UG–342 **BMC–23**

B.Sc. DEGREE EXAMINATION — DECEMBER, 2019.

Second Year

Mathematics with Computer Applications

PROGRAMMING IN C AND C++

Time : Three hours Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE of the following.

1. Explain the structure of C program.

2. Explain any four library functions with examples.

3. Write short notes on unions.

4. Write short note on opening a file.

5. Write a program to find factorial of a given number using functions.

6. What is Macro? Give the difference between Macro and Functions.

7. Write short notes on "Command line arguments".

8. Distinguish classes and structures in detail.

PART B — (5 × 10 = 50 marks)

Answer any FIVE of the following.

9. Briefly explain the different type of constants with example.

10. What is recursion? Explain with an example.

11. How to pass a structure to a function? Explain with an example.

12. Write a C program to open, read and display the contents of a text file.

13. Explain the four storage class specifications in C.

14. Give a brief account on dynamic memory allocation.

15. Write a C program to arrange the numbers in ascending and descending orders.

16. Explain the various types of constructors with example.

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UG-341 **BMC–22**

B.Sc. DEGREE EXAMINATION – DECEMBER 2019.

Second Year

Mathematics with Computer Applications

CLASSICAL ALGEBRA AND NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Find the sum to infinity of the series

$$1+\frac{3}{4}+\frac{3.5}{4.8}+\frac{3.5.7}{4.8.12}+.....$$

2. If x, y, z be n real quantities show that $(n-1)\sum n^2 > 2\sum xy$.

3. Solve the equation $x^4-5x^3+4x^2+8x-8=0$ given that one of the roots is $1-\sqrt{5}$.

4. If α,β,γ are the roots of the equation $x^3+ax^2+bx+c=0$, form the equation whose roots are $\alpha\beta$, $\beta\gamma$ and $\gamma\alpha$.

5. Prove that $1+\mu^2\delta^2=\left(1+\frac{1}{2}\delta^2\right)^2$.

6. From the following table of half-yearly premium for policies maturing at different ages, estimate the premium for policies maturing at age 63.

Age x:	45	50	55	60	65
Premium y:	114.84	96.16	83.32	74.48	68.48

7. Solve the equation $x^2+x^2-1=0$ for the positive root by iteration method.

8. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by (a) Trapezoidal rule (b) Simpson's one-third rule.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Sum the series $\frac{5}{1!}+\frac{7}{3!}+\frac{9}{5!}+...$

10. Solve the equation

$6x^6-35x^5+56x^4-56x^2+35x-6=0$.

11. Solve the equation $x^3-9x^2+108=0$ by Cardon's method.

12. Find the positive root of $x-\cos x=0$ by bisection method.

13. Solve the system by Gauss elimination method.

$2x+3y-z=5$, $4x+4y-3z=3$ and $2x-3y+2z=2$.

14. Using Stirlings' formula, find $y(1.22)$ from the following table.

x:	1.0	1.1	1.2	1.3	1.4
y:	0.84147	0.89121	0.93204	0.96356	0.98545
x:	1.5	1.6	1.7	1.8	
y:	0.99749	0.99957	0.99385	0.97385	

15. Using Newton's divided difference formula find the values of $f(2), f(8)$ and $f(15)$ given the following table:

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

16. Using Taylor series method, find $y(0.1)$ given $\frac{dy}{dx} = x + y, y(0) = 1$.

UG–331 BMS–21/BMC–21

B.Sc. DEGREE EXAMINATION — DECEMBER, 2019.

Second Year

Mathematics/Mathematics with Computer Applications

GROUPS AND RINGS

Time : 3 hours Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Prove that the function $f:\mathbb{R} \to \mathbb{R}$ defined by $f(x)=3x-5$, $\forall x \in \mathbb{R}$ is bijective. Also find f^{-1}.

2. Show that the set $G=\left\{\begin{pmatrix} a & b \\ 0 & d \end{pmatrix}: a,b,d \in \mathbb{R},\ ad \neq 0\right\}$ forms a non–abelian group under matrix multiplication.

3. Let G be a group. Prove that

   (a) $\left(a^{-1}\right)=a$, $\forall a \in G$, where a^{-1} stands for inverse of a.

   (b) $(ab)^{-1}=b^{-1}a^{-1}$, $\forall a,b \in G$

4. Prove that N is a normal subgroup of G if and only if $gNg^{-1} = N$ for every $g \in G$.

5. If f is a homomorphism of G into G' with kernel K, prove that K is a normal subgroup.

6. Prove that a field is an integral domain.

7. Show that the set of Gaussian integers $\mathbb{Z}(i) = \{a + ib : a, b \in \mathbb{Z}\}$ is an integral domain but not a field.

8. Let R be an integral domain with unit element and suppose that for all $a, b \in R$ both $a \mid b$ and $b \mid a$ are true, prove that $a = ub$, where u is a unit in R.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. If $f : A \to B$ and $g : B \to C$ are invertible functions, prove that $g \circ f$ is invertible function. Also prove that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.

10. State and prove Lagrange's theorem.

11. Let G be a group. If H and K are finite subgroups of order $o(H)$ and $o(K)$ respectively, prove that $o(HK) = \dfrac{o(H)\, o(K)}{o(H \cap K)}$.

12. Let G be a group. Prove that a subgroup N of G is a normal subgroup of G if and only if the product of two right coset is again a right coset of N in G.

13. State and prove fundamental theorem of group homomorphism.

14. If R is a commutative ring with unit elements and M is an ideal of R, prove that M is maximal if and only if R/M is a field.

15. Prove that an ideal $A = (a_0)$ is a maximal ideal of the Euclidean ring R if and only if a_0 is a prime element of R.

16. If R is a Euclidean ring, prove that any two elements a and b in R have a greatest common divisor.

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UG–046 **CCE**

B.Com./B.B.A. DEGREE EXAMINATION — DECEMBER, 2019.

ENVIRONMENTAL STUDIES

Time : 3 hours Maximum marks : 75

PART A — (3 × 5 = 15 marks)

Answer any THREE questions.

All questions carry equal marks.

1. Write about the importance of environmental studies.

   சுற்றுச்சூழலியலின் முக்கியத்துவத்தைப் பற்றி எழுதுக.

2. Discuss the over-exploitation of natural resources.

   இயற்கை வளங்களை அதிகமாக சுரண்டுவதைப் பற்றி விவாதி.

3. Write about the eco system.

   சுற்றுச்சூழல் பற்றி எழுதுக.

4. Give an account on conservation of biodiversity.

பல்லுயிர் பாதுகாப்பு பற்றி எழுதுக.

5. Write about the land resources.

நில வளங்களை பற்றி எழுதுக.

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

All questions carry equal marks.

6. Describe the food resources.

உணவு வளங்களை பற்றி எழுதுக.

7. Describe the structure and function of ecosystem.

சுற்றுச்சூழலின் கட்டமைப்பு மற்றும் செயல்பாட்டை பற்றி விவரி.

8. Explain the energy flow in the ecosystem.

சுற்றுச்சூழலில் ஆற்றல் ஓட்டத்தைப் பற்றி விளக்குக.

9. Give brief account on India as a mega diversity nation.

இந்தியாவைப் பொறுத்தவரையில் ஒரு மிகப்பெரிய பன்முகத் தன்மை கொண்ட நாடு எனக் குறிப்பிடுக.

10. Discuss the types and effects of air pollution.

காற்று மாசுபாட்டின் வகைகள் மற்றும் விளைவுகளை பற்றி விவாதி.

11. Discuss any five legal provisions to protect the environment.

சுற்றுச்சூழலைப் பாதுகாப்பதற்கான ஏதேனும் ஐந்து சட்ட விதிகளைப் பற்றி விவாதி.

12. Discuss the role of information technology in environment and human health.

சுற்றுச்சூழலுக்கும் மனித ஆரோக்கியத்திற்கும் உள்ள தகவல் தொழில் நுட்ப பங்கு பற்றி விவாதி.

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