

TSECET – 2020 Syllabus:

B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS

(100 MARKS)

Unit- I: Successive differentiation- Expansions of Functions- Mean value theorems - Indeterminate forms - Curvature and Evolutes - Partial differentiation - Homogeneous functions- Total derivative - Maxima and Minima of functions of two variables –Asymptotes- Envelopes.

Unit- II: Differential Equations of first order and first degree: Exact differential equations - Integrating Factors - Change in variables - Total Differential Equations of the form
- Differential Equations first order but not of first degree - Equations Solvable for y - Equations Solvable for x - Equations that do not contain x or y - Clairaut's equation.

Unit- III: Higher order linear differential equations: Solution of homogeneous linear differential equations with constant coefficients - Solution of non-homogeneous differential equations $P(D)y = Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}, b \sin ax/b \cos ax, bx^k, Ve^{ax}$.

Partial Differential equations - Formation and solution - Equations easily integrable - Linear equations of first order.

Unit- IV: Sequences: Limits of Sequences - Limit Theorems for Sequences - Monotonic Sequences - Cauchy Sequences – Subsequences - Lim sup's and Lim inf's – Series – Test for convergence - Alternating Series.

Unit- V: Sequences and Series of Functions: Power Series - Uniform Convergence - More on Uniform Convergence - Differentiation and Integration of Power Series.

The Riemann Integral - Properties of Riemann Integral - Fundamental Theorem of Calculus.

Unit- VI: Groups: Definition and Examples of Groups - Elementary Properties of Groups - Finite Groups - Subgroups - Subgroup Tests - Cyclic Groups - Properties of Cyclic Groups - Permutation Groups – Homomorphism – Isomorphism of Groups and their properties – Automorphism – Cosets – Normal Sub Groups.

Unit- VII: Introduction to Rings: Examples of Rings - Properties of Rings – Subrings - Integral Domains – Field - Characteristics of a Ring - Ideals and Factor Rings - Prime Ideals and Maximal Ideals - Ring Homomorphisms – Isomorphism of Rings and their properties - The Field of Quotients Polynomial Rings – Fundamental Theorem of Homomorphism.

Unit- VIII: Vector Spaces : Vector Spaces and Subspaces - Null Spaces - Column Spaces - Linear Transformations - Linearly Independent Sets - Bases - Coordinate Systems -The Dimension of a Vector Space - Rank-Change of Basis.

Unit – IX: Eigenvalues and Eigenvectors - The Characteristic Equation - Diagonalization -

Eigenvectors and Linear Transformations - Complex Eigenvalues – Orthogonality - Inner Product – Length - Orthogonality - Orthogonal Sets.

Unit- X: Solutions of Equations in One Variable : The Bisection Method - Fixed-Point Iteration - Newton's Method and Its Extensions - Error Analysis for Iterative Methods - Accelerating Convergence - Zeros of Polynomials - Interpolation - Lagrange Polynomial - Divided Differences - Numerical Differentiation and Integration.

TS ECET 2020
MODEL QUESTIONS For
B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS
(50 marks)

1. The generators of the group $G = (\mathbb{Z}_6, +)$?
a) 1,5 b) 1, 3, 5 c) 0,2,4 d) 0, 3
2. G is a finite group of order 24. H is a proper subgroup of G and order of $H > 8$ then Order of H is --
a) 12 b) 24 c) 9 d) 18
3. The Number of homomorphism's from \mathbb{Z}_8 to \mathbb{Z}_{12} --
a) 8 b) 4 c) 32 d) 24
4. V is a Inner Product space over the field of complex numbers $\{1, 1+i, 1-i\}$ then $\|1+i\| =$
a) $\sqrt{5}$ b) $\sqrt{3}$ c) $\sqrt{2}$ d) $\sqrt{7}$
5. The Complimentary function of $(-5D + 6)y = 0$
a) $y_c = C_1 e^{2x} + C_2 e^{3x}$ b) $y_c = C_1 e^{2x} - C_2 e^{3x}$
c) $y_c = C_1 e^{-2x} + C_2 e^{3x}$ d) $y_c = C_1 e^{-2x} + C_2 e^{-3x}$

TSECET – 2020 Syllabus:

B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS

ANALYTICAL ABILITY

(50 Marks)

1.Data Sufficiency: A question is given followed by data in the form of two statements labeled as I and II. If the data given in I alone is sufficient to answer the question then choice (1) is the correct answer. If the data given in II alone is sufficient to answer the question, then choice (2) is the correct answer. If both I and II put together are sufficient to answer the question by neither statement alone is sufficient, then Choice (3) is the correct answer. If both I and II put together are not sufficient to answer the question and additional data is needed, then choice (4) is the correct answer.

2. (a). Sequences and Series: Analogies of numbers and alphabets completion of blank spaces following the pattern in A: b:: C:d relationship odd thing out; Missing number in a sequence or a series.

b.Data Analysis: The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

c. Coding and Decoding Problems: A code pattern of English Alphabet is given. A given word or a group of letters are to be coded and decoded based on the given code or codes.

d. Date, Time and Arrangement Problems: Calendar problems, Clock Problems, Blood Relationship, Arrivals, Departures and Schedules; Seating Arrangements, Symbol and Notation Interpretation.

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MODEL QUESTIONS For
B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS
ANALYTICAL ABILITY **(50 Marks)**

1. Village T is in which direction with respect to village R?
- I. T is to the North of W which is to the West of S.
II. T is the North West of S
III W is the North West of R.
- 1) Any two of the three 2) Only I and II
2) 3) Only II and III 4) Only I and III
2. 4, 6, 9, $13\frac{1}{2}$, ?
- 1) $17\frac{1}{2}$ 2) 19 3) $20\frac{1}{4}$ 4) $22\frac{3}{4}$
3. Pointing towards a boy, veena said “He is the Son of only son my grandfather”. How is that boy is related to veena ?
- 1) Uncle 2) Brother 3) Cousin 4) Data Inadequate
4. In a certain code language BORN is written as APQON and LACK is written as KBBLK. How will the word GRID be written in the code language?
- 1) FSHCD 2) HSJED 3) FOHCD 4) FSHEd
5. If 30th January 2003 was Thursday. What was the day on 2nd March 2003?
- 1) Tuesday 2) Thursday 3) Saturday 4) Sunday

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TSECET – 2020 Syllabus:

B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS

Communicative English

(50 marks)

I. Vocabulary

1. Synonyms
2. Antonyms
3. Spelling
4. One Word Substitutes
5. Words often Confused
6. Idioms and Phrases

II. Grammar

7. Articles
8. Prepositions
9. Conjunctions & Adjectives
10. Tenses
11. Concord
12. Correction of Sentences

III. a. Reading Comprehension

b. Reading Comprehension

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MODEL QUESTIONS For
B. Sc.: (MATHEMATICS) GRADUATES MATHEMATICS

Communicative English

(50 marks)

1. Choose the right antonym for 'Thick'

- 1) Heavy 2) **Light** 3) Strong 4) Weak

2. Choose the correct spelt word out of the given alternatives.

- 1) **Damage** 2) Dammege 3) Damaige 4) Dammage

3. Choose the right word and fill in the blank

The children ran to _____ mother after school.

- 1) There 2) **Their** 3) His 4) Her

4. Choose the right meaning for the underlined idiom from the options given below

Mr John has the gift of the gab.

- 1) **Able to speak confidently** 2) Wealthy person 3) Gives gifts 4) Charitable attitude

5. Choose the appropriate preposition and fill in the blank

The farmer wakes up _____ sunrise

- 1) On 2) **At** 3) For 4) From
