Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

- I. (a) State that Green's Theorem in plane? Verifying it for $F_1 = y^2 - 7y$, [4]
 $F_2 = 2xy + 2x$ and C the circle $x^2 + y^2 = 1$. that is

$\lim_{x \rightarrow -1} x = -1$ to $x = 1$; $y = -\sqrt{1-x^2}$ to $y = \sqrt{1-x^2}$;

- (b) Prove that $\operatorname{div}(r^n \vec{r}) = (n+3)r^n$; if $r^n \vec{r}$ is solenoidal then find the value of n. What is importance of gradient of scalar field. [8]

- (c) Define Stoke's Theorem? Write the application of Curl of vector field.

[8] Verified the Stoke's theorem, when $\vec{F} = (2x-y)i - yz^2j - y^2zk$, where S is upper half surface of $x^2 + y^2 + z^2 = 1$. And C is circle.

- (d) Define the importance of divergence of vector? Prove that [8]

$\iint [(x^3 - yz)i - 2x^2yzj + 2zk].ndS = \frac{a^5}{3}$, Where S is a surface of cube bounded by the plane $x=0, x=a, y=0, y=a, z=0, z=a$.

- II. (a). If $u = x^2 - y^2, v = -\frac{y}{x^2+y^2}$, then u and v both are satisfied Laplace equation, but $f(z) = u+iv$, not analytic function of z. [4]

- (b) State that Milne Thomson's Method. Find the analytic function, its real part $e^{-x}\{(x^2 - y^2)\cos y + 2xy \sin y\}$ [8]

- (c) Define Harmonic function. Prove that $u = \frac{\log(x^2+y^2)}{2}$, is harmonic function. And also find its harmonic conjugate. [8]

- (d) Write the necessary condition for $f(z)$ to be analytic. Suppose $f(z) = u+iv$, is analytic on domain D. And prove that $f(z)$ is constant in D, if it satisfied one of the following condition [8]

- (i) $f'(z)$ is identically zero in D
(ii) $R(f(z)) = u = \text{constant}$.
(iii) $|f(z)| = \text{constant}$

III. (a) What about half range Fourier Series ? find Cosine series of $f(x)$ in half range [4]

$$(0, \pi). \text{ Where } f(x) = \begin{cases} \frac{\pi x}{4}, & 0 \leq x \leq \frac{\pi}{2} \\ \frac{\pi(\pi-x)}{4}, & \frac{\pi}{2} < x \leq \pi. \end{cases} \text{ And also}$$

$$\text{Deduct } \frac{\pi^2}{32} = \frac{1}{2^2} + \frac{1}{6^2} + \frac{1}{10^2} + \dots.$$

(b) Find the Fourier Series , where function defined as [8]

$$f(x) = \begin{cases} -1, & -3 < x < 3 \\ 0, & x = 0, \\ 1, & 0 < x < 3. \end{cases}$$

(c) Find Fourier series of function $f(x) = x^2, -\pi < x < \pi$. [8]

(d) Define Fourier Series of even and odd functions. And [8]

find Fourier Series for $f(x) = x, -\pi < x < \pi$.



University Teaching Department, CSVTU, Bhilai (C.G.)

B.Tech (Honours) (Data Science/ Artificial Intelligence)

Re-Class Test, April, 2022

Language and Writing Skills

Time Allowed: 2 hours

Maximum Marks: 60

Minimum Pass Marks: 21

Roll No - 29

- Note: (i) Each question contains four parts. Part (a) of each question is compulsory.
Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

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- I. (a) What is listening? . [4]
(b) Explain types of listening (pre, while, and post). [8]
(c) Explain barriers to listening. [8]
(d) What are different ways to practice effective listening. [8]
- II. (a) What is speaking? . [4]
(b) Discuss the various aspect of speaking skills. [8]
(c) What is Group Discussion? Discuss the Do's and Don'ts of Group Discussion. [8]
(d) What is presentation? Discuss the various steps used for making a presentation. [8]
- III. (a) What is reading and its types. [4]
(b) Discuss the elements of business letter. [8]
(c) What are the elements of formal report writing? [8]
(d) Discuss the importance of reading. [8]



University Teaching Department, CSVTU, Bhilai (C.G.)

B.Tech (Honours) (Data Science/ Artificial Intelligence)

Re-Class Test, April, 2022

Professional Ethics & Life Skills

Time Allowed: 1 hour 30 minutes

Maximum Marks: 60

Minimum Pass Marks: 21

Roll No - 29

Note: (i) Each question contains four parts. Part (a) of each question is compulsory.

Attempt any two parts from (b), (c), and (d) of each question.

(ii) Include suitable header file/s in all your program.

(iii) The figure in the right-hand margin indicates marks.

I. (a) Define Safety? [4]

(b) Explain professional rights & Employee rights? [8]

(c) Explain Intellectual property rights (IPR)? [8]

(d) Define any Two: [8]

a) Occupational crime

b) confidentiality

c) occupational crime (*occupational* *bcognising*)

II. Define value education? [4]

(b) What are the morals & values required in life for dealing with people? [8]

(c) What is the role of gratitude & forgiveness in our life? [8]

(d) Define any Two: [8]

a) Gratitude

b) Determination

c) Contentment

III. (a) Define Society? [4]

(b) Explain Communities with reference to change in Ancient to Modern Era? [8]

(c) Why Security is important for any society & Community? [8]

(d) Explain Social consciousness & responsibility for society? [8]



University Teaching Department, CSVTU, Bhilai (C.G.)
B.Tech (Honours) (Data Science/ Artificial Intelligence)
Re-Class Test, April, 2022
Foundation of Electronics

Time Allowed: 2 hours

*Maximum Marks: 60
Minimum Pass Marks: 21*

Note: (i) Each question contains three parts. All questions are compulsory.
(ii) The figure in the right-hand margin indicates marks.

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- I. (a) Draw the FET family tree (or classification) and write the advantages and disadvantages of MOSFET. [4]
(b) Explain the working principle of E-MOSFET with characteristics diagram. [8]
- (c) Write down the comparison between (1) FET and BJT [4]
(2) JFET and MOSFET [4]
- II. (a) Find the value of I_D (Drain current) when $V_{GS} = -3.63V$, $V_{GS} = -3V$ and $I_{DSS} = -1.75$ mA. [4] *at 0.05V*
(b) Explain Fermi Dirac statistic and Boltzmann approximation to the Fermi Dirac statistic. [8]
- (c) What is the discrete transistor amplifier? Explain Emitter Follower in brief [8]
- III. (a) Derive the continuity equation for hole and electrons in a semiconductor. [4]
- (b) Write the definition of α , β and γ . Find the value of α , β and γ if $I_B = 6mA$, $I_C = 3mA$ and $I_E = 6mA$ are given. [8]
- (c) Explain the (1) Ebers-Moll model. [4]
(2) Semiconductors and its types [4]