U.G. DEGREE EXAMINATION – DECEMBER, 2018.

Second Year

ENVIRONMENTAL STUDIES

Time : 3 hours   Maximum marks : 75

PART A — (3 × 5 = 15 marks)

Answer any THREE questions.

Each answer should not exceed 2 pages.

1. Discuss the nature and scope of environmental studies.

    சுற்றுச்சூழல் ஆய்வுகளின் இயல்பையும் நோக்கத்தையும் பற்றி விவாதிக்கவும்.

2. Give a short note on energy resources.

    ஆற்றல் வளங்கள் – விளக்கவும்.

3. Write a brief account of ecosystem.

    சுற்றுச் சூழலியல் அமைப்பு – விளக்கவும்.

4. What are the causes for water pollution?

நீர் மாசுக்கான காரணங்கள் யாவை?

5. Explain any five strategies of disaster management.

பேரிடர் மேலாண்மையின் ஏதேனும் ஐந்து திட்டங்களை விளக்கவும்.

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

Each answer should not exceed 5 pages.

6. Explain the significance of environmental studies.

சுற்றுச்சூழல் ஆய்வுகளின் முக்கியத்துவத்தை விளக்கவும்.

7. Write a detailed note on "Need and importance of Environmental Education".

சுற்றுச்சூழல் கல்வியின் தேவை மற்றும் முக்கியத்துவத்தை விளக்கவும்.

8. What are the threats to biodiversity? Explain.

பல்லுயிரியலுக்கான அச்சுறுத்தல்கள் என்ன விளக்கவும்.

9. Analyze the role of an individual in prevention of pollution.

மாசு குறைபாட்டை தடுக்கும் ஒரு நபர் பங்கை ஆராயவும்.

10. Explain the significance of Environmental ethics.

சுற்றுச்சூழல் நெறிமுறைகள் – முக்கியத்துவத்தை விளக்கவும்.

11. Explain the significance of solid waste management.

திட கழிவு மேலாண்மை – முக்கியத்துவத்தை விளக்கவும்.

12. Explain how environment influences human health.

சுற்றுச்சூழல் மனித ஆரோக்கியத்தை எவ்வாறு பாதிக்கிறது என்பதை விளக்கவும்.

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B.Sc. DEGREE EXAMINATION – DECEMBER, 2018.

Second Year

Mathematics with Computer Applications

GROUPS AND RINGS

Time : 3 hours   Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE of the following.

1. Let ρ be an equivalence relation on a set S. Show that the set of all equivalence classes forms a partition on S.

2. Show that any permutation can be expressed as a product of disjoint cycles.

3. Show that a non-empty subset H of a group G is a subgroup of G iff $a, b \in H \Rightarrow ab^{-1} \in H$.

4. Let H be a subgroup of G. Show that the number of left cosets of H of H in G is the same as the number of right cosets of H in G.

5. Show that every group of prime order is cyclic.

6. Define a ring and give an example.

7. Show that any finite integral domain is a field.

8. If a be a non-zero element of a Euclidean domain R. Show that a is a unit if and only if $d(a) = d(1)$.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE of the following.

9. Define :
   (a) Reflexive relation
   (b) Transitive relation
   (c) Partial ordering relation
   (d) Totally ordered set
   (e) Bijection.

10. Show that the union of two subgroups of a group G is a subgroup of G if and only if one is contained in another.

11. Define a cyclic group and show that a subgroup of a cyclic group is cyclic.

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12. State and prove Cayley's theorem.

13. State and prove the fundamental theorem of group homomorphism.

14. Define a field. Show that a finite commutative ring R without zero-divisors is a field.

15. Let R be a commutative ring with identity. Show that an ideal M of R is maximal if and only if R/M is a field.

16. Show that any integral domain can be embedded in a field F and every element of F can be expressed as a quotient of two elements of D.

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B.Sc. DEGREE EXAMINATION – DECEMBER, 2018.

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 : $\dfrac{1}{3} + \dfrac{1.3}{3.6} + \dfrac{1.3.5}{3.6.9} + ...\infty$.

2. Prove that $\dfrac{1}{1!} + \dfrac{2}{3!} + \dfrac{3}{5!} + ... = \dfrac{e}{2}$.

3. Solve $x^3 - 15x^2 + 71x - 105 = 0$ given that the roots of the equation are in arithmetic progression.

4. If α, β, γ are the roots of $x^3 - 14x + 8 = 0$, find (a) $\Sigma \alpha^2$ (b) $\Sigma \alpha^3$.

5. Diminish by one the roots of $x^4 - 4x^3 - 7x^2 + 22x + 24 = 0$ and hence solve it.

6. Write the procedure for finding the approximate root of $f(x) = 0$ by the false position method.

7. State Newton's backward formula for interpolation.

8. Compute the value of the definite integral $\int\limits_{1}^{2} \dfrac{dx}{x}$ using trapezoidal rule by taking the range of integral as 5 equal parts.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Sum the series $\dfrac{1}{1.3} + \dfrac{1}{1.2.3.5} + \dfrac{1}{1.2.3.4.5.7} + \dots$ to ∞.

10. Transform the equation $x^4 - 8x^3 - x^2 + 68x + 60 = 0$ into which does not contain the term in x^3 and hence solve the equation.

11. Solve : $6x^5 - x^4 - 43x^3 + 43x^2 + x - 6 = 0$.

12. Find the positive root of $x^3 - 3x + 1 = 0$ by Newton Raphson method correct to 5 decimal places.

13. Use Lagrange's interpolation formula to find $f(5)$, from the following table.

x :	3	4	6
$f(x)$:	4	13	43

14. Find the negative root of the equation $x^3 - 4x - 9 = 0$ correct to 2 places of decimals by bisection method.

15. Find the first, second derivatives of the function tabulated below at the point $x = 1.5$.

x :	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$:	3.375	7.0	13.625	24	38.875	59.0

16. Suppose the following data were obtained from an experiment.

x :	3.0	3.25	3.50	3.75	4.0	4.25	4.50	4.75	5.0
y :	6.7	7.4	8.2	9.2	10.4	11.6	12.5	13.3	14.0

Use Simpson's $\dfrac{1}{3}$ rule to approximate $\displaystyle\int_{3}^{5} y\,dx$

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B.Sc. DEGREE EXAMINATION – DECEMBER, 2018.

Second Year

Mathematics with Computer Applications

PROGRAMMING IN C AND C++

Time : 3 hours   Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE of the following.

1. Give the syntax of switch statement and give appropriate example.

2. Summarize various logical operators and bit-wise operators in C.

3. Write a C program to find sum and average of first n odd integers.

4. Using functions, write a program to find factorial of a given positive integer.

5. How is a structure declared and accessed in C?

6. How do you pass pointers as function parameter? Explain.

7. Write a short note on feof() function.

8. Write a short note on overloading of function in C++.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE of the following.

9. Discuss various *data-types* available in *C*.

10. Explain the importance *of continue break* and *goto* statements in *C*.

11. Write a C program to check whether a given positive integer *n* is prime or not.

12. Write a C program to multiply two given matrices of order $m \times n$ and $n \times r$.

13. What is the pointer? How are the pointer variables declared? Explain the pointer arithmetic.

14. A file named DATA contains a series of integers. Code a program to read these numbers and then write all odd numbers to a file to be called ODD and even numbers to a file to be called EVEN.

15. What are the different forms of inheritance? Explain in detail.

16. Write a short note on constructors and destructors in C++.

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