

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma to Degree Common Entrance Test

DDCET (Engineering) Exam Syllabus - 2024-25

Program	Paper Number	Paper	No. of question	Maximum Marks	Time Duration
Engineering (All Branches)	Basics of Science and Engineering.	BE 01	50	100	150 Min. (Two & Half Hours)
	Aptitude Test (Mathematics and Soft Skill)	BE 02	50	100	
	Total		100	200	

DDCET SYLLABUS with effect from the Year 2024 (Common to all Programmes of Diploma Engineering)			
Sr. No.	TOPICS	Questions	Marks
I	PAPER-1 – (BE -01) Basics of Science and Engineering	50	100
1	Chemistry	25	50
2	Physics	25	50
II	PAPER-2 – (BE-02) Aptitude Test (Mathematics and Soft skills)	50	100
1	Mathematics	25	50
2	Soft skills	25	50
	TOTAL	100	200

PAPER-1- BE-01

Subject: Applied Physics / Physics

Sr. No.	Topic	Sub-Topic	Weightage (%)
1	Units and Measurement	<ul style="list-style-type: none"> • Physical quantities and units. • Interconversion of units MKS (SI) to CGS and vice versa. • Errors, Estimation of error, relative error, percentage error, propagation of errors. • Measurement with Vernier caliper and micrometer screw gauge. 	20
2	Classical Mechanics	<ul style="list-style-type: none"> • Linear motion, velocity, acceleration, force, Newton's laws of motion, linear momentum and impulse of force. • Circular motion, angular velocity, angular acceleration, centripetal and centrifugal force. • Work, energy, kinetic energy, potential energy, power. 	20

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3	Electric Current	<ul style="list-style-type: none">• Charge, interaction of charges, Coulomb's force.• Electric field, electric potential, electric flux, electric current.• Resistance, conductance, resistivity, conductivity, series and parallel combination of resistors.• Capacitance, parallel plate capacitor, series and parallel combination of capacitors.	20
4	Heat and thermometry	<ul style="list-style-type: none">• Modes of heat transfer• Various temperature scale, conversion of temperature, Kelvin – Celsius, Kelvin – Fahrenheit, Fahrenheit – Celsius and vice versa.• Heat capacity and specific heat.• Thermal conductivity, coefficient of thermal conductivity, linear thermal expansion.	20
5	Wave motion, optics and acoustics	<ul style="list-style-type: none">• Types of waves, (progressive, stationary, mechanical, non-mechanical, transverse, longitudinal).• Frequency, wavelength, periodic time and their relations.• Properties and applications of electromagnetic waves (ordinary light, LASER) and sound waves (ultrasonic wave, audible wave).• Amplitude, intensity, phase and wave equations.• Reflection, refraction, Snell's law, absolute refractive index, relative refractive index, total internal reflection, critical angle, optical fiber (construction, properties and applications).• Reverberation, Reverberation time, Sabine's formula, echo, absorption coefficient.	20

References:

1. AICTE Model Curriculum for Diploma Courses in Engineering & Technology (2019)
2. GTU – Diploma Engineering
3. Ganpat University – Diploma Engineering
4. CVM University – Diploma Engineering
5. Silver Oak University – Diploma Engineering
6. Darshan University– Diploma Engineering
7. Sankalchand Patel University- Diploma Engineering
8. Marwadi University – Diploma Engineering
9. R K University – Diploma Engineering
10. Atmiya University – Diploma Engineering
11. Parul University – Diploma Engineering
12. Vidhyadeep University – Diploma Engineering

Resource Persons:

1. Dr. Uday N. Trivedi, Lecturer in Physics, Government Polytechnic, Ahmedabad
2. Shree H.S.Patel, Lecturer in Physics, R. C. Technical Institute, Ahmedabad

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Subject: Chemistry

Sr. No.	Topics	Sub-topics	Weightage (%)
1	Inorganic Chemistry		
	1.1 Atomic Structure	1.1.1 Structure of Atom, Concept of orbits and orbitals 1.1.2 Pauli's exclusion principle, Hund's rule of maximum spin multiplicity and Aufbau principle 1.1.3 Electronic configuration of elements having atomic number 1 to 30.	20
	1.2 Chemical Bonding	1.2.1 Concept of Chemical Bonding 1.2.2 Types of Chemical Bonds and their characteristics - 1. Ionic bond (example NaCl), 2. Covalent bond, (e.g., Non-Polar covalent bond: H ₂ , O ₂ , N ₂ , CH ₄ ; Polar covalent bond : HF, NH ₃ , H ₂ O), 3. Coordinate covalent bond (Dative bond) (examples NH ₄ ⁺ , H ₃ O ⁺), 4. Metallic bond, 5. Hydrogen bonding its types and significance, 6. van der Waals bond (Intermolecular force of attraction). 1.2.3 Molecular arrangement in solid, liquid and gases, Structure of solids - Molecular solid, Ionic solid, Network solid, and Metallic solid.	
2.	Analytical Chemistry		
	2.1 Solutions	2.1.1 Concept of solute, solvent and solution, Methods to express the concentration of solutions – Normality (N), Molarity (M), % (w/w), % (w/v), % (v/v), Mole-fraction (χ) and ppm (mg/L).	20
	2.2 Ionization	2.2.1 Arrhenius theory of ionization. 2.2.2 Electronic concept of oxidation, reduction, and redox reaction. 2.2.3 Degree of ionization (α) and factors affecting on it. 2.2.4 pH, pH scale, pH of acid, base and neutral solutions, Calculations of pH of dilute acidic and dilute basic solutions, Importance of pH in various fields. 2.2.5 Buffer solution, Types of buffer solution, Application of buffer solution.	
3.	Physical Chemistry		

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3.1 Electrochemistry	3.1.1 Electrolytes and Non-electrolytes with suitable examples, Types of electrolytes. 3.1.2 Construction and working of - – Electrochemical Cell, – Hydrogen Electrodes (SHE). 3.1.4 Nernst equation and its applications for non-standard half-cell and cell. 3.1.5 Electrochemical series. 3.1.6 Electrolysis, Faraday's laws of electrolysis. 3.1.7. Industrial application of electrolysis: Electro metallurgy, electroplating, and Electro refining.	20
3.2 Corrosion of metals	3.2.1 Dry or Chemical corrosion: Oxidation corrosion, 3.2.2 Wet or Electrochemical corrosion 3.2.3 Galvanic corrosion mechanism. 3.2.4 Concentration cell corrosion. 3.2.5 Pitting corrosion, Waterline and Crevice corrosion. 3.2.6 Factors affecting the rate of corrosion 3.2.7 Internal and External corrosion preventive measures	
4	Applied Chemistry	
4.1 Water Treatment	4.1.1 Source of water, Hard water and soft water. 4.1.2 Salts cause water hardness, Unit of hardness, and numericals of water hardness. 4.1.3 Problems caused by the use of hard water in boilers and its prevention. 4.1.4 Scale and Sludge, Foaming and Priming, Caustic, Embrittlement. 4.1.5 Water softening techniques: Soda-lime process, Zeolite process, Ion exchange process, Reverse Osmosis process (R.O.) 4.1.6 Treatment of Municipal drinking water: Screening, Sedimentation, Coagulation, Filtration, Sterilization of water by Chlorination, Break-point of Chlorination. 4.1.7. Enlist Indian standard specifications of drinking water.	20
4.2 Lubricants	4.2.1 Lubricants, Functions of lubricants, Classification of Lubricants: Solid, Semi- solid, Liquid and Synthetic lubricants. 4.2.2 Lubrication – Mechanism : Fluid lubrication, Boundary lubrication 4.2.3 Physical properties of Lubricants: Viscosity and Viscosity Index, Flash point and Fire point, Cloud point and Pour point, Oiliness.	

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		4.2.4 Chemical properties of Lubricants: Saponification number, Neutralization number, Emulsification number.	
		4.2.5 Biodegradable Lubricants.	
5	Organic Chemistry		
5.1 Basic concepts of Organic chemistry	5.1.1 Tetravalency of Carbon 5.1.2 Classification of Organic Compounds 5.1.3 Hydrocarbon and its classification 5.1.4 Preparation, Properties and Applications of Ethane, Ethene, Ethyne 5.1.5 Functional Groups, , Homologous series and Isomerism		20
5.2 Polymers	5.2.1 Concept of Monomer, Polymer, and Polymerization. 5.2.2 Classification of Polymers based on molecular structure: Linear Polymers, Branched polymers, Cross-linked polymers. 5.2.3 Classification of polymers based on Monomer: Homo-polymer, Co-polymer. 5.2.4 Classification of polymers based on thermal behaviour: Thermoplastics and Thermosetting plastics. 5.2.5 Addition polymerization and Condensation polymerization 5.2.6 Elastomers: Natural rubber and its properties, Vulcanization of rubber, Synthetic rubber – Buna-S rubber, Buna-N rubber, Neoprene rubber.		

❖ **References :**

1. All India Council for Technical Education (AICTE), Model Curriculum for the Diploma Courses in Engineering & Technology-2019.
2. Gujarat Technological University (GTU), Competency-focused Outcome-based Green Curriculums-2021.
3. Silver Oak University, Ahmedabad, Gujarat
4. Charutar Vidya Mandal (CVM) University, Vallabh Vidhyanagar, Gujarat
5. P P Savani University (PPSU), Dhamdod, Kosamba, Surat, Gujarat.
6. Ganpat University, Kherva, Gujarat.
7. Parul University, Vadodara, Gujarat.
8. Darshan University, Rajkot.
9. Rai University, Dholka, Ahmedabad.
10. Marwadi University, Rajkot
11. ITM Voctional University
12. C.U. Shah University, Surendranagar.
13. Dr. Subhash University, Junagadh

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❖ **Resource Persons:**

1. Mr. Darshit Bhupendrakumar Chhag, Lecturer in Chemistry, Government Polytechnic, Rajkot.
2. Dr. Narendra Ganpatbhai Makwana, Lecturer in Chemistry, Government Polytechnic, Ahmedabad.
3. Dr. Manthan K. Panchal, Principal, Silver Oak University

PAPER-2 – BE-02 – Aptitude Test

Subject: Mathematics

Sr. No.	Topic	Sub-Topic	Weightage (%)
1	Determinant and Matrices	<ul style="list-style-type: none"> • Determinant and its value up to 3rd order (Without properties) • Concept of a Matrix • Types of Matrices (Rectangular matrix, Square matrix, Null matrix, Diagonal matrix, Scalar matrix, Identity matrix, Singular and Non-singular matrix) • Addition, Subtraction and multiplication by scalar of matrices • Product of two matrices • Adjoint and Inverse of a matrix of order 2X2. • Solution of Simultaneous linear equations of two variables 	16
2	Trigonometry	<ul style="list-style-type: none"> • Units of Angles (degree and radian) • Trigonometric Functions • Periods of Trigonometric functions • Allied & Compound Angles, Multiple –Submultiples angles • Sum and factor formula 	12
3	Vectors	<ul style="list-style-type: none"> • Introduction of a Vector • Direction and Magnitude • Types of vectors (Null vector, Unit Vector) • Addition, Subtraction. • Scalar product (Dot product) and Vector Product (Cross product) • Angle between two Vectors 	8

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4	Coordinate Geometry	<ul style="list-style-type: none"> • Introduction and slope of a line • Equation of a line (Two-point form, Slope point form, Intercept form, General form) • Condition of parallel and perpendicular lines • Equation of Parallel and Perpendicular lines to the given line • Angle between two lines • Equation of a circle with centre and radius • To find centre and radius from general equation of a circle 	8
5	Function & Limit	<ul style="list-style-type: none"> • Function and simple examples • Limit of a Function • Standard formulae of Limit and related simple examples 	12
6	Differentiation and its Applications	<ul style="list-style-type: none"> • Concept of Differentiation • Working rule: Sum, Subtraction, Product and Quotient • Chain Rule • Derivative of Implicit functions, Parametric functions • Logarithmic Differentiation • Successive Differentiation up to second order • Applications: Velocity, Acceleration of given simple functions 	16
7	Integration	<ul style="list-style-type: none"> • Concept of Integration • Working rules and Integral of standard functions • Method of substitution & Integration by parts (simple examples) • Definite Integral (simple examples) 	16
8	Logarithm	<ul style="list-style-type: none"> • Logarithm as a function • Laws of Logarithm and related Simple examples 	8
9	Statistics	<ul style="list-style-type: none"> • Mean, Median and Mode for ungrouped data 	4

References:

1. AICTE Model Curriculum for Diploma Courses in Engineering & Technology (2019)
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13. Parul University – Diploma Engineering
14. C U Shah University – Diploma Engineering
15. Rai University – Diploma Engineering
16. ITM Vocational University – Diploma Engineering
17. L J University – Diploma Engineering
18. Dr. Subhash University – Diploma Engineering
19. Vidhyadeep University – Diploma Engineering

Resource Persons:

1. Dr. Vipul R Shah, Associate Professor, G H Patel College of Engineering & Technology, CVM University, Vallabh Vidyanagar
2. Dr. Nilesh A Dani, Lecturer in Mathematics, Government Polytechnic, Jamnagar
3. Dr. J S Prajapati, Lecturer in Mathematics, R. C. Technical Institute, Ahmedabad
4. Shri Nilesh M Patel, Lecturer in Mathematics, BSPP Ganpat University, Kherva

Subject: Soft Skills

Sr.	Particular / Topic	Sub Topics	Weightage (%)
1	Comprehension of Unseen Passage	An unseen passage will be given followed by 5 questions. Students have to read the passage and answer the questions.	20 %
2	Theory of Communication	<ul style="list-style-type: none">• Process of Communication• Verbal and Non-verbal Communication• Barriers to Communication	20 %
3	Techniques of Writing	<ul style="list-style-type: none">• Parts of Letter and Email• Types of Business Letter (Inquiry, Reply, Order, Complaint, Adjustment)• Common Abbreviations used in Business Letter	20 %
4	Grammar	<ul style="list-style-type: none">• Parts of Speech<ol style="list-style-type: none">1) Noun2) Pronoun3) Adjective4) Adverb5) Verb6) Preposition7) Connectors8) Interjection• Tenses• Subject Verb Agreement	20 %
5	Correction of Incorrect Words and Sentences	<ul style="list-style-type: none">• Word Correction: Students have to choose correct spelling of the word from the options given• Sentence Correction: Students have to choose grammatically or structurally correct sentence from the options given.	20 %

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References:

1. AICTE Model Curriculum for Diploma Courses - 2019– Semester – 1 – Communication Skills in English – Page No. – 20 –
Link: <https://www.aicte-india.org/sites/default/files/DiplomaET.pdf>
2. GTU – Diploma Engineering – Semester – 1- Communication Skills in English ,
Link: <https://s3-ap-southeast-1.amazonaws.com/gtusitecirculars/Syallbus/4300002.pdf>
3. Marwadi University – Diploma Engineering – Semester – 1 – Communication Skills – 1, Link: <https://www.marwadiuniversity.ac.in/wp-content/uploads/2018/10/09s11101.pdf>
4. Silver Oak University – Diploma Engineering – Semester – 1 – English,
Link: https://silveroakuni.ac.in/upload/diploma_syllabus/IT/Semester1/ENG.pdf
5. Silver Oak University – Diploma Engineering – Semester – 2 – Communication Skills and Personality Development,
Link: https://silveroakuni.ac.in/upload/diploma_syllabus/IT/Semester2/CommunicationSkillsandPersonalityDevelopment.pdf
6. Ganpat University – Diploma Engineering – Semester – 1 – Communicative English – 1, Link: <https://d2z4x7fn3a0wyp.cloudfront.net/subject/communicative-english-i/1hs121-communicative-english-i-new.pdf>
7. Ganpat University – Diploma Engineering – Semester – 2 – Communicative English – 2, Link: <https://d2z4x7fn3a0wyp.cloudfront.net/subject/communicative-english-ii/1hs221-communicative-english-ii-new.pdf>
8. Uka Tarsadiya University – Diploma Engineering – Semester – 1 – Communication Skills in English,
Link: <https://app.utu.ac.in/utuformaccess/utusyllabus.aspx?CF=7&CM=80&SY=1>
9. Sakalchand Patel University - Diploma Engineering – Semester – 1 – Communication Skills in English – 1,
Link: https://spu.ac.in/wp-content/uploads/2021/04/1ET4000101_Communication-Skills-in-English-I.pdf?x40004
10. Sakarchand Patel University - Diploma Engineering – Semester – 2 – Communication Skills in English – 2,
Link: https://spu.ac.in/wp-content/uploads/2021/04/1ET4000201_Communication-Skills-in-English-II.pdf?x40004
11. Atmiya University – Diploma Engineering – Semester – 1 – Functional English
12. Atmiya University – Diploma Engineering – Semester – 2 – Technical English
13. Dr. Subhash University, Junagadh
14. R. K. University, Rajkot
15. C. U. Shah University, Surendra Nagar
16. Rai University, Ahmedabad
17. L J University, Ahmedabad
18. Darshan University, Rajkot
19. Vidhyadeep University, Surat

Resource Persons:

1. Dr. Yatharth N. Vaidya, Lecturer in English, Government Polytechnic, Rajkot
2. Dr. Dipam J. Joshi, Lecturer in English, R. C. Technical Institute, Ahmedabad