

Syllabus
&
Model Question Papers
For 1/4 - B.Tech & 1/6 - B.Tech I – Semester
(From the admitted batch of 2015 – 2016 under CBCS Scheme)



Group – A & Group – B

Andhra University College of Engineering (Autonomous)
Andhra University
Visakhapatnam – 530 003
ANDHRA UNIVERSITY: : VISAKHAPATNAM

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COMMON SCHEME OF INSTRUCTION & EXAMINATION

I/IV B.TECH (FOUR YEAR COURSE)

&

I/IV B.TECH (SIX YEAR DOUBLE DEGREE COURSE)

(With effect from **2015-2016** admitted batch onwards)

Under Choice Based Credit System

GROUP – A

For the branches of

(Civil, Chemical, CSE, Information Technology)

I-SEMESTER

| Code No. | Course | Credits | Lecture Hrs | Tutorial Hrs | Lab Hrs | Total Contact Hrs/Week | Sessional Marks | Exam Marks | Total Marks |
|--------------|--|-----------|-------------|--------------|----------|------------------------|-----------------|------------|-------------|
| ENG 1101 | English * | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1102 | Mathematics-I * | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1103 | Mathematics-II * | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1104 | Chemistry | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1106 | Computer Programming and Numerical Methods | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1108 | History of Science and Technology | 2 | 2 | -- | -- | 2 | 30 | 70 | 100 |
| ENG 1110 | Chemistry Lab | 2 | -- | -- | 3 | 3 | 50 | 50 | 100 |
| ENG 1112 | Computer Programming and Num. Methods Lab | 2 | -- | -- | 3 | 3 | 50 | 50 | 100 |
| ENG 1114 | Sports/NSS/NCC * | 2 | -- | -- | -- | 3 | -- | -- | -- |
| TOTAL | | 28 | 17 | 5 | 6 | 31 | | | |

* Common to both Group–A and Group–B

ANDHRA UNIVERSITY: : VISAKHAPATNAM
COMMON SCHEME OF INSTRUCTION & EXAMINATION
I/IV B.TECH (FOUR YEAR COURSE)
&
I/IV B.TECH (SIX YEAR DOUBLE DEGREE COURSE)
(With effect from **2015-2016** admitted batch onwards)
Under Choice Based Credit System

GROUP – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

I-SEMESTER

| Code No. | Course | Credits | Lecture Hrs | Tutorial Hrs | Lab Hrs | Total Contact Hrs/Week | Sessional Marks | Exam Marks | Total Marks |
|----------|------------------------------------|-----------|-------------|--------------|----------|------------------------|-----------------|------------|-------------|
| ENG 1101 | English* | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1102 | Mathematics-I * | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1103 | Mathematics-II * | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1105 | Physics | 4 | 3 | 1 | -- | 4 | 30 | 70 | 100 |
| ENG 1107 | Engg. Graphics | 4 | 2 | -- | 3 | 5 | 30 | 70 | 100 |
| ENG 1109 | Professional Ethics & Moral Values | 2 | 2 | -- | -- | 2 | 30 | 70 | 100 |
| ENG 1111 | Physics Lab | 2 | | | 3 | 3 | 50 | 50 | 100 |
| ENG 1113 | Workshop | 2 | -- | -- | 3 | 3 | 50 | 50 | 100 |
| ENG 1114 | NCC/NSS Sports * | 2 | -- | -- | | 3 | -- | -- | -- |
| | TOTAL | 28 | 16 | 4 | 9 | 32 | | | |

* Common to both Group–A and Group–B

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

&
Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)
ENG 1101: ENGLISH

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Vocabulary: Word Search, Discuss and Note – Word Quiz – A List of 100 Basic Words – One Word Substitutes – 100 Difficult Words, Synonyms, Antonyms, Idioms, Technical Terms.

Grammar: Types of Sentences, Verbs, Adverbs, Pronouns, Adjectives, Gerunds & Infinitives, Articles, Quantifiers, Punctuations, Conjunctions, Exclamation.

Reading: Famous People – What is Personality, Personality based on Blood Groups – News Report, Magazine Article, Mobile Towers and Health – An Excerpt from Short Story, An Excerpt from a Biography – Open Letter to Prime Minister, Business Dilemmas: An Email Exchange – A Review of IPL: The Inside Story, Marck Zukerberg: World’s Youngest Billionaire – Solar Power: The Way Forward, From the Very Small to the Very Large.

Listening: Life in a Hostel – Eating Away those Blues!, Meeting Carl Jung – A Documentary on the Big Cat – A Consultant Interviewing Employees – A Conversation about a Business Idea – An Interview with a Woman Engineer.

Speaking: Your Favorite Holiday Destination – Describe Yourself – Why we need to save our Tiger – A Dialogue – Your First Interview – Pair Work: Setting up a New Business-Great Engineering Achievements.

Scenario: Sharing a Flat – Living in the Twenty First Century – Global Warming – Reality TV – Recession – The Sky-High Project.

Writing: Writing Sentences – Using your Dictionary – Paragraph Writing, Arguing a Case – Essay, Formal Letters, Emails, Reports and Presentations.

Life Skills and Core Skills: Self Awareness and Self Motivation – Communication, Adaptability – Motivation, Problem Solving – Personal Presentation Skills, Stress Management – Professionalism Ethics – Innovativeness and Creativity.

OBJECTIVES:

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills and Core Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

LEARNING OUTCOMES:

- The overall performance of the students will be enhanced after the course; they will be in a position to make presentations on topics of current interests – politics, famous personalities, science and technology, tourism, work and business environment, with increased public speaking skills.
- Students will be able to read, listen, speak and write effectively in both academic and non-academic environment.
- The students will be updated with certain real life situations, which they can handle when come face to face.

Prescribed Text Book: Life Through Language: A Holistic Approach to Language Learning. Board of Editors, Pearson Publishers, India 2013.

Life Through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skills leads to confidence.

Chapter – 1

People and Places:- Word Search – Ask Yourself – Self-Assessment-I – Self-Assessment – II – Sentence and its types – A Guide book entry – Life in a Hostel-Your Favorite Holiday Destination – Designing a Holiday- Writing Sentences – Self-Awareness – Self-Motivation.

Chapter – 2

Personality and LifeStyle:- Word Quiz – Verbs – Adverbs – A Big Fat Wedding – Wine and Dine – Going Places – Negotiations – Proving Yourself – Meeting Carl Jung – Describing Yourself – Living in the 21st Century – Using Your Dictionary – Communication – Adaptability.

Chapter – 3

Media and Environment:- A list of 100 basic words – Nouns – Pronouns – Adjectives – News Report – Magazine Article – User’s Manual for new iPod – A documentary on the big cat – Why we need to save our tigers: A dialogue – Global warming – Paragraph Writing – Arguing a case – Motivation – Problem Solving.

Chapter – 4

Entertainment and Employment:- One word substitutes – Parts of Speech – Gerunds and infinitives-An excerpt from short story-An excerpt from a biography-A Consultant interviewing employees-Your first Interview-Reality TV-Writing an essay-Correcting Sentences-Integrity Sense of humor.

Chapter – 5

Work and Business:- A list of 100 difficult words – Articles, Quantifiers – Punctuation – Open Letter to Prime Minister Business Dilemmas: An email exchange – A review of IPL: The Inside Story, Mark Zuckerberg: World’s Youngest Billionaire-A Conversation about a business Idea-Pair Work: Setting up a new business-Recession-Formal Letters-Emails-Reports-Professionalism-Ethics.

Reference Books:

1. Basic Vocabulary. Edgar Thorpe, Showick Thorpe. Pearson P. 2008
2. Quick Solutions to Common Errors in English, Angela Bunt. MacMillan P. 2008
3. Know Your English (Volume 1 & 2), by Dr. S. Upendra, Universities Press, India 2012
4. Business Communication Strategies. Maathukutty Monipally. Tata Mc Grahill P. 2009.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
&

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1101: ENGLISH
MODEL QUESTION PAPER

Exam Time : 3 Hrs.

Max.Marks : 70

Answer Question No.1 compulsorily and
any **Four** questions from remaining.
All questions carry equal marks.

All parts of a question must be answered at one place only.

1. a) Write an Essay on “Commercialization of Education”. 8M
- b) Correct the following sentences. 4M
- i. She likes dogs, but she don't like cats.
 - ii. I has not seen them yet.
 - iii. One of my friends are going to Mumbai.
 - iv. I have seen him yesterday.
- c) Use the appropriate articles in the given blanks (a, an, the, no article) 2M
- i. I boughtpair of shoes.
 - ii. I saw.....movie last night.
 - iii. Did you get married after leavinguniversity?
 - iv. I was at.....train station when you called me.
2. a) Write a feasibility report for setting up a Water / Power Unit at your campus. 8M
- b) Pick any Four of the following and explain them in one word and write sentences of your own using each word. 4M
- i. Language which is confusing and unintelligible.
 - ii. One who prepares plans for buildings.
 - iii. A great lover of books
 - iv. A person in charge of a museum
 - v. A man who thinks only for himself
 - vi. One who kills animals and sells their flesh
- c) Write the appropriate quantifiers for each sentence. 2M
(Some, few, much, lesser,)
- i. There were at the college last year
 - ii. The project is complicated that the last one
 - iii. I have to buypairs of blue and black jeans soon.
 - iv. Howcash do you need to purchase this CD player
3. a) Write a letter to a renowned person, requesting him to be the Chief Guest for the cultural festival of your college. 8M
- b) Identify the types of the following sentences and write a similar sentence for each type. 4M
- i. Oh, what a beautiful morning!
 - ii. Eat your supper.
 - iii. Today is my birthday.
 - iv. What gifts did you receive for your birthday?

c) Re-write the sentences by using Gerunds and infinitives forms. 2M

- i. She is good at..... (dance)
- ii. He is crazy about..... (sing)
- iii. He'd like..... (fly) an aeroplane.
- iv. I enjoy..... (write) picture postcards.

4. a) Draft an E-Mail to your friend about your career plans. 8M

b) Punctuate the following sentences taken from the text correctly. 4M

- i. Sunil Sharma is Documentation Development Manager at Cerner Corporation one of the world's largest medical software developers
- ii. As part of his job Sunil writes web-based content for Cerner
- iii. One type of website that Cerner develops is marketed to health facilities for use by doctors nurses hospital administrators and patients
- iv. This explains the communication challenge that Sunil faces. Cerner's end user is diverse consisting of lay readers and high-tech specialists

c) Pick the right synonyms of the following words. 2M

- | | | | |
|-----------------|-------------|---------------|--------------|
| i. Euphoria | ii. Vicious | iii. Remnant | iv. Acclaim |
| a) Sober | a) cruel | a) horror | a) praise |
| b) High spirits | b) kind | b) whole sale | b) blame |
| c) Mean | c) splendid | c) left over | c) honour |
| d) Feeble | d) dearest | d) energize | d) criticism |

5. a) Develop a paragraph based on the following hints. The hints are from the text in about 150 words. 8M

As the 11th President of India---- the Indian National Congress-----‘people’s president’, he was----- His contribution -----Bharat Ratna. During -----in India. He is the -----
India: 2020 and Ignited Minds.

b) Fill in the blanks with appropriate idioms from the box. 4M

(The cream of the crop, an arm and a leg, Eager beaver, shape up)

- i. Frank always tries to finish his work before everyone else. He is an_____.
- ii. We chose the prettiest, best behaved puppy. She was certainly _____.
- iii. If Madge doesn't_____, she could lose her job.
- iv. Our new office was very expensive. It cost_____.

c) Pick the right antonyms of the following words. 2M

- | | | | |
|-----------|------------|-------------|----------------|
| i. Awake | ii. Create | iii. Emerge | iv. Warm |
| a) alive | a) build | a) abandon | a) cold |
| b) stir | b) beak | b) appear | b) pleasant |
| c) asleep | c) deny | c) fall | c) unkind |
| d) truce | d) refuse | d) hide | d) indifferent |

6. a) Draft a pamphlet on any Electronic home appliances/Places of tourists' interest/an Educational institution. 8M
- b) Fill in the blanks using the appropriate forms of verbs given in the brackets. 4M
- i. The wind ____ furiously. (Blow)
 - ii. He ____ to his mother every week. (Write)
 - iii. In a fit of rage, she ____ up the letter. (Tear)
 - iv. We couldn't have _____ a better day for organizing the party. (Choose)
- c) Fill in the blanks with appropriate prepositions from the box. 2M
(in ,at, the, at, on,)
- i. They are staying at ____ hotel
 - ii. That is ____ girl I told you about
 - iii. My birthday is ____ May
 - iv. We are going to see my parents ____ the weekend

7. a) Present an argument in about 150 words on 'Women are not suitable to work in the industry.' Substantiate your argument with reasons. 8M
- b) Read the following paragraph and answer the questions : 4M

The study of history provides many benefits. First, we learn from the past. We may repeat mistakes, but, at least, we have the opportunity to avoid them. Second, history teaches us what questions to ask about the present. Contrary to some people's view, the study of history is not the memorization of names, dates, and places. It is the thoughtful examination of the forces that have shaped the courses of human life. We can examine events from the past and then draw inferences about current events. History teaches us about likely outcomes.

Another benefit of the study of history is the broad range of human experience which is covered. War and peace are certainly covered as are national and international affairs. However, matters of culture (art, literature, and music) are also included in historical study. Human nature is an important part of history: emotions like passion, greed, and insecurity have influenced the shaping of world affairs. Anyone who thinks that the study of history is boring has not really studied history.

- i. What is the main idea of this passage?
 - ii. In the first paragraph, inferences mean?
 - iii. Which method of teaching history would the author of this passage support?
 - iv. In the second paragraph, shaping of world affairs Means.
- c) Fill the blanks by using appropriate conjunctions (because, neither-nor, and, and) 2M
- i. Receptionists must be able to relay information _____ pass messages accurately.
 - ii. Mary is a member of the Historical Society _____ the Literary Society.
 - iii. Susie _____ phoned _____ wrote after she left home.
 - iv. The committee rejected the proposal _____ they did not think it was practical.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
&

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)
ENG 1102: MATHEMATICS – I

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Unit – I

Partial Differentiation

Functions of two or more variables – Partial derivatives – Homogeneous Functions – Euler’s Theorem – Total Derivative – Change of Variables – Jacobians – Geometrical Interpretation: Tangent Plane and Normal to a Surface.

Unit – II

Application of Partial Differentiation

Taylor’s Theorem for functions of two variables – Errors and Approximations – Total Differential – Maxima and Minima of functions of two variables – Lagrange’s Method of Undetermined Multipliers – Differentiation Under the Integral Sign – Liebnitz’s Rules.

Unit – III

Ordinary Differential Equations of First Order and First Degree

Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli’s Equation – Exact Differential Equations – Equations Reducible to exact equations.

Unit – IV

Applications of Differential Equations of First Order

Orthogonal Trajectories – Simple electric (LR & CR) Circuits – Newton’s Law of Cooling – Law of Natural growth and decay.

Unit – V

Linear Differential Equations of Higher Order

Solutions of Linear Ordinary Differential Equations With Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy’s linear equation – Legendre’s Linear Equation – Simultaneous linear equations.

Unit – VI

Infinite Series

Introduction to Series – Convergence, Divergence and Oscillation of Series – Comparison Test – Limit form – Integral Test – D Alembert’s Ratio Test – Raabe’s Test – Logarithm Test – Cauchy’s Root Test – Alternating Series: Lebnitz Rule – Series of Positive, Negative terms: Absolute and Conditional Convergence – Uniform Convergence: Weirstrass M –Test (All Tests without Proofs)

TEXT BOOK:

Scope and Treatment as in “Higher Engineering Mathematics”, by Dr. B. S. Grewal, 43rd edition, Khanna Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N. P. Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics by H. K. Dass, S. Chand Company.
4. Higher Engineering Mathematics by B. V. Ramana, Tata Mc Graw Hill Company
5. Higher Engineering Mathematics by Dr. M. K. Venkataraman.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
&

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1102: MATHEMATICS – I
MODEL QUESTION PAPER

Exam : 3 Hrs.

Max. Marks : 70

PART – I

1. (a) Find the value of $\frac{du}{dt}$ from given $u = y^2 - 4x$, $x = 2t^2$, $y = 4t$.
- (b) If $u = \sin^{-1} \frac{x}{y} + \tan^{-1} \frac{y}{x}$, then prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$.
- (c) Write the necessary conditions for $f(x, y)$ to have a maximum or minimum at (a, b) .
- (d) Formulate a differential equation from the relation $y = A \cos x + B \sin x$.
- (e) Find the particular integral of the differential equation $\frac{d^2 y}{dx^2} + \frac{dy}{dx} + y = (1 - e^x)^2$.
- (f) Test the convergence of the series $\sum \left(\frac{n}{n+1} \right)^n$.
- (g) Define the absolute and conditional convergence of a series. Give simple examples.

PART – II

2. (a) If $x^x y^y z^z = c$, show that $\frac{\partial^2 z}{\partial x \partial y} = -(x \log ex)^{-1}$.
- (b) If $u = \frac{x+y}{1-xy}$ and $v = \tan^{-1} x + \tan^{-1} y$, then find $\frac{\partial(u, v)}{\partial(x, y)}$. Are u and v functionally related.
If so, find this relationship.
3. (a) Expand $e^x \sin y$ at $\left(-1, \frac{\pi}{4}\right)$ as far as the terms of third degree.
- (b) Using the method of differentiation under the integral sign, prove that $\int_0^{\infty} e^{-x} \frac{\sin ax}{x} dx = \tan^{-1}(a)$.

4. (a) Solve $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$.

(b) Solve $x dy - y dx + a(x^2 + y^2) dx = 0$ by reducing into exact form.

5. (a) Find the orthogonal trajectories of the family of coaxial circles given by

$$x^2 + y^2 + 2\lambda x + c = 2, \lambda \text{ being the parameter.}$$

(b) The number N of bacteria in a culture grew at a rate proportional to N . The value of N was

initially **100** and increased to **332** in one hour. What would be the value of N after $1\frac{1}{2}$ hours?.

6. (a) Solve $\frac{d^2 y}{dx^2} - 2\frac{dy}{dx} + 10y = 0$, when $y = 4$ and $\frac{dy}{dx} = 1$ at $x = 0$.

(b) Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$.

7. (a) Solve $\frac{d^2 y}{dx^2} + y = \tan x$ by applying the method of variation of parameters.

(b) Solve $x^3 \frac{d^3 y}{dx^3} + 2x^2 \frac{d^2 y}{dx^2} + 2y = 10\left(x + \frac{1}{x}\right)$.

8. (a) Test for convergence of the series $\frac{1}{2\sqrt{1}} + \frac{x^2}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \frac{x^6}{5\sqrt{4}} \dots \dots \infty$.

(a) For what values of 'x' is the series $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} \dots \dots \infty$ convergent?

* * * * *

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

&
Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)
ENG 1103: MATHEMATICS – II

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Unit – I

Matrices – I

Rank of a matrix – Echelon Form, Normal Form – Solutions of Linear System of Equations – Consistency of Linear System of Equations – Direct Methods: Gauss Elimination Method, LU Factorization Method – Eigen Values and Eigen Vectors of a Matrix – Cayley – Hamilton Theorem – Inverse and Powers of a Matrix using Cayley – Hamilton Theorem.

Unit – II

Matrices – II

Diagonalization of a Matrix – Quadratic Forms – Reduction of Quadratic Form to Canonical Form – Nature of a Quadratic Form – Complex Matrices: Hermitian and Unitary Matrices and their Properties.

Unit – III

Laplace Transforms

Introduction – Existence Conditions – Transforms of Elementary Functions – Properties of Laplace Transforms – Transforms of Derivatives – Transforms of Integrals – Multiplication by t^n – Division by t – Evaluation of Integrals by Laplace Transforms – Laplace Transforms of Unit Step Function, Unit Impulse Function and Periodic Functions.

Unit – IV

Laplace Transforms

Inverse Laplace Transform – Convolution Theorem – Applications of Laplace Transforms to Ordinary Differential Equations, Simultaneous Linear Differential Equations with Constant Coefficients.

Unit – V

Special Functions

Bessel's Equation – Bessel's Functions – Recurrence Formulae for Bessel's Function – Generating Function – Equations Reducible to Bessel's Equation – Orthogonality of Bessel's Functions.

Legendre's Differential Equation – General Solution of Legendre Equation – Legendre Polynomials – Rodrigue's Formula – Generating Function, Recurrence Formulae, Orthogonality of Legendre Polynomials.

TEXT BOOK:

Scope and Treatment as in “Higher Engineering Mathematics”, by Dr. B. S. Grewal, 43rd edition, Khanna Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N. P. Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics by H. K. Dass, S. Chand Company.
4. Higher Engineering Mathematics by B. V. Ramana, Tata Mc Graw Hill Company

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ENG 1103: MATHEMATICS – II
MODEL QUESTION PAPER

Exam : 3 Hrs.

Max. Marks : 70

Part A is compulsory.
Answer any FOUR questions from Part B.
Each question will carry 14 marks.

PART A

1. a) Find the value of λ for which the system of equations $2x + y + 2z = 0$,
 $x + y + 3z = 0$, $4x + 3y + \lambda z = 0$ have a non-zero solution.
- b) Define Hermitian matrix and give an example.
- c) Write any two properties of Laplace transforms
- d) Find the Laplace transform of unit step function
- e) Find $L^{-1}\left(\frac{s^2 - 3s + 4}{s^3}\right)$.
- f) Write the expressions for $J_{\frac{1}{2}}(x)$ and $J_{-\frac{1}{2}}(x)$.
- g) Express $x^2 - 2x + 5$ in terms of Legendre polynomials.

PART B

2. a) Find the rank of the matrix $A = \begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$ by reducing into normal form.

- b) Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

3. a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and use it to evaluate the matrix

equation $A^6 - 6A^5 + 9A^4 - 2A^3 - 12A^2 + 23A - 9I$.

- b) If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ then show that $(I - A)(I + A)^{-1}$ is a unitary matrix.

4. a) Reduce the quadratic form $2xy + 2xz - 2yz$ to canonical form by an orthogonal transformation and discuss its nature.
- b) Solve: $x + 2y + 3z = 14$, $2x + 3y + 4z = 20$, $3x + 4y + z = 14$ by Gauss elimination method.
5. a) Find i) $L\left\{\frac{\cos at - \cos bt}{t}\right\}$ ii) $L\left\{\int_0^t e^{-t} \cos t dt\right\}$.
- b) Find the Laplace transform of the triangular wave function of period $2a$ given by
- $$f(t) = t, \quad 0 < t < a$$
- $$= 2a - t, \quad a < t < 2a.$$
6. a) Evaluate: i) $L^{-1}\left\{\log\left(\frac{s+1}{s-1}\right)\right\}$ ii) $L^{-1}\left\{\frac{3s}{s^2 + 2s + -8}\right\}$.
- b) State Convolution theorem and use it to evaluate $L^{-1}\left\{\frac{1}{(s-2)(s+2)^2}\right\}$.
7. a) Using Laplace transformation method, solve: $y'' + 2y' - 3y = \sin t$, $y = y' = 0$ at $t=0$.
- b) Prove that $J'_n(x) = \frac{1}{2}[J_{n-1}(x) - J_{n+1}(x)]$.
8. a) Prove that $\int_{-1}^1 P_n^2(x) dx = \frac{2}{2n+1}$.
- b) Prove that $P_n(x) = \frac{1}{\sqrt{\pi} 2^n} \frac{d^n}{dx^n} (x^2 - 1)^n$.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1104: CHEMISTRY

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Chapter – 1: Water Chemistry

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electrodialysis.

Chapter – 2: Solid State Chemistry

Solids: Classification of Solids – Types of Crystals – Fundamental Laws of Crystal Structure – X-Rays and Bragg's Law – Imperfections in Crystals – Band Theory of Solids – Chemistry of Semiconductors – Intrinsic, Extrinsic, Compound and Defects – Organic Semi conductors – Super Conductivity – Purification of Solids by Zone refining – Single Crystal Growth – Epitaxial Growth – Liquid Crystals.

Chapter – 3: Polymers and Plastics

Polymers: Definition – Types of Polymerization (Addition & Condensation) – Mechanisms of Polymerization – Radical and Ionic – Thermodynamics of Polymerization Process.

Plastics: Thermosetting and Thermoplastics – Effect of Polymer Structure on Properties of Cellulose Derivatives – Vinyl Resins – Nylon (6,6), Reinforced Plastics – Conducting Polymers.

Chapter – 4: Corrosion

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion.

Corrosion Controlling Methods: Protective Coatings: Metallic Coatings, Electroplating and Electroless Plating – Chemical conversion Coatings – Phosphate, Chromate, Anodized, Organic Coatings – Paints and Special Paints.

Chapter – 5: Building Materials

Portland Cement: Manufacture of Cement – Dry and Wet Process – Chemical Composition of Cement – Setting and Hardening of Cement – Cement Concrete – R.C.C. – Decay of Concrete and Protective Measures – Special Cements.

Refractories: Classification – Properties – Engineering Applications

Ceramics: Classification – Properties – Engineering Applications

Chapter – 6: Fuels and Lubricants

Solid Fuels: Wood and Coal, Ranking of Coal – Analysis (Proximate and Ultimate) Coke Manufacture – Otto Huffmann's Process – Applications.

Liquid Fuels: Petroleum Refining – Motor Fuels – Petrol and Diesel Oil – Knocking – Octane number – Cetane Number.

Gaseous Fuels: Biogas, LPG and CNG – Characteristics – Applications.

Rocket Fuels: Propellants – Classification – Characteristics

Lubricants: Classification – Mechanism – Properties of Lubricating Oils – Selection of Lubricants for Engineering Applications.

Reference Books:

Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.

A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.

Engineering Chemistry – B. K. Sharma – Krishna Prakashan – Meerut.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1104: CHEMISTRY
MODEL QUESTION PAPER

Exam : 3 Hrs.

Ext. Marks : 70

Answer Question No.1 and Any Other Four Questions.
Each Question Carries 14 Marks (5 x 14 = 70)

1. Write a short note for each of the following (7 x 2 = 14)
 - a) Hardness of water and its removal.
 - b) Schottky defect
 - c) Preparation of Nylon 6, 6
 - d) Pitting corrosion
 - e) Role of gypsum in cement.
 - f) Compare LPG and CNG
 - g) Liquid Propellants
2.
 - a) Mention boiler troubles and their removal by internal treatment. 6 M
 - b) Explain lime-soda process. 4 M
 - c) Explain electro dialysis with a neat sketch 4 M
3.
 - a) Explain various imperfections in crystals 6 M
 - b) Explain intrinsic and extrinsic semi conductors 4 M
 - c) What is zone refining of solids? 4 M
4.
 - a) Briefly explain the mechanisms of addition polymerization 6 M
 - b) Differentiate thermosetting and thermoplastic polymers 4 M
 - c) Explain the nature of conduction in conducting polymers 4 M
5.
 - a) Explain the mechanism involved in electro chemical corrosion 6 M
 - b) Explain any four factors effecting corrosion 4 M
 - c) Explain metallic coatings for control of corrosion 4 M
6.
 - a) Explain the wet process of manufacture of cement with a neat sketch and give the final composition. 6 M
 - b) Explain any four properties and applications of refractories. 4 M
 - c) Give the classification of ceramics with examples. 4 M
7.
 - a) Explaining refining of petroleum with a neat sketch and the characteristics of the products. 6 M
 - b) Explain the manufacture of coke by Otto Hoffmann's process 4 M
 - c) Explain any four properties of lubricating oils. 4 M

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1106: COMPUTER PROGRAMMING USING C & NUMERICAL METHODS

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Introduction To C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output.

Decision Making, Branching, Looping ,Arrays & Strings: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else..if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, the do statement, The for statement, Jumps in Loops ,One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables.

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments- Program Applications.

Numerical Methods: Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method. **Interpolation:** Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals.

Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule. **Solutions of Ordinary First Order Differential Equations:** Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.

Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

Let Us C , Yashwant Kanetkar, BPB Publications, 5th Edition.

Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.

The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI

Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1106: COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
MODEL QUESTION PAPER

Exam : 3 Hrs.

Ext. Marks : 70

Answer any FIVE questions.

First Question is compulsory.

Answer any FOUR from the remaining questions.

All questions carry equal marks.

- 1 a) Write the precedence rules for arithmetic operators and give example.
b) What is keyword? Write any five keywords and explain them.
c) What are the advantages of functions?
d) Distinguish between local and global variables.
e) What is meant by structure within structure? Explain briefly.
f) Explain Bisection method.
- 2 a) Write the general forms of if-else and switch –case statements and compare them.
b) Write a program to compute roots of quadratic equation using switch-case statement.
- 3 a) What are loops? Explain various loop statements with suitable example.
b) Write a C program to find the sum of digits in a given number.
- 4 a) Explain the following concepts associated with functions:
 - i) Function declaration
 - ii) Function definition and
 - iii) Function call.
b) Explain various parameter passing mechanisms.
- 5 a) What is a Pointer? How is it initialized? What is the function of a pointer variable? What are its uses?
b) Explain the concept of pointers to structures with suitable example.
- 6 a) Explain the following
 - i) Structure
 - ii) Accessing elements in structure
 - iii) Arrays of structures
b) Write a program to process employee records by using structures.
- 7 a) Briefly explain file handling functions.
b) Write a C program to copy the contents of one file to another file.
- 8 a) Find the root of the following equation using Newton-Raphson method, correct the result upto 3 decimal places.
$$x^3 - 3x - 5 = 0.$$

b) Evaluate

$$\int_{-2}^2 x \sin(x) dx \text{ using Simpson's rule.}$$

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)
ENG 1108 HISTORY OF SCIENCE & TECHNOLOGY

| | | | |
|-----------------|--------------------|-------------------|-------------|
| Theory | : 2 Periods | Sessionals | : 30 |
| Tutorial | : 0 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 2 |

Objectives of the Course:

- To know the contributions of the scientists for the development of society over a period of time.
- To understand the Science and Technological developments that lead to human welfare.
- To appreciate the Science and Technological contributions for the development of various sectors of the country.
- To identify the technical transfer versus economic progress of the countries.

Learning Outcome: By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of the society at large.

Unit – I

Historical Perspective of Science and Technology:

Nature and Definitions; Roots of Science – In Ancient Period and Modern Period (during the British Period); Science and Society; Role of Scientists in the Society. **(6 Periods)**

Unit – II

Policies and Plans After Independence:

Science and Technology Policy Resolutions; New Technology Fund; Technology Development (TIFAC); Programs aimed at Technological Self Reliance; Activities of Council of Scientific and Industrial Research. **(6 Periods)**

Unit – III

Science and Technological Developments in Critical Areas:

Space – The Indian Space Program: India's Geostationary Satellite Services – INSAT System and INSAT Services; **Defense Research and Technology** – Research Coordination, Research efforts and Development of Technologies and Spin-off Technologies for civilian use; **Nuclear Energy** – Effects of a nuclear explosion and India's safety measures. **(6 Periods)**

Unit – IV

Impact of Science and Technology in Major Areas:

Ocean Development: Objective of Ocean Development, Biological Mineral Resources, Marine Research and Capacity Building; **Biotechnology:** Meaning, Biotechnology Techniques-Bioreactors, Cell Fusion, Cell or Tissue Culture, DNA Finger Printing, Cloning, Artificial Insemination and Embryo Transfer Technology and Stem Cell Technology; Application of Biotechnology – Medicine, Biocatalysts, Food Biotechnology, Fuel and Fodder and Development of Biosensors. **(6 Periods)**

Technology Transfer and Development:

Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques

Appropriate Technology – Criteria and Selection of an Appropriate Technology; Barriers of Technological Change. **(6 Periods)**

Text Books:

Kalpanma, **Science and Technology in India**, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.

Srinivasan M., **Management of Science and Technology (Problems and Prospects)**, East – West Press (P) Ltd., New Delhi.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1108: HISTORY OF SCIENCE & TECHNOLOGY
MODEL QUESTION PAPER

Exam : 3 Hrs.

Ext. Marks : 70

Answer Question No.1 compulsorily and
any **Four** questions from remaining.
All questions carry equal marks.

All parts of a question must be answered at one place only.

1. Write short answers for the following.

- a) Explain the terms Science and Technology.
- b) Describe the role of Scientist in the society.
- c) Science and Technology Policy resolutions.
- d) Defense Spin-offs.
- e) Biosensors.
- f) Barriers of Technological change.
- g) Types of Technology transfer.

2. Describe the roots of science and technology in ancient period in India.

3. Explain the salient features of new technology fund and programs aimed at technological self reliance.

4. Describe the achievements of Council of Scientific and Industrial Research.

5. Explain the salient features of Space program and INSAT services.

6. Explain the importance of Nuclear energy and describe the nuclear explosion and India's safety measures.

7. Describe the importance of Ocean development and explain the marine research and capacity building.

8. What is Appropriate technology? Explain the criteria for selection of an appropriate technology.

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1110: CHEMISTRY LAB

| | | | |
|-----------------|-------------------|-------------------|-------------|
| Lab Hrs | : 2 | Sessionals | : 50 |
| Tutorial | : 0 Period | Ext. Marks | : 50 |
| Exam | : 3 Hrs. | Credits | : 2 |

1. Determination of Sodium Hydroxide with HCl (Na_2CO_3 Primary Standard)
2. Determination of Fe(II)/Mohr's Salt by Permanganometry
3. Determination of Oxalic Acid by Permanganometry
4. Determination of Hardness of Water sample by EDTA method
5. Determination of Calcium in Portland Cement by Permanganometry
6. Determination of Chromium (VI) by Mohr's Salt Solution
7. Determination of Zinc by EDTA method
8. Determination of Alkalinity (Carbonate and Hydroxide) of water sample-(Demonstration)
9. Determination of Strength of the given HCl solution by titrating against NaOH using a pH meter-(Demonstration)
10. Determination of Copper (II) by Iodometric Titration (Demonstration)

Reference Books:

Vogel's Quantitative Chemical Analysis – V – Edition – Longman

Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

**Chemistry Lab will not have a Model
Question Paper**

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1112: COMPUTER PROGRAMMING AND NUMERICAL METHODS LAB

| | | | |
|-----------------|-------------------|-------------------|-------------|
| Lab Hrs | : 2 | Sessionals | : 50 |
| Tutorial | : 0 Period | Ext. Marks | : 50 |
| Exam | : 3 Hrs. | Credits | : 2 |

1. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line.
2. Write a program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).
3. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
6. Write a function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
8. Implement bisection method to find the square root of a given number to a given accuracy.
9. Implement Newton Raphson Method to determine a root of polynomial equation.
10. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange's Interpolation.
11. Write a function which will invert a matrix.
12. Implement Simpson's 1/3rd rule for numerical integration.
13. Implement Trapezoidal rule for numerical integration.
14. Write a program to solve a set of linear algebraic equations.
15. Write a program to solve a differential equation using Runge-Kutta Method.

**Computer Programming and Numerical
Methods Lab will not have a Model
Question Paper**

Group – A
For the branches of
(Civil, Chemical, CSE, Information Technology)

ENG 1114: SPORTS/NCC/NSS

Contact Hrs. : 3 Hrs.

Credits : 2

It is only an audit course and the credits are given based on the attendance. Every student should have a minimum of 75% attendance and as per university rules. Every student should choose either sports or NCC or NSS at the starting of the semester and pursue the same in that semester.

**Sports/NCC/NSS Activity will not have a
Model Question Paper**

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1105 : PHYSICS

| | | | |
|---------------------|--------------------|-------------------|-------------|
| Theory | : 3 Periods | Sessionals | : 30 |
| Tutorial Hrs | : 1 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Unit – I

Thermodynamics

8 - Hours

Introduction, Heat and Work, First Law of Thermodynamics and applications, Reversible and Irreversible Process, Carnot Cycle and Efficiency, Second Law of Thermodynamics, Carnot's Theorem, Entropy, Second Law in terms of entropy, Entropy and disorder, Third Law of Thermodynamics (Statement Only).

Unit – II

Electromagnetism

16 – Hours

Concept of Electric Flux, Gauss's Law – Some Applications, Electric Potential and Field Strength, Potential due to Point Charge and Dipole, Magnetic Field – Magnetic Force on Current, Torque on Current Loop, The Biot-Savart's Law, B near a Long Wire, B for a Circular Current Loop, Ampere's Law, B for a Solenoid, Hall Effect, Faraday's Law of induction, Lenz's law, Inductance, L-R Circuit, Induced Magnetic Fields, Displacement Current, Maxwell's Equations (Both differential and integral forms), Magnetic Materials: Classification of Magnetic Materials and properties.

Unit – III

12-Hours

Optics

Interference: Principles of Super Position – Young's Experiment – Coherence – Inference in thin films, Wedge shaped film, Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Single slit (Qualitative and Quantitative Treatment)

Polarization: Polarization by reflection, refraction and double refraction in uniaxial crystals, Nicol Prism, Quarter and Half wave plate, Circular and elliptical polarization and detection.

Unit – IV

14-Hours

Lasers

Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby Laser, Gas Laser (He-Ne Laser), Semiconductor Laser, Applications of Lasers.

Fiber Optics

Optical Fiber and Total Internal Reflection, Acceptance Angle and cone of a Fiber, Numerical Aperture, Fiber optics in Communications, Optical Parts in Fiber, Application of Optical Fibers.

Ultrasonics

Introduction, Production of Ultrasonics by Magnetostriction and Piezoelectric effects, Ultrasonics and diffraction pattern, Applications of Ultrasonics.

Unit – V

Modern Physics

De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids, Classification of materials into conductors, semi conductors and insulators .

Superconductivity

Super conductivity, Meisner Effect, Types of Superconductors and Applications of Superconductors.

Nanophase materials – Introduction and properties, Synthesis - Chemical vapour deposition method – sol-gel methods, Applications of nano materials.

(10 Hours)

Books Recommended

- 1) Engineering Physics by R.K. Gaur and S.L. Gupta
- 2) Physics by David Halliday and Robert Resnick – Part I and Part II

Reference Books:

- 1) Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar; S. Chand & Company Ltd.
- 2) Modern Engineering Physics by A.S. Vadudeva
- 3) University Physics by Young and Freedman
- 4) Nonconventional Energy by Ashok V. Desai

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1107 : PHYSICS
MODEL QUESTION PAPER

Exam : 3 Hrs.

Max. Marks : 70

Answer FIVE questions.

The First question is compulsory.

Answer any FOUR out of the remaining Seven.

1. (a) State and Explain first law of thermodynamics. (4)
(b) What is electric flux explain. (3)
(c) Explain double refraction (4)
(d) Explain the basic principle of optical fibre.(3)
2. (a) Explain the working of Carnot's heat engine. Obtain an expression for its efficiency. (10)
(b) Explain the concept of entropy? (4)
3. (a) State and prove Gauss theorem in electrostatics. (7)
(b) Explain what is Hall effect and its importance. (7)
4. (a) State and explain Ampere's law. (4)
(b) Discuss the growth and decay of current in L-R circuit.(10)
5. (a) Obtain the conditions for the interference of light reflected by a thin parallel film. (7)
(b) Discuss the qualitative description of diffraction of light at single slit. (7)
6. (a) Explain what is population inversion and pumping in lasers? (4)
(b) With neat diagrams, describe the principle, construction and working of Ruby laser.
Discuss the applications of lasers.(10)
7. (a) What is Piezoelectric effect? Explain how Ultrasonics can be generated by piezoelectric phenomena. (8)
(b) State and explain Heisenberg's uncertainty principle. (6)
8. (a) Derive Schrödinger time independent wave equation. (8)
(b) What are nano materials? Give some applications of nano materials. (6)

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1107 : ENGINEERING GRAPHICS

| | | | |
|----------------|--------------------|-------------------|-------------|
| Theory | : 2 Periods | Sessionals | : 30 |
| Lab Hrs | : 3 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 4 |

Introduction: Lines, Lettering and Dimensioning. Geometrical Constructions. Introduction to Scales.

Curves: Conic sections: General construction of ellipse, parabola and hyperbola. Construction of involutes. Normal and tangent.

Projections of Points: Principal or Reference Planes, Projections of a point situated in any one of the four quadrants

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of straight line inclined to both the reference planes:

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other reference plane and perpendicular to one reference plane and inclined to other reference plane. Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projection of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

Projections of Section of Solids: Section Planes: Parallel and inclined section planes, Sections and True shape of section, Sections of Solids: Prism, Pyramid, Cylinder and Cone .

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Isometric Views: Introduction to Isometric projection, Isometric scale and Isometric view. Isometric views of simple planes. Isometric view of Prisms, Pyramids, cylinder and cone. Isometric view of an object when projections are given.

Text Book:

Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.

Reference:

Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata Mc-Graw Hill.

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1107: ENGINEERING GRAPHICS
MODEL QUESTION PAPER

Exam : 3 Hrs.

Max. Marks : 70

Part A is compulsory. Answer any Four questions from Part B.

Part A is to be answered on the main answer book and Part B on the drawing sheet.

All questions carry equal marks.

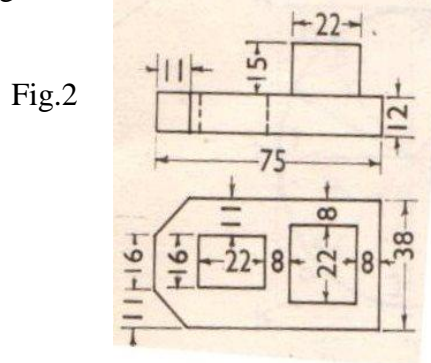
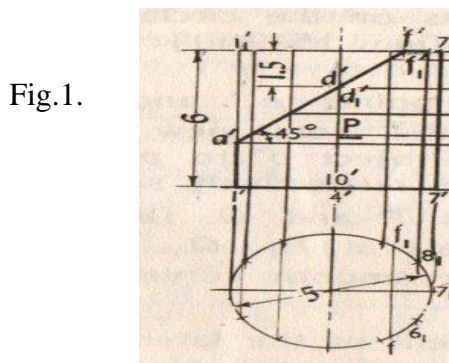
Assume the missing data if any, suitably.

PART-A

1. Write the following in brief:
 - (a). What is representative fraction?
 - (b). Define the term horizontal trace.
 - (c). What is meant by oblique plane?
 - (d). What are the different types of solids?
 - (e). Define the term section plane.
 - (f). State the methods of development.
 - (g). Define isometric scale.

PART-B

2. Construct an ellipse when the distance of the focus from the directrix is equal to 50 mm and eccentricity is $\frac{2}{3}$.
3. A line AB, 75 mm long, is inclined at 45° to the H.P. and 30° to the V.P. Its end B is in the H.P. and 40 mm in front of the V.P. Draw its projections.
4. Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 30° to the H.P. and a side parallel to the H.P. and inclined at an angle of 60° to the V.P.
5. Draw the projections of a cone, base 45 mm diameter and axis 50 mm long, when it is resting on the ground on a point on its base circle with the axis making an angle of 30° with the H.P. and its top view making 45° with the V.P.
6. A hexagonal prism, has a face on the ground and the axis parallel to the V.P. It is cut by a vertical section plane, the H.T. of which makes an angle of 45° with xy and which cuts the axis at a point 20 mm from one of its ends. Draw its sectional front view and the true shape of the section. Take side of the base 25 mm long and height 65 mm.
7. Draw the development of the lateral surface of the part P of the cylinder in Fig.1.
8. Draw the isometric view of the below Fig.2



Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1109 : PROFESSIONAL ETHICS & MORAL VALUES

| | | | |
|---------------------|--------------------|-------------------|-------------|
| Theory | : 2 Periods | Sessionals | : 30 |
| Tutorial Hrs | : 0 Period | Ext. Marks | : 70 |
| Exam | : 3 Hrs. | Credits | : 2 |

Unit – I

Ethics & Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, **Human Values – Classification of Values, Universality Values. (6 Periods)**

Unit

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics, Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI. **(6 Periods)**

Unit – III

Engineering as Social Experimentation: Engineering as Social Experimentation, Engineering Professionals – Life Skills, Engineers as Managers, Consultants and Leaders, Role of Engineers in Promoting Ethical Climate, Balanced Outlook on Law. **(6 Periods)**

Unit – IV

Safety, Social Responsibility and Rights: Safety and Risk, Moral Responsibility of Engineers for Safety, Case Studies – Bhopal Gas Tragedy, Chernobyl Disaster, Fukushima Nuclear Disaster, Professional Rights, Gender Discrimination, Sexual Harassment at Work Place. **(6 Periods)**

Unit – V

Global Issues: Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical Living, Concept of Harmony in Life. **(6 Periods)**

Text Books:

Govindarajan M., Natarajan S. and Senthil Kumar V.S., Engineering Ethics, Prentice Hall of India, (PHI) Delhi, 2004.

Subramaniam R., Professional Ethics, Oxford University Press, New Delhi, 2013.

References:

Charles D, Fleddermann, “Engineering Ethics”, Pearson/PHI, New Jersey, 2004 (Indian Reprint).

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1109 : PROFESSIONAL ETHICS & MORAL VALUES
MODEL QUESTION PAPER

Exam : 3 Hrs.

Max. Marks : 70

Question No.1 is compulsory.
Answer any FOUR from the remaining
All questions carry equal marks.

1. Write short answers for the following:
 - (a) Ethical Vision
 - (b) Profession and Professionalism
 - (c) Environmental Ethics
 - (d) Bhopal Gas Tragedy
 - (e) Gender discrimination
 - (f) Cyber Crimes
 - (g) Engineers as Managers
2. Discuss the scope and aim of Engineering Ethics.
3. Explain the role of Engineers in promoting ethical climate.
4. What are Values? Explain in detail the classification of human values.
5. Elucidate the moral responsibility of engineers towards safety and risk.
6. Define the concept of globalization and explain the role of MNCs in our country.
7. What are the functions of various sample codes of ethics?
8. Discuss the need to focus on professional ethics.

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1111: PHYSICS LAB

| | | | |
|----------------|--------------------|-------------------|-------------|
| Theory | : 0 Periods | Sessionals | : 50 |
| Lab Hrs | : 3 Period | Ext. Marks | : 50 |
| Exam | : 3 Hrs. | Credits | : 2 |

List of Experiments

4. Melde's Experiment – Determination of frequency of an electrically maintained tuning fork.
5. Newton's Rings – Determination of Radius of Curvature of a Convex Lens
6. Diffracting Grating – Determination of wavelengths of lines of mercury spectrum using spectrometer.
7. Determination of Cauchy's constants using Spectrometer and mercury light.
8. Wedge Method – Determination of thickness of paper by forming parallel interface fringes.
9. Determination of refractive index of Ordinary (μ_o) and Extraordinary (μ_e) rays
10. Variation of Magnetic field along the axis of current carrying circular coil Stewart and Gee's apparatus.
11. Carey Foster's bridge a) laws of resistance b) temperature coefficient of resistance.
12. Lee's Method – Determination of coefficient of thermal conductivity of a bad conductor.
13. Determination of Magnetic Moment and Horizontal (M & H) component of Earth's Magnetic field.
14. Calibration of voltmeter using potentiometer.
15. Calibration of low range Ammeter using potentiometer.
16. Determination of band gap of semi conductor.
17. Laser – Diffraction
18. Hall Effect - a) Determination of Hall Coefficient b) Determination of charge density.

**Physics Lab will not have a
Model Question Paper**

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1113: WORKSHOP

| | | | |
|----------------|--------------------|-------------------|-------------|
| Theory | : 0 Periods | Sessionals | : 50 |
| Lab Hrs | : 3 Period | Ext. Marks | : 50 |
| Exam | : 3 Hrs. | Credits | : 2 |

Carpentry:

Bench Work, tools used in carpentry.

Jobs for Class work – half lap joint, mortise and tenon joint, half – lap dovetail joint, corner dovetail joint, central bridle joint.

Sheet Metal:

Tools used in sheet metal work, Laying development of the sheet metal jobs, soldering.

Jobs for class works – Square tray, taper tray(sides), funnel, elbow pipe joint, 60⁰ pipe joint.

Fitting:

Tools used in fitting work, Different files, chisels, hammers and bech vice.

Jobs for class work – Square, hexagon, rectangular fit, circular fit and triangular fit.

Reference

Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.

**Workshop will not have a
Model Question Paper**

Group – B
For the branches of
(EEE, ECE, Mechanical, Marine, Metallurgy, Geo-Informatics, Instrumentation Technology)

ENG 1114: SPORTS/NCC/NSS

Contact Hrs. : 3 Hrs.

Credits : 2

It is only an audit course and the credits are given based on the attendance. Every student should have a minimum of 75% attendance and as per university rules. Every student should choose either sports or NCC or NSS at the starting of the semester and pursue the same in that semester.

**Sports/NCC/NSS will not have a
Model Question Paper**