

[B16 ENG 1101]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
ENGLISH
MODEL QUESTION PAPER
(Common to all branches)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. a) Write an Essay on **One** of the following. (7M)
i. Pros and cons of Internet
ii. Terrorism, a social evil
- b) Correct any **Five** of the following sentences. (5M)
i. The machineries were expensive.
ii. Suppose, if you arrive late, you will miss the show.
iii. Choose the best of the two options.
iv. I enjoyed during the holidays.
v. I have seen him yesterday.
vi. The teacher gave us many advices.
- c) Use the appropriate articles in the given blanks. (2M)
i. He speaks English very well.
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 report on **One** of the following. (7M)
i. Write a feasibility report for setting up a Water / Power Unit at your campus.
ii. Write a report on Educational Tour
- b) Write one word substitutions to any **Four** of the following and write sentences by using them. (5M)
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 appropriate quantifiers for each sentence (Some, few, much, lesser, a little, less). (2M)
i. There were at the college last year
ii. The project is complicated than 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 on **One** of the following. (8M)
- i. Write a letter to a renowned person, requesting him to be the Chief Guest for the cultural festival of your college.
 - ii. Write a letter to the editor about the problem of brain drain.
- 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, to-infinitives or plain infinitive 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
 - a) Sober b) High spirits c) Mean d) Feeble
 - ii. Vicious
 - a)cruel b)kind c)splendid d)dearest
 - iii. Remnant
 - a)horror b)whole sale c)left over d)energize
 - iv. Acclaim
 - a) praise b) blame c) honour d) criticism
5. a) Develop a paragraph (150words) based on the following hints. (7M)
- 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 the appropriate idioms from the box. (5M)
- (The cream of the crop, an arm and a leg, hand in glove, hue and cry, 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_____.
- v. The two friends are _____ with each other.
- c) Pick the right antonyms of the following words. (2M)
- i. Awake
 - a)alive b) stir c) asleep d) truce
 - ii. Create
 - a) build b) beak c) deny d) refuse
 - iii. Emerge
 - a) abandon b) appear c) fall d) hide
 - iv. Warm
 - a) cold b) pleasant c) unkind d)indifferent
6. a) Draft a pamphlet on any Electronic home appliances/Places of tourists' interest/an Educational institution/ an exhibition. (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 (in , at, the, at, on,). (2M)
- 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. (7M)
- b) Read the following paragraph and answer the questions: (5M)

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.
- v. What is the conclusive thought of the author?

- 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.

8. a) Select appropriate words from the below word list to complete the following sentences. (6M)
(popularity, interact, networking, revolutionized, overwhelmed, reputation)

- i. Sachin's _____ was evidence of the fact that he was a friendly and fun to be with.
- ii. _____ is the key to understanding the market better.
- iii. Leela was _____ with emotion at the award ceremony.
- iv. His failure to reach the meeting on time has not done any good to his _____.
- v. A tiny little box between the electric guitar and the amplifier _____ rock music.
- vi. Javed said 'We at DSIJ love to _____ with our readers and we have some special sections for all of you.

b) Write a conversation between two/ three friends who are discussing an idea for a business they would like to set up. (8M)

(or)

Write a conversation between two students discussing a social issue.

[B16 ENG 1101]

[B16 ENG 1102]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
MATHEMATICS - I
MODEL QUESTION PAPER
(Common to all branches)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Solve the following. [7x2 = 14 marks]
- (a) Find the total derivative of x^2y with respect to x when x and y are connected by the relation $x^2 + xy + y^2 = 1$
- (b) If the plane $3x + 12y - 6z - 17 = 0$ touches the conicoid $3x^2 - 6y^2 + 9z^2 + 17 = 0$ find the point of contact
- (c) Write the necessary conditions for $f(x,y)$ to have a maximum or minimum at (a,b) .
- (d) Form the differential equation from the equation $x = a \sin(\omega t + b)$
- (e) Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
- (f) Solve $\frac{d^4y}{dx^4} + 2\frac{d^2y}{dx^2} + y = 0$
- (g) Express $f(x) = \frac{x}{2}$ as a Fourier series in the interval $-\pi < x < \pi$

2. (a) If $U = \tan^{-1} \frac{x^3 + y^3}{x - y}$ and $x U_x + y U_y = \sin 2U$, prove that

$$x^2 U_{xx} + 2xy U_{xy} + y^2 U_{yy} = 2 \cos 3U \sin U$$

(b) If $u = x^2 - 2y^2$; $v = 2x^2 - y^2$ where, $x = r \cos \theta$, $y = r \sin \theta$

show that $\frac{\partial(u,v)}{\partial(r,\theta)} = 6 r^3 \sin 2\theta$

3. (a) Expand $x^2 y + 3y - 2$ in powers of $(x - 1)$ and $(y + 2)$ using Taylor's theorem.
 (b) By using the method of differentiation under the integral sign

Prove that $\int_0^\infty \frac{\tan^{-1}(ax)}{x(1+x^2)} dx = \frac{\pi}{2} \log(1+a) : a \geq 0$

4. (a) Solve $\frac{dy}{dx} = y \tan x - y^2 \sec x$

(b) Solve $\frac{dy}{dx} + \frac{y \cos x + \sin y + y}{\sin x + x \cos y + x} = 0$

5. (a) Find the orthogonal trajectories of the family of parabolas $ay^2 = x^3$

- (b) If 30 % of radio active substance disappeared in 10 days, how long will it take for 90 % of the substance to disappear?

6. (a) Solve $\frac{d^2y}{dx^2} + 4y + 5y = -2 \cosh x$ given that $y = 0$ and $\frac{dy}{dx} = 1$ at $x = 0$

(b) Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$, by using method of variation of parameters.

7. (a) Solve $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} - 4y = x^2 + 2 \log x$

(b) Solve the simultaneous equations $\frac{dx}{dt} + y = \sin t$, $\frac{dy}{dt} + x = \cos t$, given that $x = 2$ and

$y = 0$ when $t = 0$

8. (a) Find the Fourier series of $f(x) = x - x^2$ in the interval $-\pi < x < \pi$

(b) Find the half- range cosine series for $f(x) = x$ in the interval $0 < x < 2$

[B16 ENG 1102]

[B16 ENG 1103]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
MATHEMATICS - II
MODEL QUESTION PAPER
(Common to all branches)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks

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

1. Solve the following. [7x2 = 14 marks]
 - 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) Solve the difference equation $u_{n+1} - 2u_n + 2u_{n-1} = 0$.
 - g) Find the z-transform of n^2 .

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
 $f(t) = t, 0 < t < a$
 $= 2a - t, a < t < 2a$.
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) Solve the difference equation $y_{n+2} - 6y_{n+1} + 8y_n = 2^n$.
 b) Use z-transforms to solve $y_{n+2} - 5y_{n+1} + 6y_n = 1$, given $y_0 = 0, y_1 = 1$.
8. a) Find inverse Z-transform of $\frac{z^2 + 2z}{(z+1)(z-1)^2}$ by the use of Partial fractions.
 b) Given $Z(u_n) = \frac{2z^2 + 3z + 4}{(z-3)^3}; |z| > 3$, find the values of u_1, u_2 and u_3 .

[B16 ENG 1103]

[B16 ENG 1104]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
CHEMISTRY
MODEL QUESTION PAPER
(Common to CIVIL, CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks

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

1. Write a short answer to the following. [7x2 = 14 marks]
 - (a) What is hardness of water.
 - (b) How solids are classified?
 - (c) What are ceramics?
 - (d) What is the Galvanic corrosion?
 - (e) What do you mean by conducting polymers?
 - (f) Define cetane number?
 - (g) Write any two advantages of LPG as motor fuel.
2.
 - (a) Describe the ion exchange process of water softening
 - (b) Describe the steps involved in municipal water treatment.
3.
 - (a) Write the manufacture of Portland cement.
 - (b) Write the properties and applications of ceramics.
4.
 - (a) Give a detailed account on band theory of solids.
 - (b) Explain zone refining of solids with neat diagram.
5.
 - (a) What is corrosion ? Explain the theory of dry corrosion with examples.
 - (b) What is paint? Explain the constituents of paint.
6.
 - (a) Define polymerization. Explain the mechanism of addition polymerisation with suitable Examples.
 - (b) Write the preparation and properties of cellulose derivatives.
7.
 - (a) Describe the manufacture of coke by Otto- Hoffmann's process
 - (b) What is synthetic petrol? Explain Fischer Tropsch, method with a neat diagram.
8.
 - (a) Explain the desalination of water by reverse osmosis method.
 - (b) Explain the principles of Lubrication with neat diagram.

[B16 ENG 1104]

[B16 ENG 1105]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
PHYSICS
MODEL QUESTION PAPER
(Common ECE, EEE & Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - (a) Distinguish between heat and work.
 - (b) What is a cyclic process and how it can be represented ?
 - (c) What is Hall effect ?
 - (d) Explain the principle of super position.
 - (e) Explain the principle of light propagation in an optical fiber.
 - (f) Define magneto striction effect.
 - (g) State the uncertainty principle.

2.
 - (a) Distinguish between reversible and irreversible process. Mention the conditions of reversibility of a process (4M)
 - (b) State and prove the Carnot's theorem (7M)
 - (c) What is the efficiency of a Carnot engine operating between melting point and boiling Point of water under normal conditions. (3M)

3.
 - (a) State and Explain the Biot and Savart law. Using it, deduce an expression for the magnetic Induction along the axis of a circular current carrying coil. (10M)
 - (b) What are Maxwell's equations and explain their significance. (4M)

4.
 - (a) Define interference phenomena of light. (2M)
 - (b) Deduce the conditions for maxima and minima of monochromatic light reflected from a thin transparent film. (8M)
 - (c) Describe the characteristics of lasers. (4M)

5.
 - (a) Define numerical aperture of an optical fiber and what is its physical significance. (2M)
 - (b) Deduce an expression for the numerical aperture of a fiber (7M)
 - (c) Mention the important applications of ultra sonics (5M)

6. (a) What are matter waves and describe their properties . (3M)
(b) Deduce the Schrodingers time independent wave equation. (8M)
(c) Give a classification of materials based on the band theory of solids (3M)
7. (a) What are nano materials and describe the methods of characterizing the nano materials (6M)
(b) Describe with neat figure, any one method of synthesis of nano materials. (8M)
8. Write about
(a) Entropy and disorder (4M)
(b) Requirements of any laser device (4M)
(c) Piezoelectric method of producing ultrasonics (6M)

[B16 ENG 1105]

[B16 ENG 1106]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
MODEL QUESTION PAPER
(Common to CIVIL, CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

- 1 Write a short answer to the following. . [7x2 = 14 marks]
- a) What is recursion? Give an example.
 - b) Explain scope and extent of variables.
 - c) What are truncation and round off errors?
 - d) Distinguish between local and global variables.
 - e) Explain different bitwise operators?
 - f) Explain Euler's Method.
 - g) What is Interpolation?
- 2 a) Explain different types of operators in C.
b) Write a program to check whether the given number is palindrome or not.
- 3 a) What is an array? Explain two dimensional array with an example?
b) Write a C program to generate prime numbers less than the given number.
- 4 a) What is a Pointer? How is it initialized? What is the function of a pointer variable? What are its uses?
b) What is a loop ?Explain general forms of all loop structures with suitable examples.
- 5 a) Explain the difference between call by reference & call by value?
b)Write a program to sort an array of elements in ascending order?

6 a) Explain the following

i) Structure

ii) Accessing elements in structure

iii) Arrays of structures

b) Briefly explain file handling functions.

7 a) Use gauss elimination method to solve

$$2x+y+z=10, 3x+2y+3z=18, x+4y+9z=16$$

b) Given $y' = y - x$, where $y(0) = 2$ find $y(0.1)$ and $y(0.2)$ using Runge-kutta fourth order method

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

2

$\int x \sin(x) dx$ using Simpson's 1/3 rule.

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[B16 ENG 1106]

[B16 ENG 1107]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
ENGINEERING GRAPHICS
MODEL QUESTION PAPER
(Common to ECE, EEE & Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. . [7x2 = 14 marks]
- (a) What is an involute? Write its uses?
 - (b) Define Conics.
 - (c) What is an auxiliary plane? State its purpose?
 - (d) Define frustum of a solid.
 - (e) Define the term section plane.
 - (f) State methods of developments.
 - (g) Define isometric scale.
2. An inelastic string 145 mm long has its one end attached to the circumference of a circular disc of 40 mm diameter. Draw the curve traced out by the other end of the string, when it is completely wound around the disc, keeping the string always tight.
3. A line AB, of 80 mm long has its end A, 15 mm in front of VP and 20 mm above HP. The other end B is 40 mm above HP and 50 mm in front of VP. Draw the projections of the line and determine the inclinations of the line with HP and VP.
4. Draw a rhombus of diagonals 100 mm and 60 mm long, with the longer diagonal horizontal. The figure is the top view of a square of 100mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground.
5. A pentagonal pyramid, with base 30mm and height 80mm, rests on one edge of its base on HP. The highest point in the base is 30mm above HP. Draw its projections, when the axis is parallel to VP. Drawn another front view, on a reference line inclined at 30° to the edge on which it is resting, so that the base is visible.
6. A cone, base 75 mm diameter and axis 80 mm long is resting on its base on the H.P. it is cut by a section plane perpendicular to the V.P., inclined at 45° to the H.P. and cutting the axis at a point 35 mm from the apex. Draw its front view, sectional top view and true shape of the section.

7. A right regular hexagonal pyramid of 30 mm side of base and height of 70 mm stands with its base on HP. A through circular hole of 30 mm diameter is drilled through the pyramid such that the axis of the hole is perpendicular to VP and intersects the axis of the pyramid 20 mm above the base. Draw the development of the lateral surface of the pyramid showing the true shape of the holes formed on it.

8. A right circular cylinder 5cm diameter of base and 7cm height has its base in the HP. A right circular cone diameter of base 4cm and height 4cm rests centrally over the upper flat surface of the cylinder. Draw the isometric view of the above combination

[B16 ENG 1107]

[B16 ENG 1108]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
HISTORY OF SCIENCE AND TECHNOLOGY
MODEL QUESTION PAPER
(Common to CIVIL, CSE & IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
- 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 effects of 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.

[B16 ENG 1108]

[B16 ENG 1109]
I/IV B.Tech. DEGREE EXAMINATION
First Semester
PROFESSIONAL ETHICS AND MORAL VALUES
MODEL QUESTION PAPER
(Common to ECE, EEE & Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - (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.

[B16 ENG 1109]

[B16 ENG 1201]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
MATHEMATICS-III
MODEL QUESTION PAPER
(Common to all branches)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Solve the following. [7x2 = 14 marks]
- (a) Find the angle between the line $\frac{x+1}{2} = \frac{y}{3} = \frac{z-3}{6}$ and the plane $3x + y + z = 7$.
- (b) Define right circular cylinder.
- (c) Change the integral $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ into polar coordinates.
- (d) Express $\int_0^\pi \sqrt{\tan \theta} d\theta$ in terms of gamma function.
- (e) Evaluate $\int_0^1 \int_0^{1-y} xy dx dy$ using Dirichlet's integral.
- (f) State Parseval's identity for Fourier transforms.
- (g) Find the Fourier cosine transform of $f(x) = e^{-ax}$ ($a > 0$).
2. (a) Find the image of the point $(2, -1, 3)$ in the plane $3x - 2y - z - 9 = 0$.
- (b) Find the equation of the plane which passes through the point $(3, -3, 1)$ and is perpendicular to the planes $7x + y + 2z = 6$ and $3x + 5y - 6z = 8$.
3. (a) Prove that the three planes $2x + y + z = 3$, $x - y + 2z = 4$, $x + z = 2$ form a triangular prism
- (b) Find the magnitude and equations of the shortest distance between the lines
- $$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+3}{4} \text{ and } \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$$
4. (a) Find the equation of the sphere having its centre on the plane $4x - 5y - z = 3$

and passing through the circle $x^2 + y^2 + z^2 - 2x - 3y + 4z + 8 = 0$, $x - 2y + z = 8$.

(b) Find the equation of the right circular cone generated by rotating the line

$$\frac{x}{1} = \frac{y}{2} = \frac{z}{3} \text{ about the line } \frac{x}{-1} = \frac{y}{1} = \frac{z}{2}.$$

5. (a) Evaluate the integral by changing the order of integration $\int_0^3 \int_1^{\sqrt{4-y}} (x+y) dx dy$.

(b) Find by double integration the area of the lemniscate $r^2 = a^2 \cos 2\theta$.

6. (a) Evaluate the integral $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z dz dx dy$.

(b) Find the centroid of the area enclosed by the parabola $y^2 = 4ax$, the x-axis and its latus rectum.

7. (a) Express the function $f(x) = \begin{cases} 1 & \text{for } |x| \leq 1 \\ 0 & \text{for } |x| > 1 \end{cases}$

as a Fourier integral. Hence evaluate $\int_0^\infty \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$.

(b) Find the Fourier Sine transform of $\frac{e^{-ax}}{x}$.

8. (a) Find Fourier transform of $f(x) = \begin{cases} 1 & \text{for } |x| \leq a \\ 0 & \text{for } |x| > a \end{cases}$.

Hence evaluate $\int_0^\infty \frac{\sin ax}{x} dx$.

(a) Use Parseval's identity to show that $\int_0^\infty \frac{dt}{(t^2+1)(t^2+4)} = \frac{\pi}{12}$.

[B16 ENG 1201]

[B16 ENG 1202]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
PHYSICS
MODEL QUESTION PAPER
(Common to CIVIL, CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - a) Distinguish between heat and work.
 - b) What is a cyclic process and how it can be represented ?
 - c) What is Hall effect ?
 - d) Explain the principle of super position.
 - e) Explain the principles of light propagation in an optical fiber.
 - f) Define magneto striction effect.
 - g) State the uncertainty principle.

2.
 - (a) Distinguish between reversible and irreversible process. Mention the conditions of reversibility of a process (4)
 - (b) State and prove the Carnot's theorem (3)
 - (c) What is the efficiency of a Carnot engine operating between melting point and boiling Point of water under normal conditions. (7)

3.
 - (a) State and Explain the Biot and Savart law. Using it, deduce an expression for the magnetic Induction along the axis of a circular current carrying coil. (10)
 - (b) What are Maxwell's equations and explain their signature (4)

4.
 - (a) Define interference phenomena of light. (2)
 - (b) Deduce the conditions for maxima and minima of monochromatic light reflected from a Thin transparent (8)
 - (c) Describe the characteristics of lasers. (4)

5.
 - (a) Define numerical aperture of an optical fiber and what is its physical significance. (2)
 - (b) Deduce an expression for the numerical aperture of a fiber (7)
 - (c) Mention the important applications of ultrasonics (5)

6.
 - (a) What are matter waves and describe their properties . (3)
 - (b) Deduce the Schrodingers time independent wave equation. (8)

- (c) Give a classification of materials based on the band theory of solids (3)
7. (a) What are nano materials and describe the methods of characterizing the nano materials (6)
(b) Describe with neat figure, any one method of synthesis the nano materials. (8)
8. Write about
- (a) Entropy and disorder (4)
(b) Requirement of any laser device (4)
(c) Piezoelectric method of producing ultrasonics (6)

[B16 ENG 1202]

[B16 ENG 1203]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
CHEMISTRY
MODEL QUESTION PAPER
(Common to ECE, EEE, Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - a) What is hardness of water.
 - b) How solids are classified?
 - c) What are ceramics?
 - d) What is the Galvanic corrosion?
 - e) What do you mean by conducting polymers?
 - f) Define cetane number?
 - g) Write any two advantages of LPG as motor fuel.
2. (a) Describe the ion exchange process of water softening
(c) Describe the steps involved in municipal water treatment.
3. (a) Write the manufacture of Portland cement.
(b) Write the properties and applications of ceramics.
4. (a) Give a detailed account on band theory of solids.
(b) Explain zone refining of solids with neat diagram.
5. (a) What is corrosion ? Explain the theory of dry corrosion with examples.
(b) What is paint? Explain the constituents of paint.
6. (a) Define polymerization. Explain the mechanism of addition polymerisation with suitable Examples.
(b) Write the preparation and properties of cellulose derivatives
7. (a) Describe the manufacture of coke by Otto- Hoffmann's process
(b) What is synthetic petrol? Explain Fischer Tropsch, method with a neat diagram.
8. (a) Explain the desalination of water by reverse osmosis method.
(b) Explain the principles of Lubrication with neat diagram.

[B16 ENG 1203]

[B16 ENG 1204]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
ENGINEERING GRAPHICS
MODEL QUESTION PAPER
(Common to CIVIL, CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
- a) What is an involute? Write its uses?
 - b) Define HT and VT.
 - c) What is an auxiliary plane? State its purpose?
 - d) Define frustum of a solid.
 - e) Define the term section plane.
 - f) State methods of developments.
 - g) Define isometric scale.
2. An inelastic string 145 mm long has its one end attached to the circumference of a circular disc of 40 mm diameter. Draw the curve traced out by the other end of the string, when it is completely wound around the disc, keeping the string always tight.
3. A line AB, of 80 mm long has its end A, 15 mm in front of VP and 20 mm above HP. The other end B is 40 mm above HP and 50 mm in front of VP. Draw the projections of the line and determine the inclinations of the line with HP and VP.
4. Draw a rhombus of diagonals 100 mm and 60 mm long, with the longer diagonal horizontal. The figure is the top view of a square of 100mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground.
5. A pentagonal pyramid, with base 30mm and height 80mm, rests on one edge of its base on HP. The highest point in the base is 30mm above HP. Draw its projections, when the axis is parallel to VP. Draw another front view, on a reference line inclined at 30° to the edge on which it is resting, so that the base is visible.
6. A cone, base 75 mm diameter and axis 80 mm long is resting on its base on the H.P. it is cut by a section plane perpendicular to the V.P., inclined at 45° to the H.P. and cutting the axis at a point 35 mm from the apex. Draw its front view, sectional top view and true shape of the section.
7. A right regular hexagonal pyramid of 30 mm side of base and height of 70 mm stands with its base on HP. A through circular hole of 30 mm diameter is drilled through the pyramid such that

the axis of the hole is perpendicular to VP and intersects the axis of the pyramid 20 above the base. Draw the development of the lateral surface of the pyramid showing the true shape of the holes formed on it.

8. A right circular cylinder 5cm diameter of base and 7cm height has its base in the HP. A right circular cone diameter of base 4cm and height 4cm rests centrally over the upper flat surface of the cylinder. Draw the isometric view of the above combination.

[B16 ENG 1204]

[B16 ENG 1205]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
MODEL QUESTION PAPER
(Common to ECE, EEE & Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

- 1 Write a short answer to the following. [7x2 = 14 marks]
- a) What is recursion? Give an example.
 - b) Explain scope and extent of variables.
 - c) What are truncation and round off errors?
 - d) Distinguish between local and global variables.
 - e) Explain different bitwise operators?
 - f) Explain Euler's Method.
 - g) What is Interpolation?
- 2
- a) Explain different types of operators in C.
 - b) Write a program to check whether the given number is palindrome or not.
- 3
- a) What is an array? Explain two dimensional array with an example?
 - b) Write a C program to generate prime numbers less than the given number.
- 4
- a) What is a Pointer? How is it initialized? What is the function of a pointer variable? What are its uses?
 - b) What is a loop ?Explain general forms of all loop structures with suitable examples.
- 5
- a) Explain the difference between call by reference & call by value?
 - b) Write a program to sort an array of elements in ascending order?

6 a) Explain the following

i) Structure

ii) Accessing elements in structure

iii) Arrays of structures

b) Briefly explain file handling functions.

7 a) Use gauss elimination method to solve

$$2x+y+z=10, 3x+2y+3z=18, x+4y+9z=16$$

b) Given $y' = y - x$, where $y(0) = 2$ find $y(0.1)$ and $y(0.2)$ using Runge-kutta fourth order method

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

2

$\int x \sin(x) dx$ using Simpson's rule.

-2

[B16 ENG 1205]

[B16 ENG 1206]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
PROFESSIONAL ETHICS AND MORAL VALUES
MODEL QUESTION PAPER
(Common to CIVIL, CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - (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.

[B16 ENG 1206]

[B16 ENG 1207]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
HISTORY OF SCIENCE AND TECHNOLOGY
MODEL QUESTION PAPER
(Common to ECE, EEE, Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks

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

1. Write a short answer to the following. [7x2 = 14 marks]
 - 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.

[B16 ENG 1207]

[B16 CE 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
BUILDING MATERIALS AND BUILDING CONSTRUCTION
MODEL QUESTION PAPER
(Department Subject - CIVIL)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
 - a) Differentiate between wet and dry process manufacturing of ordinary Portland cement.(OPC)
 - b) How do you diagnose defects in painting suggest remedies
 - c) What is bearing capacity of soil? What is its importance?
 - d) Draw neat sketch of dog-legged staircase and quarter landing staircase
 - e) what are differences between distemper and emulsion paint
 - f) Explain decay of timbers
 - g) Define scaffolding and mention its components parts
2.
 - a) Discuss various methods of storing cement in the field and in godowns
 - b) Define Farm Work and explain the different types of farm-work.
3.
 - a) Draw the cross section of a tree and indicate various details.
 - b) Explain the properties of glass. What are the uses of glass brick and sheet glass?
4.
 - a) Describe various types of Pile foundations with brief description and usual notations
 - b) Explain about concrete blocks and FAL-G blocks
5.
 - a) How concrete is graded as per I.S.code? List out the factors effecting choice of mix problems.
 - b) Draw the sketch of queen post truss with all details
6.
 - a) Discuss the importance of location of doors, windows and ventilators in a building.
 - b) Explain the chemistry of plastics. Enumerate the various uses of plastics in buildings.
7.
 - a) Bring out the importance of aluminum and PVC doors, Windows and ventilators in building construction.
 - b) Describe the constituents of varnishes and explain the uses of varnishes
8.
 - a) What is a step? Mention its different types
 - b) Write short note on Transporting, placing and vibrating of concrete.

[B16 CE 1208]

[B16 CS 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
PROBABILITY, STATISTICS & QUEUING THEORY
MODEL QUESTION PAPER
(Department Subject-Common to CSE, IT)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

- 1 Write a short answer to the following [7x2 = 14 marks]
- State the limitations of axiomatic approach to probability.
 - State the properties of distribution function.
 - Show that $E(aX + b) = aE(X) + b$.
 - Find the moment generating function of Poisson distribution
 - Define rank correlation?
 - Define Type-I-error and Type-II-error.
 - What are the operating characteristics of a queuing model?
- 2 (a) State and prove addition theorem of probability for n events.
(b) Three machines A, B and C produce respectively 50%, 30% and 20% of the total number of items of a factory. The percentage of defective output of these machines is 3%, 4% and 5%
(i) If an item is selected at random, find the probability that the item is defective.
(ii) Suppose an item is selected at random and is found to be defective. Find the probability that it was produced by machine A.
- 3 (a) The diameter of an electric cable is assumed to be a continuous variate with p.d.f. $f(x) = 6x(1-x)$, $0 \leq x \leq 1$. Verify that the above is p.d.f. Also find the mean and variance.
(b) Let X be a random variable with the following probability distribution:
- | | | | |
|---------------|-----|-----|-----|
| x : | -3 | 6 | 9 |
| P (X = x) : | 1/6 | 1/2 | 1/3 |
- Find $E(X)$, $E(X^2)$ and using the laws of expectation, evaluate $E(2X+1)^2$
- 4 (a) Twenty identical coins each with probability P of showing heads are tossed. The probability of heads showing on 10 coins is same as that of heads showing on 11 coins. Find P .
(b) X is a normal variate with mean 30 and standard deviation 5. Find the probability that (i) $26 \leq X \leq 40$ (ii) $X \geq 45$ (iii) $|X - 30| > 5$

- 5 (a) Obtain the equations of two lines of regression for the following data. Also obtain the estimate of X for $Y = 70$

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

- (b) Find the correlation coefficient for the following data:

x :	1	2	3	4	5	6	7	8	9	10
Y :	10	12	16	28	25	36	41	49	40	50

- 6 (a) A sample of 100 items, drawn from a universe with mean value 64 and standard deviation 3 has a mean value 63.5. Is the difference in means significant? What will be your inference if the sample has 200 items?

- (b) Determine a 95% confidence interval for the mean of a normal population with the Sample 145, 146, 142, 143

- 7 (a) A group of 10 boys fed on a diet A and another group of 8 boys fed on a different diet B recorded the following increase in weights.

Diet A	5	6	8	1	12	4	3	9	6	10	Kgs
Diet B	2	3	6	8	10	1	2	8			Kgs

Does it show the superiority of Diet A over that of Diet B

- (b) Theory predicts that the proportion of beans in four groups A, B, C, D should be 9:3:3:1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287, 118. Does the experiment support the theory?

- 8 (a) For $\{(M/M/1):(\infty/FIFO)\}$ queuing model, in the steady state case, obtain the average queue length in terms of relevant parameters λ and μ .

- (b) Arrivals at a telephone booth are considered to be Poisson with an average time of 12 min. between one arrival and the next. The length of phone call is assumed to be distributed exponentially with mean 4 min.

(a) Find the average number of persons waiting in the system.

(b) What is the probability that a person arriving at the booth will have to wait in the Queue?

[B16 CS 1208]

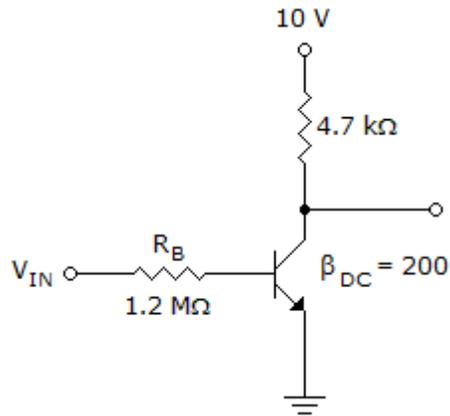
[B16 EC 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
ELECTRONIC DEVICES AND CIRCUITS
MODEL QUESTION PAPER
(Department Subject-ECE)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following [7x2 = 14 marks]
 - a. What is meant by diffusion current in a semi-conductor?
 - b. A silicon diode has a saturation current of 7.5 pA at 300 °K. Calculate the saturation current at 330 ° K.
 - c. Define peak inverse voltage of a diode.
 - d. Draw the input and output characteristics of a transistor in CE configuration and mark the cutoff, saturation and active regions.
 - e. Compare JFET with BJT.
 - f. Define pinch-off voltage.
 - g. Draw the equivalent circuit of transistor for high frequencies
2.
 - a. Explain the current components in a PN junction diode and Derive the diode current equation.
 - b. Explain about avalanche and zener breakdowns.
3.
 - a. Explain about intrinsic and extrinsic semiconductors
 - b. write short note on (i) Hall effect (ii) continuity equation
4.
 - a. Explain the working of Bridge rectifier. Give the expressions for RMS current, PIV, ripple factor and efficiency.
 - b. A diode whose internal resistance is 20Ω is to supply power to a 100Ω load from 110V(rms) source supply. Calculate (i) peak load current (ii) the dc load current (iii) the ac load current (iv) the percentage regulation from no load to full load.
5.
 - a. Draw and explain the input and output characteristics of a transistor in CB configuration.
 - b. Determine the minimum value of I_B that produces saturation in the following figure.



6. a. Explain with the help of neat diagrams, the structure of an N-channel FET and its Volt-ampere characteristics.
- b. Explain the operating principle of enhancement mode MOSFET. How does it differ from depletion mode type?
7. a. Explain how FET acts as a voltage variable resistor.
- b. Show that if a FET is operated at sufficiently low drain voltage, it behaves as a resistance R given by $R = R_O / [1 - (V_{GS} / V_P)^{1/2}]$ Where R_O is the channel resistance for zero gate voltage.
8. Write a short notes on
 - a. Photo transistor
 - b. Tunnel diode
 - c. Transition capacitance

[B16 EC 1208]

[B16 EE 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
CIRCUIT THEORY
MODEL QUESTION PAPER
(Department Subject-EEE)

Time: 3 Hrs.

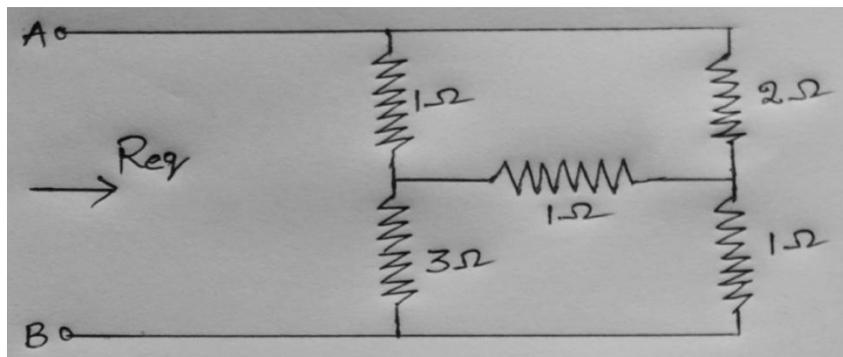
Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

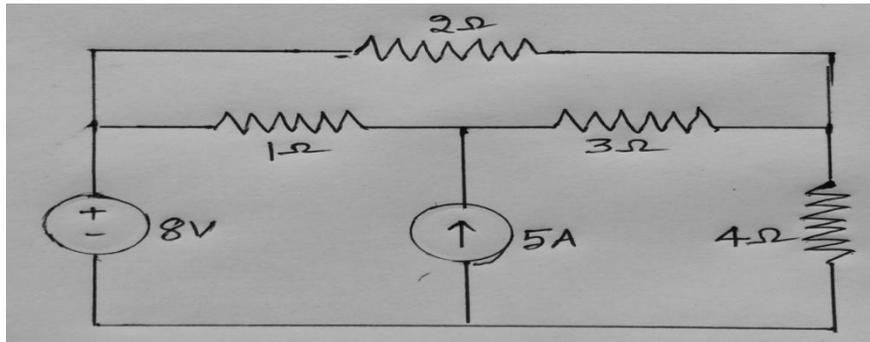
1. Write a short answer to the following [7x2 = 14 marks]

- a) What are the limitations of superposition theorem?
- b) Distinguish between Active and Passive elements.
- c) Draw the characteristics of an ideal voltage source.
- d) State Maximum power transfer theorem.
- e) Define MMF, Reluctance and Magnetic flux with respect to a magnetic circuit.
- f) State Faradays laws of Electromagnetic Induction.
- g) What is Self inductance?

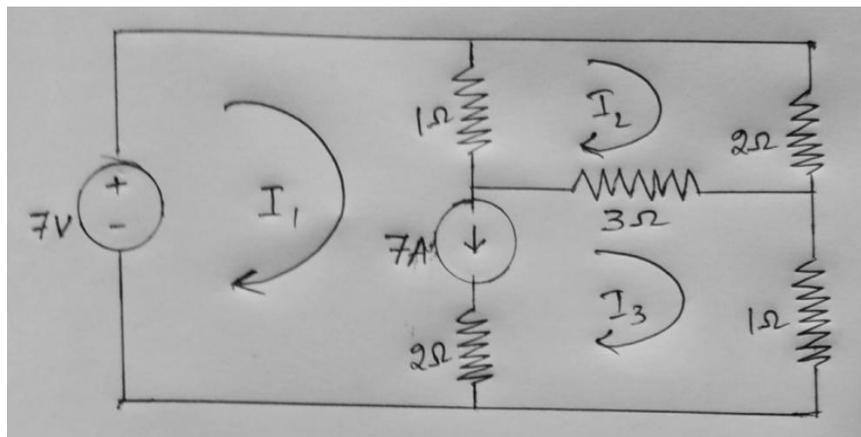
2. a) Find the equivalent resistance between the terminals A and B of the given network.



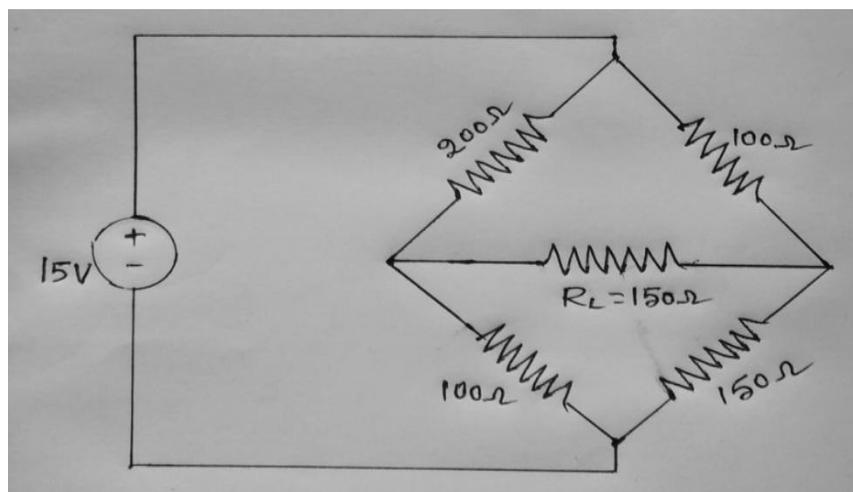
b) Using Nodal analysis find the currents and voltages in all the branches of the given network.



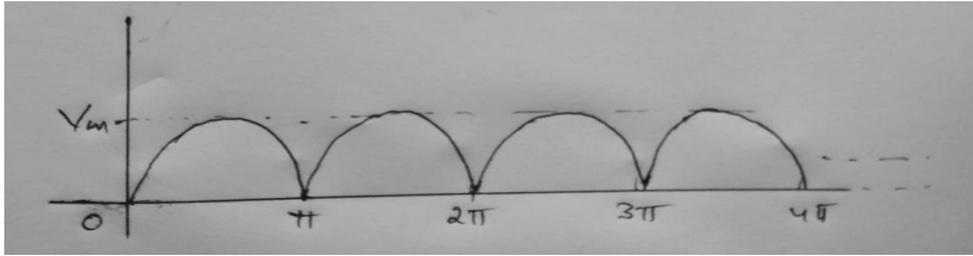
3.a) Find the mesh current I_1 in the given circuit using mesh Analysis.



b) Find the current through the load resistance R_L in the given circuit using thevenin's theorem.



4. a) Define Average, RMS values of a periodic waveform. Obtain the Average and RMS values of the rectified sinusoidal waveform shown in figure.



- b) A series R-L-C circuit has $R=10\text{ohms}$, $L=0.01\text{H}$, $C=100\mu\text{F}$. Find the Resonant frequency, Quality factor and Band width of the circuit.
- 5.a) Explain (i) Instantaneous power (ii) Average power (iii) Complex power applied to AC circuits.
- b) The supply voltage to a circuit is $v(t)=220\sqrt{2}\text{Sin}(wt)$ and the current drawn from it is $i(t)=14.14\text{Sin}(wt - 45^\circ)$. Find the Apparent, Active and Reactive powers.
6. a) Obtain the relation between Line and Phase quantities in a Star connected circuit.
- b) A 220V, 3-phase voltage is applied to a balanced delta connected 3-phase load of $(15+j20)$ ohms per phase. Find (i) Phasor current in each line (ii) Power consumed per phase and (iii) Phasor sum of three line currents and comment on it.
7. a) Distinguish between Statically induced emf and Dynamically induced emf.
- b) An iron ring of cross-sectional area of 10 cm^2 is wound with a wire of 1500 turns has a saw cut of 3mm air gap. Calculate the magnetizing current required to produce a flux of 0.25mwb if the mean length of the magnetic path is 50cm and relative permeability of 470 and the leakage factor is 1.2.
8. a) What are the advantages of three phase circuits? (4M)
- b) Give the Analogy between Electric and Magnetic circuits. (4M)
- c) Explain about the measurement of power in three phase circuits. (6M)

[B16 EE 1208]

[B16 ME 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
METALLURGY AND MATERIALS ENGINEERING
MODEL QUESTION PAPER
(Department Subject-Mechanical)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write a short answer to the following. [7x2 = 14 marks]
- a) Define lattice parameters.
 - b) Define Gibbs phase rule
 - c) Explain peritectic transformation
 - d) Define heat treatment
 - e) Write a short note on isothermal transformation curves
 - f) Define smart materials.
 - g) Write short notes on fiber composites.
2.
 - a) Discuss various types of defects in crystals?
 - b) Explain different crystal structures and find the atomic packing factor for BCC, and FCC structures.
3.
 - a) With a neat sketch explain iron-carbon phase diagram and label all its phases.
 - b) What is a phase diagram? And discuss the construction of phase diagrams.
4.
 - a) What are the different steps to construct isothermal transformation curves for a eutectoid steel and explain it.
 - b) Explain the Austempering and Martempering process.
5.
 - a) Define composite materials? Discuss briefly various reinforcements in composite materials.
 - b) Mention advantages, limitations and applications of particle- reinforced composites.
6.
 - a) Explain the composition and application of the following.
 - i) Hadfield Steels, ii) Tool Steels, iii) High Speed Steels
 - b) What are different types of cast irons and explain how malleable cast iron is produced.
7.
 - a) What are the different case hardening methods and explain Carburizing process.
 - b) Explain flame and Induction hardening process with neat diagram.

- 8 Write a short note on any THREE of the following
- a) Nano materials
 - b) Invariant reactions
 - c) Applications of composites
 - d) Concept of Slip and Twinning
 - e) Precipitation Hardening

[B16 ME 1208]

[B16 ENG 2101]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
MATHEMATICS-IV
MODEL QUESTION PAPER
(Common to CIV, ECE, EEE & ME)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

- 1 (a) Find a unit vector normal to the surface $x^3 + y^3 + 3xyz = 3$ at the point $(1, 2, -1)$.
(b) Show that $\text{Curl}(\text{grad } \phi) = 0$.
(c) Show that $\iiint_S \nabla r^2 \cdot d\vec{s} = 6V$.
(d) State two-dimensional Laplace equation in Cartesian coordinates. Define harmonic function.
(e) Find the analytic function whose real part is $x^3 - 3xy^2$.
(f) Evaluate $\oint_C \frac{z^2 - z + 1}{(z - 2)} dz$ where C is the circle $|z| = 1$.
(g) Find the nature and location of the singularities of the function $\frac{1}{(z - 1)^3}$.
- 2 (a) Find the directional derivative of $f = x^2 - y^2 + 2z^2$ at the point $P(1, 2, 3)$ in the direction of the line PQ where Q is the point $(5, 0, 4)$. Also calculate the magnitude of the maximum directional derivative.
(b) Prove that $\nabla^2 f(r) = f''(r) + \frac{2}{r} f'(r)$.
- 3(a) Show that $\vec{F} = (2xy + z^3)\vec{i} + x^2\vec{j} + 3xz^2\vec{k}$ is a conservative field. Find the potential function and hence the work done in moving a particle in this field from $(1, -2, 1)$ to $(3, 1, 4)$.
(b) Use Green's theorem to evaluate $\oint_C [(3x - 8y^2)dx + (4y - 6xy)dy]$ where C is the boundary of the region described by $x = 0, y = 0$ and $x + y = 1$
- 4 (a) Evaluate $\iiint_V \text{div } \vec{F} dv$ where $\vec{F} = y\vec{i} + x\vec{j} + z^2\vec{k}$ over the cylindrical region bounded by $x^2 + y^2 = 9, z = 0$ and $z = 2$.

(b) Find components of the vector field $z\bar{i} - z\bar{j} + y\bar{k}$ in cylindrical polar coordinates.

5 (a) Solve the equation $p y^3 + q x^2 = 0$ by the method of separation of variables.

(b) A tightly stretched string with fixed end points $x = 0$ and $x = l$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points a velocity $\lambda x(l-x)$, find the displacement of the string at any distance x from one end at any time t .

6 (a) If $f(z)$ is a regular function of z , prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4 |f'(z)|^2$.

(b) Find the bi-linear transformation which maps the points $z = 1, -1, \infty$ of the z -plane onto the points $w = 1+i, 1-i, 1$ of the w -plane. Hence find the critical points and the invariant points of this transformation.

7(a) Evaluate $\oint_C \frac{z^3 + z + 1}{z^2 - 7z + 2} dz$, where C is the ellipse $4x^2 + 9y^2 = 1$.

(b) Find the Laurent's expansion of the function $f(z) = \frac{1}{(1-z)(2-z)}$ valid for

(i) $0 < |z-2| < 1$ (ii) $|z-1| > 1$.

8 (a) Evaluate $\int_C \tan z dz$ where C is the circle $|z| = 2$.

(b) Use calculus of residues to evaluate $\int_0^{2\pi} \frac{\cos 3\theta}{5 - 4\cos\theta} d\theta$.

[B16 EE 2101]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
NETWORK ANALYSIS & SYNTHESIS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

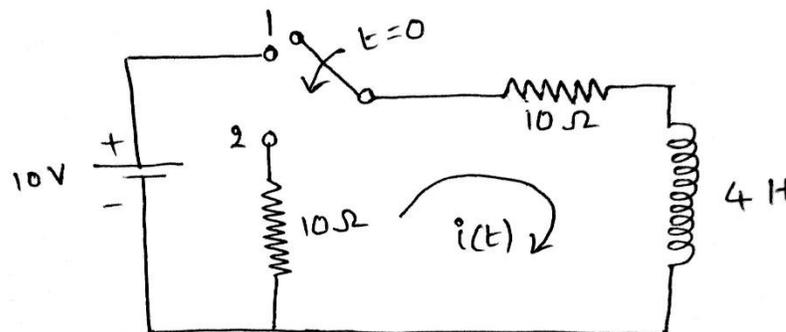
PART-A

(7*2=14M)

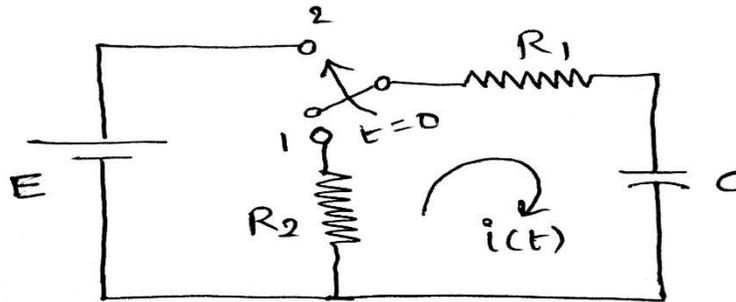
- 1.a) Distinguish between natural response and forced response.
- b) Write two properties of driving point functions.
- c) State final value theorem in Laplace domain.
- d) Define H-Parameter.
- e) Explain Dot convention for mutually coupled circuits.
- f) Write down the Hurwitz conditions for stability
- g) Write the Foster form of R-L network

PART-B

2. a) In the circuit shown below the switch K is moved from position 1 to 2 at $t=0$, the steady state condition being reached in position 1, Find the expression for $i(t)$ for $t>0$. (7M)



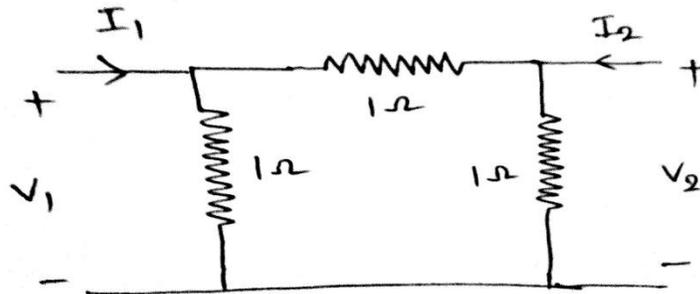
- b) Derive the expression for $i(t)$ when the switch is moved from position 1 to position 2 at $t=0$ in the circuit shown. The switch was in position 1 for a long time. (7M)



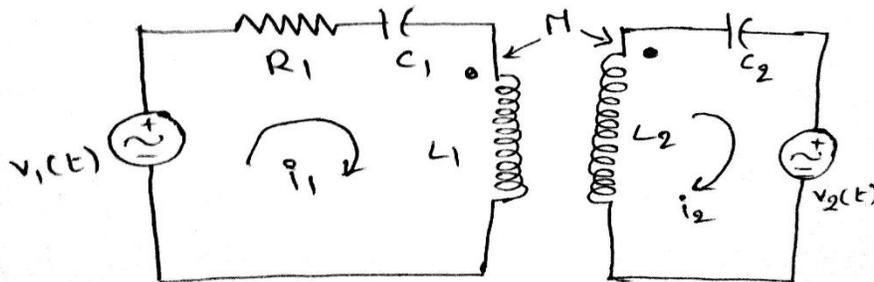
3. a) State and prove convolution theorem. (7M)

- b) A Series R-L-C circuit with $R=3\Omega$, $L=1H$, $C=0.5F$ is excited by a unit step voltage. Obtain the expression for the current $i(t)$ using Laplace transform method. Assume the circuit is initially relaxed. (7M)

4. a) Express ABCD-parameters in terms of Z-Parameters. Obtain the Z-Parameters of the network shown in figure. (7M)



- b) Write the loop equations for the network shown. (7M)



5. a) Determine whether the function $F(s) = \frac{(s^2+6s+5)}{(s^2+9s+14)}$ is positive real function? (7M)

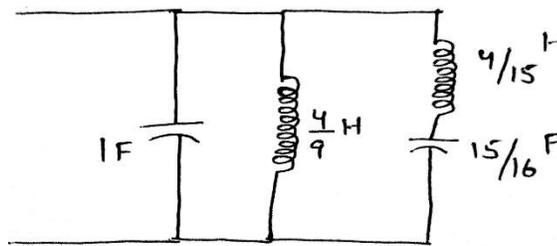
b) Test if the polynomial $s^4 + 8s^2 + 32$ is Hurwitz? (7M)

6. a) Find the Forster form 1 of the RL impedance function $Z(s) = \frac{(s+1)(s+4)}{(s+5)(s+3)}$ (7M)

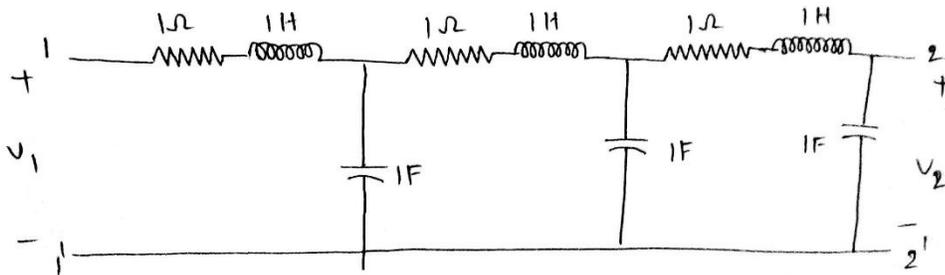
b) Draw the pole zero diagram of the impedance transformed function. (7M)

$$Z(s) = \frac{s(s^2+3)(s^2+7)}{(s^2+1)(s^2+5)}$$

7. a) Find the driving point impedance $Z(s)$ of the given network. (7M)



b) For the ladder network find the driving point impedance at 1-1' with 2-2' open. (7M)



8. a) Explain the concept of duality. (4M)

b) Explain the properties of driving point immittance functions. (6M)

c) A series RL circuit has a constant voltage V , applied at $t=0$. At what time does $V_R = V_L$ (4M)

[B16 EE 2102]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
ELECTRO MAGNETIC FIELD THEORY
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

1. a) What are the various types of charge distributions and explain briefly?.
- b) State coulomb's Law.
- c) Define Electric field intensity and Electric flux density.
- d) Show that $\nabla \cdot \bar{E}$ is zero for the field of a uniform line charge.
- e) Derive the relation between \bar{D} and \bar{E} .
- f) State Biot-savert's Law and explain briefly.
- g) Two straight parallel wires separated by 2 m carry 5A and 10 A current in the opposite direction in air. Find the force per unit length?
2. a) Derive an expression for Electric field intensity due to infinite line charge distribution?
- b) A $2 \mu\text{C}$ point charge is located at $A(4,3,5)$ in free space. Find $E_\rho, E_\phi,$ and E_z at $P(8,12,2)$
3. a) Derive an expression for Electric field intensity due to infinite sheet of charge distribution by using Gauss's law?
- b) Uniform line charges of 120nC/m lie along the entire extent of three coordinate axes. Assuming free space conditions. Find Electric field Intensity \bar{E} at $P(-3,2,-1)$.
4. a) State Gauss law and Derive an expression for the Gauss law in Integral form and point form.
- b) Starting from Gauss law as applied to the differential volume element, explain the concept of Divergence.

5. a) Define an electric dipole and derive an expression for \vec{E} due to electric dipole.
- b) Find the stored energy in a system of 4 identical charges of $Q = 4\text{nC}$ at the corners of a square of a 1m on a side?
- c) State and prove the Uniqueness theorem.
6. a) Derive an expression for a curl and applying Ampere's Circuital law to an incremental surface.
- b) Explain and derive the boundary conditions of electric field for a dielectric – dielectric medium
7. a) Write down the Maxwell's equations for time varying fields in integral and point form.
- b) Explain clearly why the expression is modified for the magnetic fields which vary with time and derive an expression for the modified Ampere's circuital law.
- 8 a) The magnetic field intensity of a uniform plane wave in air is 20A/m in the a_y direction. the wave is propagating in the a_z direction at a frequency of 2×10^9 rad/sec. Find (i) wave length (ii) frequency (iii) time period(iv) amplitude of \vec{E} .
- b) State and prove the Poynting theorem and derive an expression for Poynting theorem in integral and point form.

[B16 EE 2103]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
ELECTRICAL MEASUREMENTS & INSTRUMENTS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

1. (a) List sources of measurement error
(b) Write the principle of frequency meter
(c) What is the purpose of price gaurd wire bridge?
(d) what is wetson synchro scope?
(e) Define leakage factor in magnetic instrument.
(f) What is a potentiometer?
(g) What is phase angle error in potential transformer?
2. (a) Describe the working principle of moving coil ammeter
(b) Discuss various methods of producing controlling torque in indicating instruments
3. (a) Explain about campbell's De saulty's bridge.
(b) Explain about wein's bridge.
4. What do you understand by attraction type and repulsion type instruments? what is the importanace of deflecting torque in indicating instruments?
5. (a) Explain the working principle of balastic galvanometer
(b) Explain working principle of hibberts magnetic standard flux meter.
6. (a) Explain about determination of B-H curve using CRO
(b) Discuss about determination of leakage factor in magnetic measurements
7. (a) Write and explain working principle of AC.polar and co-ordinate type potentiometers
(b) Explain calibration of ammeters
8. Derive the Torque equation of Induction type instruments?

[B16 EE 2103]

[B16 EC 2104]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
ELECTRONICS DEVICES & CIRCUITS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1.
 - a. What is meant by diffusion current in a semi-conductor?
 - b. A silicon diode has a saturation current of 7.5 pA at room temperature to 300 °K. Calculate the saturation current at 400 ° K.
 - c. Derive the expression for ripple factor of half wave rectifier.
 - d. Draw the input and output characteristics of a transistor in CE configuration and mark the cutoff, saturation and active regions.
 - e. Compare JFET with MosFET
 - f. Write a short note on diode switching times
 - g. Draw the equivalent circuit of transistor for high frequencies

2.
 - a. Explain the current components in a PN junction diode and Derive the diode current equation.
 - b. Briefly explain about avalanche and zener breakdown.

3.
 - a. Explain about intrinsic and extrinsic semiconductors
 - b. write short note on (i) Hall effect (ii) continuity equation

4.
 - a. Explain the working of Bridge rectifier. Give the expressions for RMS current, PIV, ripple factor and efficiency.

 - b. A diode whose internal resistance is 20Ω is to supply power to a 100Ω load from 110V(rms) source supply. Calculate (i) peak load current (ii) the dc load current (iii) the ac load current (iv) the percentage regulation from no load to full load.

5.
 - a. Draw and explain the input and output characteristics of a transistor in CC configuration.
 - b. Refer to the figure 1 , determine the minimum value of I_B that produce saturation

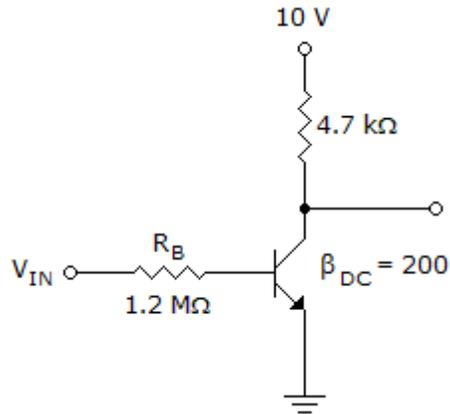


Figure 1

6. a. Explain with the help of neat diagrams, the structure of an N-channel FET and its Volt-ampere characteristics. In what ways it is different from a bipolar transistor.
 b. Describe the kind of operation that takes place in the enhancement mode MOSFET. How does this differ from depletion mode type?
7. a. Explain the performance of FET as a voltage variable resistor.
 b. Show that if a FET is operated at sufficiently low drain voltage, it behaves as a resistance R given by $R = R_0 / [1 - (V_{GS} / V_P)^2]$ Where R_0 is the channel resistance for zero gate voltage.
8. Write a short note on
 - a. Photo transistor
 - b. Tunnel diode
 - c. Diode capacitances

[B16 ME 2106]
II/IV B.Tech. DEGREE EXAMINATION
First Semester.
ENGINEERING MECHANICS & STRENGTH OF MATERIALS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

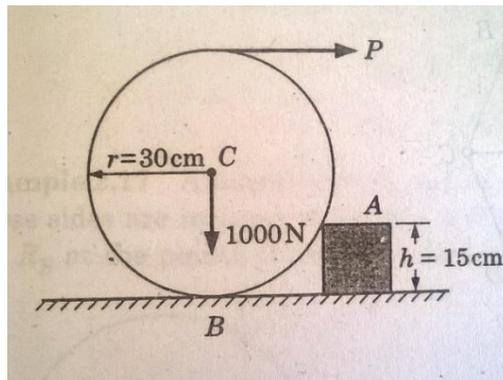
Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

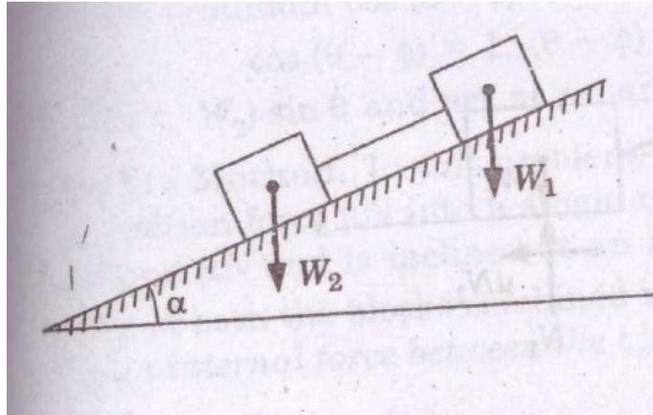
1. Answer the following questions
 - (a) State Lamé's Theorem. [2 M]
 - (b) State Laws of friction. [2 M]
 - (c) State Parallel axis theorem. [2 M]
 - (d) Differentiate Kinematics and Kinetics [2 M]
 - (e) Draw Stress-Strain curve for ductile materials [2 M]
 - (f) Write the flexural formula. [2 M]
 - (g) Explain various types of supports. [2 M]

2.
 - (a) State and prove the Varignon's theorem. [7 M]
 - (b) A uniform wheel of 60 mm diameter and weighing 1000 N rests against a rectangular block 15 cm high lying on a horizontal plane as shown in the figure below. It is to be pulled over this block by a horizontal force P applied to the end of a string wound round the circumference of the wheel. Find the force P when the wheel is just about to roll over the block. [7 M]

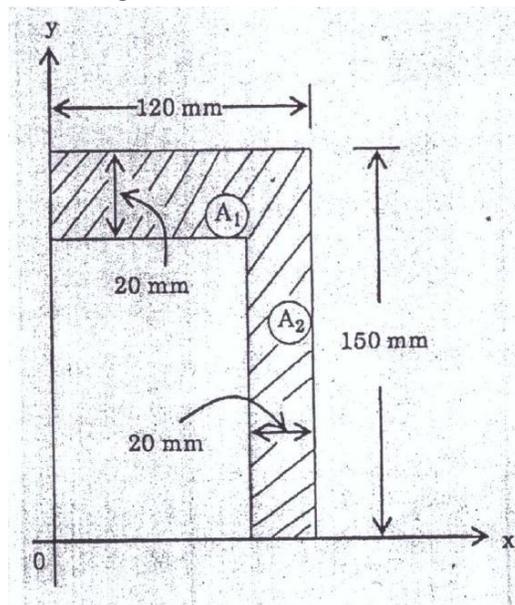


3.
 - (a) Determine the centroid of a triangle. [7 M]
 - (b) Two blocks of weight $W_1 = 50\text{ N}$ and $W_2 = 50\text{ N}$ rests on a rough inclined plane and connected by a string as shown in the figure below. The coefficient of friction between the inclined plane and W_1 and W_2 are $\mu_1 = 0.3$ and $\mu_2 = 0.2$ [7 M]

respectively. Find the inclination of the plane for which slipping will impend.



4. Find the Moment of Inertia of the area of the L- Section about the Centroidal X and Y axis as shown in the figure below. [14 M]



5. (a) State the Newton's laws of Motion. [7 M]
- (b) A particle is thrown with a velocity of 5 m/s at an elevation of 60° to the horizontal. Find the velocity of another particle thrown at an elevation of 45° which will have a) Maximum horizontal range b) Maximum equal height and c) equal time of flight. [7 M]
6. (a) Explain Shear force and Bending moment. [7 M]
- (b) Draw SFD and BMD for a simply supported beam carrying UDL. [7 M]
7. Derive the Torsional Equations and state the relevant assumptions made. [14 M]
8. A steel bar is 900 mm long; its two ends are 40 mm and 30 mm in diameter and [14 M]

the length of each rod is 200 mm. The middle portion of the bar is 15 mm in diameter and 500 mm long. If the bar is subjected to an axial tensile load of 15 kN. Find its total extension. Take $E = 200 \text{ GN/m}^2$ (where $1\text{G} = 10^9$).

[B16 EE 2201]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
ELECTRICAL MACHINES-I
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

- 1) a) Explain the application of DC series motor?
 - b) What are Interpoles ? What should be the polarity of the interpoles with respect to the main poles in a D.C Generator and in a D.C Motor.
 - c) Classify different types of DC generators?
 - d) Explain why equalizer bar is used for two D.C compound generator to operate in parallel.
 - e) Swinburne's test can be performed on dc series motor? If so why? If not why?
 - f) Mention cooling methods of transformers?
 - g) Draw the phasor diagram of single phase transformer with inductive load.
- 2) a) Derive the expression for torque in singly excited magnetic system?
 - b) A smooth core armature working in a 4 pole field magnet has a gap (iron to iron) of 0.5cm. The area of surface of each pole is 0.1m^2 . The ampere turns absorbed by each pole are 3000. Calculate:
 - i) Mechanical force exerted by each pole on the armature.
 - ii) Energy stored in the four air gaps.
- 3) a) Explain the phenomenon of commutation in DC machines and discuss the methods adopted for improving commutation.
 - b) A compensated generator has an inter pole air gap of 0.082m and a flux density in the inter pole air gap of 0.36T. The ratio of pole arc to pole pitch is 0.65. If the armature ampere turns per pole is 16200, determine the ampere turns per pole for the compensated winding and for inter pole winding.
 - c) A 6 pole machine has an armature with 90 slots and 8 conductors per slot and runs at 1000 rpm, the flux per pole is 0.05wb. Determine the induced emf if winding is
 - i) Lap connected
 - ii) Wave connected
- 4) a) Briefly describe the methods of speed control of DC shunt motor?
 - b) a 500 v dc shunt motor takes 8 amperes on no-load the armature and field resistances are 0.2 and 250 ohms respectively. Find the efficiency of the machine when running as a motor taking a current of 90 amperes from the supply.

- 5) a) What are the necessary conditions for parallel operation. Explain parallel operation of two shunt generators.
b) Explain the characteristics of dc series and shunt motor?
- 6) a) write the procedural steps to calculate the losses and efficiency of dc machine using Swinburn's test
b) In Hopkinson's test on two identical machines the following readings were obtained.
Line current: 460V, motor armature current: 300A, Field currents are 5A and 4.4A for motor and generator respectively. Calculate the efficiency of each machine.
- 7) a) Derive the approximate expression for regulation of a single phase transformer. Hence, obtain the condition for regulation to be maximum.
b) A 20 KVA 2500/250 v, 50 HZ, single phase transformer has following results:
O.C Test (L.V side): 250 v, 1.4 amp, 105 watts
S.C Test (H.V side): 104 v, 8 amp, 320 watts
Calculate the efficiency at full load and 0.8 pf lagging?
- 8) a) Explain the Scott-connection in three phase Transformer?
b) Two transformers A and B of different ratings but equal voltage ratios share a load of 500KVA at 0.8 p.f. Lagging at 400V by operating in parallel. Transformer A has a rating of 500KVA, resistance drop of 1.5% and reactance drop of 5%. Transformer B has a rating of 1000KVA, resistance drop of 1% and reactance drop of 4%. Calculate load shared by each transformer and the power factor at which it is working.

[B16 EE 2202]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
SIGNALS & SYSTEMS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

- 1 a) A continuous time LTI system is characterized by its impulse response $h(t) = a^t u(t)$. Determine whether the System causal and stable?
 - b) Determine the fundamental period for the given signal $h[n] = \text{Cos}((4\pi/17)n)$.
 - c) Explain briefly about (i) Time-shifting (ii) Time-scaling (iii) Time-inversion.
 - d) Find the energy of the given discrete time signal $h[n] = (0.6)^n u[n]$.
 - e) Derive the relation between Z- transform and Fourier transform ?
 - f) Explain briefly the methods of reconstruction of a continuous time signal from its samples?
 - g) What are the convergence conditions for the validity of the Fourier series?
-
- 2 a) Find the impulse response of a system described by the first order difference equation $y[n] + 2y[n - 1] = x[n]$. Assume the condition of initial rest.
 - b) Find the convolution sum for the following signals as:
$$x[n] = \alpha^n u[n] \text{ and } h[n] = \beta^n u[n].$$
-
- 3 a) Classify the Systems and Explain all the system properties with examples.
 - b) A discrete time LTI system has an impulse response $h[n] = a^n u[n + 2]$. Determine whether the system BIBO stable, Causal and memoryless?
-
- 4 a) A stable LTI system that is characterized by the differential equation
$$\frac{d^2 y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$
. Find the impulse response of the system?

- b) Find the Fourier transform for the signal $x(t) = t e^{-at} u(t)$ using frequency Differentiation property?
- 5 a) Show that for continuous time signals, the convolution of the two signals in time domain is equivalent to multiplication of their spectra in the frequency domain.
- b) Determine the transfer function for the system described by the difference equation $y[n] + 3y[n-1] + 2y[n-2] = 5x[n-1] + 2x[n-2]$. And find the pole-zero's of the above system.
- 6 a) Find the Fourier transform of the signal. $x(t) = e^{-2|t-1|}$.
- b) Find the best approximation of a signal $f(t) = t$ in terms of the signal $x(t) = \sin(t)$ over an interval $(-\pi \leq t \leq \pi)$.
- 7 a) a) Find the convolution integral of the following signals:

$$x(t) = \begin{cases} 1; & 0 < t < T \\ 0, & \text{otherwise} \end{cases} \quad \text{and} \quad h(t) = \begin{cases} t; & 0 < t < 2T \\ 0, & \text{otherwise} \end{cases}$$

- b) Determine the impulse response of the system described by the difference equation $y[n] - 3y[n-1] - 4y[n-2] = x[n] + 2x[n-2]$. Assume that the system is initially at rest.
- 8 a) Determine the inverse Z- transform of the following

$$H(z) = \frac{(3 - \frac{5}{6}z^{-1})}{(1 - \frac{1}{4}z^{-1})(1 - \frac{1}{3}z^{-1})}$$

- b) A signal $x(t) = \cos 5\pi t + 0.5 \cos 10\pi t$ is instantaneously sampled. Find the Maximum Interval of sampling rate from which the signal can be recovered and Find the discrete time signal.

[B16 EC 2206]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
ANALOG ELECTRONICS CIRCUITS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

1. [7x2=14 M]
- (a) List any two reasons for the need of cascading amplifiers.
 - (b) Draw the hybrid $-\pi$ model for a transistor in the CE configuration.
 - (c) Mention any four advantages of negative feedback.
 - (d) List the advantages of push pull class B amplifier.
 - (e) Classify Oscillators.
 - (f) Define slew-rate and input offset current for OP-AMP
 - (g) List the ideal characteristics of an OP-AMP.
2. (a) Derive expression for voltage gain (A_V) and current gain (A_I) for two stage RC coupled amplifier using low frequency model. State the assumptions clearly.
- (b) A transistor is connected as a CE amplifier with load resistance of $10K\Omega$. The parameters are $h_{ie}=5K\Omega$ and $h_{fe}=330$. Calculate the overall gain for mid frequency range when four such stages are connected in cascaded RC coupling. Assume $R_s=0$.
3. (a) An amplifier gain changes by $\pm 10\%$ using negative feedback amplifier is to be modified to yield gain of 100 with 0.1% variation. Find required loop gain and amount of negative feedback.
- (b) Derive expressions for voltage gain, input impedance and output impedance in case of voltage series feedback.
4. (a) Derive expressions for efficiency of class A power amplifier with
- (i) Resistive load (series fed)
 - (ii) Transformer coupled load.
- (b) Explain how harmonic distortion is reduced in a push-pull amplifier.
5. (a) Derive an expression for the frequency of oscillation of a RC phase shift oscillator. Determine the min h_{fe} for the transistor.
- (b) In a Colpitts oscillator $C_1 = 0.001 \mu F$ and $C_2 = 0.01 \mu F$ and $L = 5 \mu H$. Calculate

- (i) Frequency of oscillations
 - (ii) If 'L' is doubled, find the new frequency.
6. (a) A three stage double tuned amplifier system is to have a half power B.W. of 30 KHz centred on a centre frequency of 400 KHz. Assuming that all stages are identical, determine the half power B.W. of single stage. Assume that each stage coupled to get max. flatness.
- (b) Differentiate single tuned and stagger tuned amplifier.
7. (a) With the help of neat diagrams, explain the following applications of OP-AMP.
- (i) Differential amplifier.
 - (ii) Summing amplifier.
- (b) Design an OP-AMP circuit to give an output $V_o = 3/4 V_1 + 5/6 V_2 + 6/7 V_3$, where $V_1 = 1$ V, $V_2 = 2$ V and $V_3 = 3$ V.
8. (a) Explain the concept of "Virtual ground" for OP-AMPS and derive an expression for closed loop gain of inverting configuration of OP-AMP.
- (b) Define the following Op Amp parameters: (i) CMRR, (ii) PSRR and (iii) I/P Bias Current.

[B16 ME 2204]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
PRIMEMOVERS & PUMPS
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Answer the following questions
 - (a) Differentiate between the impulse and reaction turbine. [2 M]
 - (b) What is meant by slip and negative slip. [2 M]
 - (c) Define overall efficiency of a centrifugal pump. [2 M]
 - (d) Define unit speed, unit power and unit discharge of the turbine. [2 M]
 - (e) Explain various processes on a Rankine Cycle. [2 M]
 - (f) Differentiate four stroke and two stroke cycle. [2 M]
 - (g) What are advantages of gas turbines? [2 M]

2.
 - (a) Explain the working principle of a pelton turbine with neat sketch. [7 M]
 - (b) A jet of water having velocity of 30 m/sec strikes a curved vane which is moving with velocity of 15 m/sec. The jet makes an angle 30° with the direction of the motion of vane at inlet and leaves at an angle 60° to the direction of motion of vane at outlet. Assume vanes are perfectly smooth and calculate: (i) vane angle at inlet & outlet; (ii) workdone/sec per unit mass/sec. [7 M]

3.
 - (a) Explain the characteristics curves of pumps. [7 M]
 - (b) A centrifugal pump is to discharge $0.12 \text{ m}^3/\text{sec}$ at a speed of 1440 rpm against a head of 30 m. The diameter and width of impeller at outlet are 25 cm and 5 cm. The manometric efficiency is 75%. Find the vane angle at outlet. [7 M]

4.
 - (a) Define specific speed of a turbine and obtain the equation for it. [7 M]
 - (b) A Kaplan turbine working under head of 29 m develops 1287.57 kW shaft power, the coefficient of flow velocity is 0.62. Diameter of boss is 0.34 times of diameter of runner and overall efficiency is 89%. Find the diameter of runner and speed of the turbine. Take $C_u = 0.45$. [7 M]

5.
 - (a) Derive the equation for work done by the impeller of a centrifugal pump. [7 M]
 - (b) A double acting reciprocating pump running at 40 rpm is discharging 1 m^3 of water per minute. The pump has a stroke of 400 mm. The diameter of the piston is 200 mm. The delivery and suction head are 20 m and 5 m respectively. Find

the slip and power required to drive the pump.

6. (a) Compare Otto, Diesel and Dual cycles for the same compression ratio. [7 M]
(b) Differentiate between petrol and diesel engine. [7 M]
7. (a) List the methods that used in reducing the speed of the turbine rotor. [7 M]
(b) Derive an expression for simple impulse turbine [7 M]
- 8 (a) Explain about simple closed cycle gas turbine. [7 M]
(b) In a gas turbine the compressor is driven by the high pressure turbine. The exhaust from the high pressure turbine goes to a free low pressure turbine which runs the load. The air flow rate is 20 kg/sec and the minimum and maximum temperature are respectively 300K and 1000K. The compressor pressure ratio is 4. Calculate the pressure ratio of the low pressure turbine and the temperature of exhaust gases from the unit. The compressor and turbine are isentropic. C_p of air and exhaust gases = 1 KJ/Kg – K and $\gamma = 1.4$. [7 M]

[B16 EE 2203]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
ELCTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION
MODEL QUESTION PAPER
ELECTRICAL ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only.

1.
 - a) What is water hammering effect? How to eliminate it?
 - b) What is the difference between load curve & load duration curve?
 - c) Draw the 1-line diagram of A.C Power supply system.
 - d) What is the importance of Inter-Connector in Distribution system?
 - e) Define GMR and GMD.
 - f) Explain SKIN EFFECT.
 - g) Why the Capacitance effect is neglected in the Short Transmission line?
 - h) Write the Importance of String Efficiency.

2.
 - a) Draw the schematic diagram of thermal power plant and explain its components.

 - b) What are the different types of tariffs and explain each one.

3.
 - a) Explain radial and ring main distribution systems and also write advantages and disadvantages of each with neat sketch.

 - b) A ring main can be considered to be a Quadrilateral whose perimeter is 300m. The system is fed at a point A at 240V. Loads are taken off the points B, C and D and are 100A, 70A, and 50A res. If AB= 70m, DC = 90m and CB = 80m and the resistance of each conductor is $0.2 \Omega/\text{Km}$, find the voltage at points B and C.

4.
 - a) State Kelvin's law and write its limitations.

 - b) A 2-wire feeder carries a constant current of 250A throughout the year. The portion of capital cost which is proportional to the area of cross-section is RS 5 per Kg of the copper conductor. The interest and depreciation per annum and the cost of energy is 5Paise per kWh. Find the most economical cross sectional area of the conductor. Given that the density of copper is $8.93\text{gm}/\text{cm}^3$ And its Resistivity is $1.73 \times 10^{-8} \Omega\text{-mt}$.

5. a) Derive the necessary equations and draw the vector diagrams for a Middle - condenser method of Medium Transmission line and derive A,B,C & D constants.
- b) Derive the expression of Inductance for a 1-phase transmission line.
6. a) Describe the methods of equalizing the potential distribution across a string of suspension insulators.
- b) A Transmission line has a span of 214m between the level supports. The conductors have a cross-section area of 3.225 square-cm. Calculate the safety factor under the following conditions-
Vertical sag: 2.35m; wind pressure: 1.5 Kg/m run Breaking stress: 2540Kg/ square-cm
Weight of conductor : 1.125 Kg/m.
7. a) Explain Capacitance and Intersheath Grading of cables.
- b) In a 5 insulator disc string, capacitance between each unit and earth is 1/6 of the mutual capacitance. Find the voltage distribution across each insulator in the string has a percentage of the voltage of the conductor to earth. Find the string efficiency.
8. a) Compare HVDC & EHV-AC Transmission.
- b) What is mean by **Bundling** Conductors? Write the Advantages of Bundled conductors.
- c) Explain String Chart.

[B16 EE 2203]

[B16 ENG 2201]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester.
ENVIRONMENTAL STUDIES
MODEL QUESTION PAPER
(Common to ECE,EEE& ME)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsorily.
Answer any FOUR questions from the 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) Give the objectives of Environmental Studies
- (b) Define ecosystem
- (c) What are hotspots?
- (d) What is soil erosion?
- (e) What is sustainable development?
- (f) State the practical benefits of watershed management
- (g) What is biomagnifications movement?

2. Write about structure and function of forest ecosystem

3. Give an account of the various energy resources of India and their merits and demerits.

4. Give the bio-geographical classification of India and add a brief note on threats to biodiversity

5. Explain causes, effects and control measures of water pollution

6. Write a critical account of the effect of population growth on environment.

7. Give an account of rain water harvesting and watershed management with suitable example

8. Write short notes:

- a) Conflicts of water
- b) Effect of modern agriculture
- c) Noise pollution
- d) Solid waste management

[B16 ENG 2201]

[B16 EE 3101]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
ELECTRICAL MACHINES-II
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Draw the equivalent circuit of a single phase induction motor based on double field revolving theory. 2M
 - b. What do you understand by the terms, normal excitation, and over excitation with synchronous motor operation? 2M
 - c. What are the speed control methods of a squirrel cage induction motor? 2M
 - d. Define the infinite bus. 2M
 - e. Explain the hunting process. 2M
 - f. Define synchronizing power. 2M
 - g. What is synchronous condenser? What are its applications? 2M

2.
 - a. Discuss various starting methods adopted for a delta connected squirrel cage induction motor. 7M
 - b. A 3 - Φ , 4 pole, 50Hz, induction motor has a rotor resistance of 0.1Ω and standstill rotor reactance of 0.8Ω / phase. If the full load slip is 5%, determine the full load torque as a percentage of maximum torque. What should be the value of external rotor resistance per phase to give half the maximum torque at starting? 7M

3.
 - a. Describe the construction, principle of operation and applications of a split phase induction motor. 7M
 - b. Explain the principal of operation of a single phase induction motor by double field revolving theory. 7M

4.
 - a. Briefly explain the significance of pitch factor and Distribution factor. Develop the Voltage equation for a synchronous machine having fractional pitch with distributed winding. 7M
 - b. A 3 phase, star connected synchronous generator driven at 750rpm is required to generate a line to line voltage of 440V at 50HZ on open circuit. The stator is wound with 2slots per pole per phase and each coil has 4 turns. Calculate the useful flux per pole. 7M

5.
 - a. Explain ampere turns or MMF method for determining voltage regulation. 7M

- b. A 15,000 KVA, 6600 volts, 3 ϕ , star connected synchronous generator with armature resistance of 0.4Ω and synchronous reactance of 6Ω /phase delivers full load current at a pfof 0.8 lag with rated voltage. Estimate the terminal voltage for the same excitation and load current at 0.8 pf leading. 7M
6. a. Explain the working of a synchronous motor for constant power and varying excitation. Also draw the phasor diagram. 7M
- b. A 3300v, star connected synchronous motor is operating at constant terminal voltage and constant excitation. Its synchronous impedance is $0.8+j5 \Omega$.It operates at a power factor of 0.8 leading when drawing 800KW from the mains. Find its power factor when the input is increased to 1200KW,excitation remaining constant. 7M
7. a. Develop the vector diagram based on two reactions theory for a salient pole alternator 7M
- b. A 2MVA, 3 ϕ , star connected 8 pole 750 rpm alternator is operating on 6000 volts busbars. X_s is 6Ω /phase. Find the synchronizing power and torque per mechanical degree of displacement for full load at 0.8 pf lagging. 7M
8. a. Why does a synchronous motor require some extra arrangement for starting? Explain any one method of starting. 7M
- b. How to determine X_d and X_q by conducting slip test. 7M

[B16 EE 3101]

[B16 EE 3102]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
POWER SYSTEM ANALYSIS AND STABILITY
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

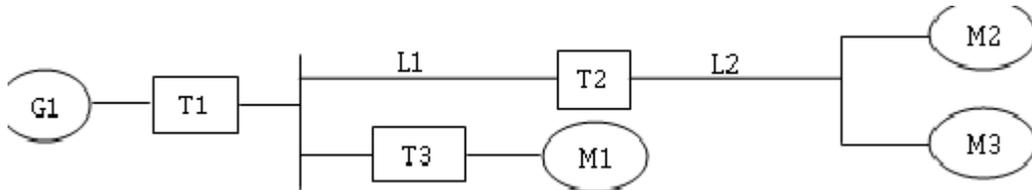
Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.
 Answer any FOUR questions from the remaining.
 All Questions Carry equal marks
 All parts of a question must be answered at one place only

1. Explain the following.
 - a. What is one line diagram? How the power system components are represented for it? 2M
 - b. What is the need for load flow study? 2M
 - c. What is bus impedance matrix? Mention its importance. 2M
 - d. What is the need for short circuit study (or) fault analysis? 2M
 - e. Define negative sequence and zero sequence components. 2M
 - f. Distinguish between steady state and transient stability. 2M
 - g. Give the expression for swing equation and explain each term along with their units. 2M

2. a. Show that the per unit equivalent impedance of a two winding transformer is the same whether the calculations is made from H.V. side or the L.V. side. 7M
- b. The single line diagram of a power system is shown in figure. Obtain the p.u reactance diagram. $G1=50\text{MVA}, 11\text{KV}, X''=15\%$; $M1=15\text{MVA}, 13\text{KV}, X''=12.5\%$ $M2, M3=20\text{MVA}, 12\text{KV}, X''=13\%$ each. ; $T1, T2=30\text{MVA}, 11\text{KV}/132\text{KV}, X=11\%$ each. ; $T3=25\text{MVA}, 13\text{KV}/115\text{KV}, X=12\%$. ; $L2, L1=50\Omega$ each. Select 50 MVA, 11 KV in G1 as base values 7M



3. a. Compare the load flow techniques 7M
- b. Explain the step by step computational procedure for the Newton-Raphson method of load flow studies. 7M

4. For the power system shown in figure the impedances are given as in the table. Calculate voltages at the end of 1st iteration using G-S method for the following schedule 14M

Bus No.	Type	Generation		Load		Voltage magnitude	Reactive power limit		Line Data (P.U)	
		P	Q	P	Q		Q_{min}	Q_{max}		
1	Slack	-	-	-	-	1.0	-	-	1-2	$0.08+j*0.24$
2	PV	5.32	-	-	-	1.1	-0.25	0.25	2-3	$0.002+ j*0.06$
3	PQ	-	-	3.64	0.53	-	-	-	1-3	$0.06+j*0.18$

5. a. What are the various types of faults? Find the fault current when an L-L-G fault occurs at the terminals of an unloaded generator. 7M
- b. Derive an expression for the positive sequence current I_{a1} of an unloaded generator when it is subjected to a double line to ground fault. 7M
6. a. Describe the various types of current limiting reactors used in power system. 7M
- b. Two 5 MVA, 50 Hz, 11 kV alternators with subtransient reactance $X'' = 0.1$ p.u and a transformer of 40 MVA, 11/66 kV and reactance of 0.08 p.u are connected to a bus A. another generator rated 60 MVA, 11 kV with a reactance of 0.12 p.u is connected to a bus B. both A and B are interconnected through a reactor of 80 MVA, 20% reactance. If a 3-phase fault occurs on the H.V side of the transformer, calculate the current fed into the fault and fault MVA. 7M
7. a. Mention various methods of which transient stability can be improved 7M
- b. Derive an expression for point by point method for the solution of swing equations. What are its short coming? Explain. 7M
8. a. State and explain equal area criterion. How do you apply equal area criterion to find the maximum additional load. 7M
- b. A generator operating at 50 Hz delivers 1.0 p.u power to an infinite bus through a transmission circuit in which resistance is neglected. A fault take place reducing the maximum power transferable to 0.5 p.u. whereas before the fault fair power was 2.0 p.u and after the clearance of the fault, it is 1.15 p.u. by the use of equal area criterion, determine the critical clearing angle. 7M

[B16 EE 3102]

[B16 EC 3105]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
LINEAR INTEGRATED AND PULSE CIRCUITS
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. What is Linear Wave shaping. 2M
 - b. Draw the V to I and I to V converter. 2M
 - c. Draw the precision rectifier circuit diagram. 2M
 - d. What are the advantages of active filters over passive filters. 2M
 - e. What is the principle of oscillators and Classify Oscillators. 2M
 - f. State Clamping Circuit Theorem. 2M
 - g. Define Settling time and transition time in a BistableMultivibrator. 2M

2.
 - a. Explain Instrumentation Amplifier in detail. 7M
 - b. Explain Sample and Hold Circuit with neat sketches. 7M

3.
 - a. Design a 1st order LPF and HPF and draw its output response. 7M
 - b. Design RC phase shift oscillator for $f = 1\text{KHz}$.. 7M

4.
 - a. Explain operation of Astable multi-vibrator configured around IC 555 timer and derive expression for output voltage 7M
 - b. Explain three terminal IC voltage regulators. 7M

5.
 - a. Using relevant diagrams and wave forms explain the response of a low Pass RC circuit to Square input. Obtain the expression for its output voltage. 7M
 - b. Explain the principle of clamping and also discuss the need for shunt resistor in parallel with the diode in the basic clamping circuit. 7M

6.
 - a. Design a Bistable multi vibrator with following specifications. $V_{CC} = V_{BB} = 10\text{V}$, $I_C(\text{sat}) = 5\text{mA}$, $h_{fe}(\text{Min}) = 25$, and Maximum Trigger frequency of 25KHz . 7M
 - b. Explain the operation of an Collector Coupled AstableMultivibrator Using relevant Diagrams. 7M

7.
 - a. Explain the operation of Double Clippers with and without bias. 7M
 - b. Explain the operation of an Regenerative comparator with circuit diagram and Waveforms. If $R_1 = 50\text{K}\Omega$, $R_2 = 100\Omega$, $\pm V_{sat} = \pm 14\text{V}$, $V_{ref} = 0.2\text{V}$ and $V_{in} = 1\text{V}(p-p)$ 7M
Find the values of V_{UT} and V_{LT} .

8. Write a short note on
 - a. Switched Capacitance Filters. 5M
 - b. Role of Commutating Capacitors in Multivibrators. 5M
 - c. Transistors As a Switch. 4M

[B16 EC 3105]

[B16 EE 3103]
 III/IV B.Tech. DEGREE EXAMINATION
 First Semester
CONTROL SYSTEMS
 MODEL QUESTION PAPER
 (Common to ECE & EEE)

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Write short notes on the following:
 - a. Define 'Transfer Function' of an LTI system. 2M
 - b. What are the typical test input signals? Which one is used mostly?. 2M
 - c. The unit-impulse response of a system is $g(t)=20e^{-10t}$. Write the system transfer function in time constant form. 2M
 - d. The open-loop transfer function of a unity feedback control system is 2M

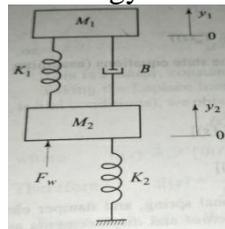
$$G(S) = \frac{25}{S(S+5)}$$

What is the SS error for unit ramp input?
 - e. What is the advantage of 'Derivative control' action? 2M
 - f. 2M

$$G(S)H(S) = \frac{1}{S^2(1+S\tau)}$$

Sketch the polar plot for
 - g. State 'Nyquist stability criterion' 2M

2.
 - a. Compare open-loop and closed loop systems 7M
 - b. Determine the transfer function $Y_1(s)/F_w(s)$ of the system Shown in below. Also obtain its electrical analog based on f-v analogy. 7M



3.
 - a. Obtain the signal flow graph for the following electrical system and then find its transfer function using Mason's gain rule. 7M

$$\begin{array}{c} \text{---} R \text{---} \\ | \\ \text{---} R \text{---} \\ | \\ C \\ | \\ \text{---} \\ | \\ C \\ | \\ \text{---} \end{array}$$
 - b. A unity feedback system is characterized by an open-loop transfer function $G(s) = \frac{K}{S(S+10)}$. Determine the value of gain K such that the system has a damping ratio of 0.5. With this value of K, find the settling time and percent overshoot of unit-step response. 7M

4. a. Derive the expression for unit-step response of a standard second-order system which is under-damped. 7M
 b. Using R-H criterion, find the range of K for the closed loop system to be stable. The 7M
 open loop transfer function of the system is $G(S)H(S) = \frac{K}{S(S+1)(S+2)}$
5. Obtain the Root-locus for the system with $G(S)H(S) = \frac{K}{S(S+4)(S^2+4S+8)}$. 14M
 What value of K makes the closed loop system marginally stable?
6. Draw the Bode plots for the system having $G(S)H(S) = \frac{10}{S(1+0.02S)(1+0.2S)}$. 14M
 Determine the Gain Margin and Phase Margin.
7. Draw Nyquist diagram and determine the stability of a control system with open-loop 14M
 transfer function $G(S)H(S) = \frac{3}{S(S+1)^2}$.
8. Write short notes on the following
 a. Frequency Domain specifications 4M
 b. Steady-state Errors and Integral Control 5M
 c. Constant M and N circles. 5M

[B16 EE 3103]

[B16 EE 3104]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
DIGITAL ELECTRONICS & LOGIC DESIGN
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. What are the three methods of obtaining the 2's complement of a given binary number? 2M
 - b. State and prove the following laws of Boolean algebra. 2M
i) Commutative ii) associative
 - c. Draw and explain active low S-R latch. 2M
 - d. Difference between combinational and sequential logic circuits? 2M
 - e. What is a PLD? What is the principal advantage of a PLD? 2M
 - f. What is race around condition in JK flip flop? 2M
 - g. What are universal gates? Why they are called so? 2M

2.
 - a. Convert the following to Decimal and then to octal 7M
(i) (125F)₁₆ (ii) (10111111)₂ (iii) (392)₁₀
 - b. How do you convert a gray number to binary? Generate a 4-bit gray code directly using the mirror image property? 7M

3.
 - a. Reduce using mapping the following expression and implement the real minimal expression in Universal logic. 7M
 $F = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 15)$
 - b. Perform the realization of half adder and full adder using decoders and logic gates 7M

4.
 - a. Convert a D flip flop into SR flip flop and JK flip flop? 7M
 - b. What is difference between latch and flip flop? Explain about clocked RS flip flop using NAND gates 7M

5.
 - a. Design a MOD-8 synchronous up counter using JK flip flop 7M
 - b. Explain about shift registers. 7M

6.
 - a. What is a PLD? Compare the three combinational PLDs? 7M
 - b. Design an Excess-3 to BCD code converter using a PLA? 7M

7.
 - a. List out the comparisons of TTL, RTL and ECL logic families 7M
 - b. Realize NAND Gate using TTL Logic 7M

8.
 - a. Design a full adder with two half adders and basic gates. 7M
 - b. Design a BCD to excess_3 code converter. 7M

[B16 EE 3104]

[B16 EE 3105]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
COMPUTER ARCHITECTURE AND ORGANISATION
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Explain in brief register transfer language. 2M
 - b. Discuss about an instruction code of a general computer. 2M
 - c. Compare immediate direct and an indirect address instruction with an example. 2M
 - d. Convert the following arithmetic expression from reverse polish notation into infix notation. $ABC*/D-EF/+$ 2M
 - e. Draw the block diagram for RAM and ROM chips of a general computer. 2M
 - f. Compare isolated I/O and memory mapped I/O 2M
 - g. Write in brief about control memory. 2M

2.
 - a. Write the advantages of bus transfer? Draw a block diagram of a basic computer showing how data can be transferred from any of the 8 - bit register to a common bus by explaining its action? 7M
 - b. Explain why each of the following micro operations cannot be executed during a single clock pulse in the system. Specify a sequence of micro operations that will perform the operation. 7M
 - i) $AC \leftarrow AC + TR$
 - ii) $DR \leftarrow DR + AC$ (AC does not change)

3.
 - a. Write the sequence of micro operations and draw the flow chat of interrupt cycle in a basic computer? 7M
 - b. Describe the sequence of signals that occur on address bus, control bus and the data bus when a computer fetches an instruction. 7M

4.
 - a. Explain about a stack as memory of a computer with an example? 7M
 - b. Explain about various addressing modes of a basic computer. 7M

5.
 - a. Distinguish between virtual memory and cache memory. 7M
 - b. Explain associate memory. 7M

6.
 - a. Explain parallel priority interrupt and daisy chain interrupt with examples. 7M
 - b. Explain about handshaking method. 7M

7.
 - a. Difference between micro programmed control and hardwired control. 7M
 - b. Write a step by step procedure of designing a control unit. 7M

8. Explain about
 - a. DMA 7M
 - b. Address sequencing. 7M

[B16 EE 3105]

[B16 CS 3109]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
DATABASE MANAGEMENT SYSTEMS
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. How do you convert ER diagram with two entity sets and one-to-many relationship to tables 2M
 - b. Construct SQL statement for finding number of employees in each department in emp table 2M
 - c. Construct SQL statement for displaying salaries of employees in descending order in emp table 2M
 - d. Write SQL command for creating dept(deptno,dname,loc) table 2M
 - e. Construct SQL statement to display employees' names starting with letter S 2M
 - f. Create a trigger to ensure marks of students between 0 to 100 in marks table (sno,smarks) 2M
 - g. What are ACID properties 2M
2. Explain the advantages of DBMS 14M
3. Demonstrate the usage of nested queries and different kinds of joins 14M
4. Demonstrate the features of ER model 14M
5. Summarize different normal forms upto BCNF with examples 14M
6. Explain different variations of 2PL 14M
7. Explain ARIES with illustrations. 14M
8. Explain Loss-less join and dependency preserving decompositions 14M

[B16 CS 3109]

[B16 EE 3106]
 III/IV B.Tech. DEGREE EXAMINATION
 First Semester
DIGITAL SIGNAL PROCESSING
 MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. What is zero padding? What are its uses? 2M
 - b. What is the DFT of unit impulse $\delta(n)$? 2M
 - c. If z-transform of $x(n)$ is $X(z)$ then what will be the transform for $a^n x(n)$ 2M
 - d. Derive formula for DFS periodic convolution of two sequences of same length 2M
 - e. Give some applications of digital signal processing. 2M
 - f. Give Chebyshev filter transfer function. Distinguish between the frequency responses of chebyshev type 1 and type 2 filters. 2M
 - g. Find circular convolution of two finite duration sequences $x_1(n) = \{1, -1, -2, 3, -1\}$, $x_2(n) = \{1, 2, 3\}$. 2M

2. a. Check whether the system characterized by $y(n) = \frac{1}{x(n-1)} + 2x(n)$ is linear, Time-Invariant, causal, static. 7M
 b. Given second order filter 7M

$$y(n) = 2r \cos(\omega_0) y(n-1) - r^2 y(n-2) + x(n) - r \cos(\omega_0) x(n-1)$$
 Test the stability

3. a. Determine the z-transform and ROC of the given signal 7M

$$x(n) = \left(\frac{1}{2}\right)^n u(n) - \left(\frac{1}{3}\right)^n u(-n-1)$$
 b. Find Inverse z-transform of $X(Z) = \frac{z}{z^2 + \frac{1}{12}z - \frac{1}{12}}$ by convolution method 7M

4. a. Determine the frequency response $H(e^{j\omega})$ for the system and plot the magnitude and phase response 7M

$$h(n) = \frac{1}{3} \text{ for } 0 \leq n \leq 2$$

$$1 \text{ otherwise}$$
 b. Prove that convolution in time domain leads to multiplication in frequency domain for the discrete time signals 7M

5. Compute IDFT of the sequence 14M

$$X(K) = \{7, -0.707 - j0.707, -j, 0.707 - j0.707, 0.707 + j0.707, j, -0.707 + j0.707\}$$

6. Design a digital low pass Butterworth filter such that pass band magnitude is constant to within 1dB for frequencies below 0.2π and stop band attenuation is greater than 15dB for frequencies between 0.3π and π . (bilinear or impulse invariant) 14M

$$20 \log_{10} |H(e^{j0.2\pi})| \geq -1 \text{ and } 20 \log_{10} |H(e^{j0.3\pi})| \leq -15$$

7. Obtain cascade realization of the following system 14M
- $$H(Z) = \frac{(1 + \frac{3}{2}z^{-1} + \frac{1}{2}z^{-2})(1 - \frac{3}{2}z^{-1} + z^{-2})}{(1 + z^{-1} + \frac{1}{4}z^{-2})(1 + \frac{1}{4}z^{-1} + \frac{1}{2}z^{-2})}$$

8. Design a filter with $H_d(e^{j\omega}) = e^{-j3\omega}$ $-\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4}$ 14M
 $= 0$ $\frac{\pi}{4} \leq \omega \leq \pi$ Using hamming window with
 N=7

[B16 EE 3106]

[B16 EE 3201]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
ADVANCED CONTROL SYSTEMS
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Distinguish between D.C and A.C tachometer 2M
 - b. What is null position in synchro? Give the applications of synchro. 2M
 - c. Define State and state variables 2M
 - d. Define Z-transform 2M
 - e. Distinguish between lead and lag compensation 2M
 - f. Write the properties of state transition matrix. 2M
 - g. What are the conditions to be fulfilled for state controllability and observability? 2M

2.
 - a. Derive the transfer function of armature controlled D.C servomotor? 7M
 - b. Explain the principle and operation of stepper motor? Write its applications in control systems? 7M

3.
 - a. Obtain the state variable representation in diagonal form for the system with transfer function 7M

$$\frac{C(s)}{U(s)} = \frac{2}{s^3 + 6s^2 + 11s + 6}$$
 and obtain state transition matrix?
 - b. Investigate the controllability and observability condition for the following system. 7M

$$\dot{x}(t) = [-11 \ 0 \ -1]X(t) + [0 \ 1]U(t)$$

$$y(t) = [1 \ 1]X(t)$$

4.
 - a. Find the Z- transform of the following functions 7M
 (i) $f(t) = \sin \omega t$
 (ii) $f(t) = t$
 - b. Find the inverse z-transform of $F(z) = \frac{z^2 - 0.5z - 0.2}{z^2 - 0.2z}$ 7M

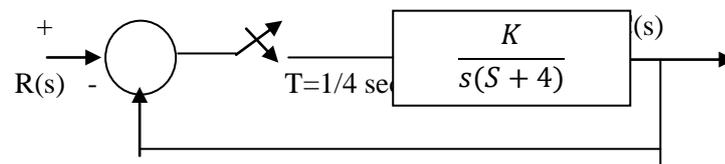
5.
 - a. The forward path transfer function of a certain unity feedback control system is given by 14M

$$G(s) = \frac{k}{s(s+2)(s+8)}$$
 Design a suitable lag compensator so that the system meets following specifications
 (i) Percentage Overshoot $\leq 16\%$ for unit step input (ii) Steady state error ≤ 0.125 for unit ramp input.

6.
 - a. Explain Jurys stability test 7M
 - b. Check if all the roots of the following characteristic equation lie within the unit circle or not 7M

$$z^3 - 0.2z^2 - 0.25z + 0.05 = 0$$

7. a. In the mapping $Z = e^{Ts}$ Prove that a stable analog system results in a stable digital system 7M
 b. Consider the system shown in fig below. Using bilinear transformation determine the value of K such that the system is stable 7M



8. Write a short notes on following:
- a. Magnetic Amplifier 5M
 - b. Methods for inverse Z-transforms 5M
 - c. Bilinear Transformation 4M

[B16 EE 3201]

[B16 EE 3202]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
POWER ELECTRONICS
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Explain Briefly why snubber circuit is necessary to SCR. 2M
 - b. Explain Why a positive signal is needed to fire an SCR . 2M
 - c. Differentiate between R & RC Triggering circuits. 2M
 - d. Classify choppers and give its applications. 2M
 - e. Distinguish between series and parallel inverters. 2M
 - f. Distinguish between circulating and non-circulating modes of operation of cyclo converter. 2M
 - g. Explain why thyristor should be connected in series and parallel. 2M
2.
 - a. Draw the two transistor model of an SCR and explain how such model of an can be used to describe the working of SCR. 7M
 - b. Explain necessity of connecting SCR's in series. 7M
3.
 - a. Discuss the mechanism of turn-off of a SCR using Resonant pulse commutation. 7M
 - b. Explain turning –ON of SCR using UJT triggering circuit. 7M
4.
 - a. Draw the circuit diagram of 1- \emptyset semi converter with RL load and explain its operation. Also draw the output current and voltage waveforms. 7M
 - b. For a 3- \emptyset fully controlled SCR bridge converter operating from 3- \emptyset ,400 volts,50 hzsupply. Calculate the average D.C output voltage for a firing angle of 45° . 7M
5.
 - a. Explain step up cycloconverter with a circuit diagram and neat output voltage waveforms. 7M
 - b. Draw the circuit diagram and output voltage waveform of 1- \emptyset A.C voltage controller with RL load. Derive the expression for output voltage waveform. 7M
6.
 - a. Explain 3- \emptyset bridge inverter for 180° mode of operation with circuit diagram and related waveforms 7M
 - b. Explain harmonic reduction methods in inverter output voltage. 7M
7.
 - a. Draw the basis structure of V-I characteristics of power IGBT and Explain. 7M
 - b. Explain with circuit diagram and related waveforms of 3- \emptyset full converter with RL load. 7M
8.
 - a. Explain step up chopper with circuit diagram and related waveforms 7M
 - b. Explain the principle of operation of 1- \emptyset full bridge inverter. 7M

[B16 EE 3202]

[B16 ENG 3201]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
PRINCIPLES OF ECONOMICS AND MANAGEMENT
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Micro & Macro Economics 2M
 - b. Oligopoly 2M
 - c. Public Enterprises types 2M
 - d. Functions of HR Manager 2M
 - e. Plant Location 2M
 - f. Functions of Marketing 2M
 - g. Phases of installing a project 2M

2.
 - a. What is Law of Demand? What are its Assumptions and Exceptions? 7M
 - b. What is utility? Explain the Law of diminishing marginal utility and its limitations. 7M

3.
 - a. What is Market? Explain the features of different market structures? 7M
 - b. What are the features of perfect competition? Explain how price is determined under Perfect competition. 7M

4.
 - a. What are the features of Joint Stock Company? Explain Merits and demerits of Joint Stock Company? 7M
 - b. What is business? Explain the features of private and public limited companies. 7M

5.
 - a. Define Management. Describe Henry Fayol's principles of management. 7M
 - b. What are the functions of Management? Describe Taylor's scientific management? 7M

6.
 - a. What is Production Planning and Control? Explain the functions of Production Planning and Control? 7M
 - b. Describe the Break-Even analysis and What are its assumptions and applications. 7M

7.
 - a. Explain the types of capital and what are the various methods of raising finance. 7M
 - b. What is Depreciation? Explain Straight line and Diminishing balance methods. 7M

8.
 - a. Define Entrepreneurship and explain the functions of an Entrepreneur. 7M
 - b. Explain about Training and Development. What are the objectives of Entrepreneurial development. 7M

[B16 ENG 3201]

[B16 EE 3203]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
POWER SYSTEM PROTECTION
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. What is primary protection? 2M
 - b. Define cut-off current and pre-arcing time with respect to a fuse. 2M
 - c. Define asymmetrical breaking capacity and making capacity. 2M
 - d. Briefly explain pickup level and operating time of a relay. 2M
 - e. Explain briefly the protection against phase to phase faults in the stator of a generator. 2M
 - f. What is the need of a rod-gap? 2M
 - g. How is directional relay useful in the protection of a parallel feeder? 2M
2.
 - a. What are the essential qualities of power system protection? 7M
 - b. Explain the role of CTs and PTs in protection. 7M
3.
 - a. Explain the phenomenon of single frequency and double frequency transients. 7M
 - b. Explain the construction and working of a HRC fuse. Give advantages and applications of these fuses. 7M
4.
 - a. Describe with neat sketches the construction and operation of a Air Blast circuitbreaker and its types. 7M
 - b. Give the properties of SF₆ gas and explain the arc extinction process in SF₆ gas and mention its advantages. 7M
5.
 - a. Explain the arc interruption methods used in C.B. Explain current zero interruption theories in C.B. 7M
 - b. A 3 – Φ oil CB is rated at 1000A, 1500MVA, 33KV, 4sec. find the rated normal current, symmetrical breaking current and short time rating. 7M
6.
 - a. Explain about directional overcurrent relay with a schematic diagram and derive its torque expression. 7M
 - b. Explain mho relay with expressions for torque and impedance for the operation of the relay. Draw the operating characteristic on R-X diagram. 7M
7.
 - a. Explain about rod gap and arcing horn for overvoltage protection. 7M
 - b. Briefly explain the types of lightning arresters. 7M
8.
 - a. Explain Peterson coil for protection against arcing grounds with neat diagrams. Derive the expression for the inductance required. 7M
 - b. A 33 kV, 3-phase, 50 Hz, 60 km long overhead line has a capacitance to ground of each line equal to 0.015 μF/km. Determine the inductance and kVA rating of the Peterson coil. 7M

[B16 EE 3203]

[B16 EE 3204]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
MICROPROCESSOR & MICRO CONTROLLER
MODEL QUESTION PAPER
ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Explain the following.
 - a. Explain the types of flags in 8085. 2M
 - b. What is the use of stack pointer in 8085 microprocessor 2M
 - c. Draw the timing diagram of opcode fetch. 2M
 - d. What is the purpose of 8279 IC. 2M
 - e. Distinguish between RAM & ROM 2M
 - f. Explain the various addressing modes in 8086. 2M
 - g. How do you select the register bank in 8051 microcontroller? 2M

2.
 - a. Draw the functional block diagram of 8085 microprocessor and explain the each block function 7M
 - b. Draw the timing diagram for memory read operation. 7M

3.
 - a. Distinguish between Memory mapped I/O and Peripheral mapped I/O 7M
 - b. Discuss the addressing modes of 8085 with suitable examples. 7M

4.
 - a. Explain the modes of operation in 8255PPI 7M
 - b. Explain the different modes of operation for 8253 7M

5.
 - a. With neat block diagram explain the functions of 8279. 7M
 - b. Briefly explain the A/D converter and explain its operation using SAR 7M

6.
 - a. Draw the internal architecture of 8051 family of microcontrollers. 7M
 - b. Draw the Internal RAM memory organization of 8051 Microcontroller and explain its operation. 7M

7.
 - a. Draw the diagram to interface a stepper motor with 8051 micro controller and explain. 7M
 - b. Explain the following special function registers of 8051 microcontroller 7M
(i) SCON (ii) TMOD

8. Write a short notes on 7M
 - a. Various flags in 8086 . 7M
 - b. DMA controller
 - c. 8051 interrupts

[B16 EE 3204]

[B16EE4101]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
ELECTRIC DRIVES
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Write short notes on the following:
 - a. What are the differences between DC drive and AC drive. 2M
 - b. Advantages and disadvantages of Electric drive. 2M
 - c. Methods of speed control of DC series motor. 2M
 - d. What is slip power and mention recovery schemes. 2M
 - e. Draw the speed-torque curves for single-phase fully controlled rectifier fed DC separately excited motor. 2M
 - f. Why DC series motor acts as self-excited series generator during regenerative braking in chopper control. 2M
 - g. Explain different types of electric braking. 2M
2.
 - a. Explain the four-quadrant operation of drive with neat sketches. 7M
 - b. Discuss the various methods of starting of 3-phase synchronous Motor. 7M
3. Obtain the speed-torque characteristics of a single phase fully controlled rectifier fed DC separately excited motor in both continuous and discontinuous current modes with waveforms. 14 M
4.
 - a. Obtain the speed-torque characteristics of a chopper fed DC series motor for continuous current mode operation. 7M
 - b. Explain Closed Loop Control of DC drive with block diagram. 7M
5.
 - a. Explain Static Kramer's Drive with circuit diagram. 7M
 - b. Explain Static Scherbius Drive with circuit diagram. 7M
6. Obtain the speed-torque characteristics for an induction motor with
 - a. Variable Voltage Control 7M
 - b. Variable Frequency Control 7M
7.
 - a. Describe self-controlled synchronous motor drive in detail. 7M
 - b. Explain the operation of cycloconverter fed self-controlled synchronous motor drive. 7M
8. Write short notes on the following

- a. Describe various speed control methods of Induction motor. 4M
- b. Derive the torque expression for single phase fully controlled rectifier fed DC series motor in continuous mode. 6M
- c. Describe load commutated CSI fed synchronous motor. 4M

[B16EE4101]

[B16EE4102]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
NON-CONVENTIONAL ENERGY SOURCES
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. a) List the merits of renewable energy sources. 2 Marks
b) Define solar constant. 2 Marks
c) Write about heat transport system in solar collectors. 2 Marks
d) Define lift and drag forces in a wind turbine. 2 Marks
e) What is tidal range? 2 Marks
f) Draw the structure of earth's interior indicating each zone. 2 Marks
g) What is gasification of biomass? 2 Marks
2. a) Describe the impact of renewable energy on environment. 7 Marks
b) What are the prospects of renewable energy sources? 7 Marks
3. a) Explain various devices for solar radiation measurement. 7 Marks
b) How can one estimate of average solar radiation? 7 Marks
4. a) Describe flat-plate collector with a neat diagram. 7 Marks
b) Give the conversion efficiency and power output from solar cell. 7 Marks
5. a) Describe the aerodynamics of a wind turbine. 7 Marks
b) Derive the expression for the maximum power extracted by the wind turbine. 7 Marks
6. a) Derive the expression for average power generated during one filling or emptying process in a single basin tidal plant. 7 Marks
b) A simple single-basin type tidal power plant has a basin area of 22 km^2 . The tide has a range of 10 m. The turbine stops operation when the head on it falls below 3m. Calculate the average power generated during one filling/emptying process in MW if the turbine generator efficiency is 70%. Sea water density is 1025 kg/m^3 . 7 Marks
7. a) Explain about earth's interior describing various parts. 7 Marks

- b) Explain liquid dominated and vapour dominated geothermal power generation. 7 Marks
8. a) Explain the factors affecting biogas production. 7 Marks
- b) With a neat diagram, explain the working of bio-mass conversion processes. 7 Marks

[B16EE4102]

[B16EE4103]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
ENERGY MANAGEMENT & AUDITING
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Write short notes on the following:
 - a. Explain the barriers in Energy Audit? 2M
 - b. List the different types of depreciation methods 2M
 - c. Write short notes on non-renewable energy sources. 2M
 - d. Explain the concept of green building. 2M
 - e. Explain DSM through TOD. 2M
 - f. Explain energy monitoring system. 2M
 - g. Explain the features of SCADA system. 2M

2.
 - a. What are the implications of Electricity Act 2003 ? 7M
 - b. How are energy sources classified? Write in detail about promising future energy resources. 7M

3.
 - a. What are the benefits of demand side management? Explain phases of implementation of demand side management. 7M
 - b. Define energy management. Explain vital elements for successful energy management. 7M

4.
 - a. What is the importance of data in energy audit ? Explain ways to analyze data related to energy and production. 7M

 - b. The following measurements were noted on test rig regarding units produced and energy required for producing the goods. Formulate energy and production relationship by using least square :

Goods Produced (P)	Energy Required (E)
2	4.08
4	11.1
6	30.13
8	81.1
10	222.6

 7M

5.
 - a. Investment for a set of interrelated energy efficiency projects identified in a medium size process plant works out to Rs. 14.00 lacs. Annual savings for the first five consecutive years are Rs. 3,00,000 Rs. 4,00,000, Rs. 4,00,000, Rs. 4,50,000 and Rs. 3,00,000 respectively. The cost of capital is 12% p.a. What is the Net Present Value (NPV) ? As per NPV, suggest 7M

- whether the plant can go ahead with the projects.
- b. Write in detail about : (1) Time of Day Tariff 7M
(2) Apparent Energy Tariff.
6. Write short notes
- a. Personality & Attitude 7M
b. Principles of learning & Stress Management. 7M
7. a. Explain financial appraisal methods. 7M
b. Discuss the main objectives of carrying sensitive analysis. Also state the different factors that are considered for sensitive analysis. 7M
8. a. Define supply side management (SSM) . What are its constraints. 7M
b. Explain demand side management (DSM) in agricultural sector. 7M

[B16EE4103]

[B16EE4104]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
ELECTRICAL MACHINE DESIGN
(Elective-II)
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1.
 - a. What are the rules for selecting stator and rotor slots of three phase slip ring induction motor? 2M
 - b. What is meant by short circuit ratio? 2M
 - c. Discriminate integral slot and fractional slot winding. 2M
 - d. Explain about B-H curve ? 2M
 - e. Explain the function of Commutator in D.C Machine? 2M
 - f. What are the different methods for cooling of Transformers? 2M
 - g. Give the relation between machine KVA rating and dimensions of a.c machines 2M
2. a. State and explain the factors which govern the choice of specific magnetic loading and specific electric loading 14M
3. a. Derive the output equation of a DC Machine in terms of its main dimensions. 7M
b. A 4 pole wave wound armature has 230 conductors and 23 Commutator segments. Give the table of winding connections in terms of coil sides. Choose a Retrogressive winding. 7M
4. a. Derive an expression for output in KVA in terms of its main dimensions for 3-phase transformer. Explain how heat generated in a transformer can be managed. Give a detailed scheme. 7M
b. Derive an expression for output in KVA in terms of its main dimensions for 3-phase transformer. Explain how heat generated in a transformer can be managed. Give a detailed scheme. 7M
5. a. Derive the output equation of an Induction motor. 7M
b. Find the value of diameter and length of stator core of a 7.5KW, 220V, 50Hz, 4 pole, 3-phase induction motor for best power factor. Magnetic loading= 0.4 wb/m^2 ; Sp. Electric loading= 22000 A/m , Efficiency= 0.86 ; power factor= 0.87 . core length/pole pitch= 1.0. 7M
6. a. Derive the output equation of synchronous machine. 7M
b. Determine the main dimensions of a 25 MVA, 50 Hz, 3-phase turbo alternator, given mean gap density= 0.5 Tesla , specific electric loading of 550 ampere conductors per

cm. of armature periphery; peripheral speed should not exceed 145 m/s; Air gap is 3

7. a. Give the various factors to be considered for the selection of stator slots of a 3-phase alternator. 7M
- b. Give the developed view for the R-phase of a 3-phase, 4 pole, 24 slots, star connected lap winding with coil short pitched by one slot. Each slot contains two coil sides. Phase sequence is RYB. 7M
8. a. List out the procedure involved in the design of shunt field winding and series field 7M
- b. A 4-pole, 25 HP, 500V, 600 rpm series motor has an efficiency of 82%. The pole faces are square and the ratio of pole arc to pole pitch is 0.67. Take $B_{av}=0.58 \text{ wb/m}^2$ and $ac=17000$ ampere conductors/meter. Obtain the main dimensions of the core. 7M

[B16EE4104]

[B16EE4105]
 IV/IV B.Tech. DEGREE EXAMINATION
 First Semester
OPERATIONS RESEARCH
 (Elective-III)
ELECTRICAL & ELECTRONICS ENGINEERING
 MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1.
 - a. Define operations research. 2M
 - b. What are the rules used in representing the arrow networks? 2M
 - c. What is an unbalanced transportation problem? How do you proceed with such problems to solve Them. 2M
 - d. What are the limitations of graphical method in LPP? 2M
 - e. Explain briefly the procedure adopted in assignment algorithm. 2M
 - f. Define Slack of an event and critical path. 2M
 - g. What is meant by a feasible solution of a linear programming problem? 2M

2.
 - a. Bharat Electric Company supplies resistors that are produced of wire wound. They can manufacture two types of resistors namely Type-I and Type-II. Type-I requires 8cm of wire while Type-II requires 15cm. To manufacture both types require One man-hour each. On a single shift there are 100 man-hours available and 75cm of wire in stock. If profits on these resistors are Rs.3/- and Rs.4/- per resistor, formulate the information into an LPP so that the number of Types I and II that when manufactured on each shift will maximize the profit? 7M
 - b. Using graphical method, solve the following LPP 7M

$$\begin{aligned} &\text{Maximize } Z = 8x_1 + 6x_2 \\ &\text{Subject to } 2x_1 + x_2 \leq 72 \\ &x_1 + 2x_2 \leq 48 \\ &\text{and } x_1 \geq 0, x_2 \geq 0 \end{aligned}$$

3.
 - a. Solve the following LP problem using the simplex method 7M

$$\begin{aligned} &\text{Minimize } Z = x_1 - x_2 - 2x_3 \\ &\text{Subject to } 3x_1 + x_2 + 3x_3 \leq 7 \\ &\quad \quad \quad -x_1 + 2x_2 \geq -6 \\ &\quad \quad \quad 4x_1 + 3x_2 + 5x_3 \leq 10 \\ &\text{and } x_1 \geq 0, x_2 \geq 0, x_3 \geq 0 \end{aligned}$$
 - b. Using Big-M method, solve the following LP problem 7M

$$\begin{aligned} &\text{Maximize } Z = -4x_1 - 3x_2 \\ &\text{Subject to } 3x_1 + x_2 = 3 \\ &\quad \quad \quad 3x_1 + 4x_2 \geq 6 \end{aligned}$$

$$x_1 + x_2 \leq 4$$

$$\text{and } x_1 \geq 0, x_2 \geq 0$$

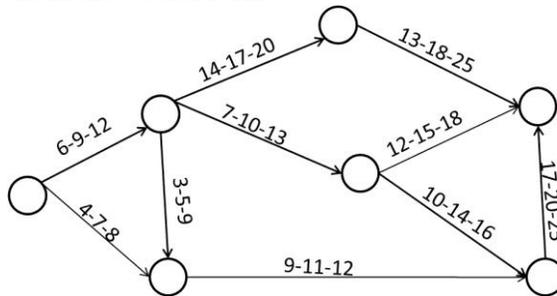
4. a. Explain an Initial basic feasible solution to the Vogel's Approximation method of solving a Transportation problem. 7M
- b. Solve the following transportation problem using North-West Corner method for finding initial basic feasible solution 7M

9	12	9	6	9	10	5
7	3	7	7	5	5	6
6	5	9	11	3	11	2
6	8	11	2	2	10	9
4	4	6	2	4	2	22

5. a. what is an unbalanced assignment problem? Explain the method of assignment problem applied for obtaining a solution if the matrix is rectangular. 7M
- b. The distances in KM to be travelled are given in the following matrix. Solve the assignment problem so as to minimize total distance travelled. 7M

	A	B	C	D	E	F
I	10	10	12	15	15	11
II	8	8	9	7	7	12
III	8	8	9	7	7	12
IV	6	6	9	8	8	10
V	6	6	9	8	8	10
VI	6	6	7	6	6	6

6. a. State the rules for drawing a network diagram for a project and numbering the events by Fulkerson's rule on it. 7M
- b. Calculate the Variance and Expected activity times for the activities of the network shown in figure below. Enter calculations in the tabular form 7M



7. a. For the data given below, find the following 14M
- The Expected Task times and their variances
 - The earliest Expected and Latest Allowable occurrence times of each event
 - The critical Path

Task	A	B	C	D	E	F	G	H	I	J	K	L
Least Time(days)	3	1	2	6	8	0	5	6	1	3	8	2
Most Likely Time(days)	5	2	4	8	12	0	7	9	2	6	15	4
Greatest Time(days)	6	3	6	12	17	0	9	12	3	8	20	6

Precedence relationships are- A & B can start immediately C, D > A ; E > B, C; F, H > E, G > D, F;
 J > G;
 I, K > H; L > J, I.

8. a. School children Nissi and Hansy play a game who have some 25 paise coins and 50 paise coins. Each draw a coin from their bags without knowing others choice. If the sum of coins drawn by both is even Nissi wins them, otherwise Hansy wins. Find the best strategy for each player and also find the value of the game. 7M
- b. solve the following game whose pay-off matrix is given below by graphical method. 7M

	B1	B2	
A1	1	-3	
A2	3	5	
A3	-1	6	
A4	4	1	
A5	2	2	
A6	-5	0	

[B16EE4105]

[B16EE4106]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
FLEXIBLE AC TRANSMISSION SYSTEMS
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

- | | | | |
|----|----|--|----|
| 1. | a. | Distinguish between transient stability and steady state stability in power flow systems. | 2M |
| | b. | Mention the importance of self-commutating converters? | 2M |
| | c. | Write the three important objectives of shunt compensation. | 2M |
| | d. | What is meant by switched transients in thyristor switched capacitor? | 2M |
| | e. | What are the characteristics differences between TSSC and TCSC? | 2M |
| | f. | Mention the practical applications of STATCOM. | 2M |
| | g. | What are stand-alone series and shunt compensations? | 2M |
| 2. | a. | Explain various loading capability limits in power flow systems. | 7M |
| | b. | Describe relative importance of different types of controllers. | 7M |
| 3. | a. | Enumerate single phase full-wave bridge converter operation. | 7M |
| | b. | Discuss three-phase current source converter operation in brief. | 7M |
| 4. | a. | Explain midpoint voltage regulation for line segmentation using shunt compensation. | 7M |
| | b. | Emphasize features of thyristor-controlled reactor. | 7M |
| 5. | a. | Obtain transfer function of static VAR compensator and mention its compensation effect on stability. | 7M |
| | b. | Explain necessary modifications in static VAR generation characteristics due to regulation slope. | 7M |
| 6. | a. | Draw and explain the impedance versus delay angle characteristics of TCSC. | 7M |
| | b. | Discuss improvement of transient stability using series compensation on transmission systems. | 7M |
| 7. | a. | Describe dependence of real and reactive power flow control in UPFC. | 7M |
| | b. | Write a comparison between IPFC and UPFC. | 7M |
| 8. | a. | Explain midpoint voltage regulation for line segmentation using shunt compensation. | 7M |
| | b. | What is meant by power oscillation damping? Explain its functional control implementation. | 7M |

[B16EE4106]

[B16EE4107]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
INTRODUCTION TO SOFT COMPUTING
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Write short notes on the following:
 - a. What are supervised learning and unsupervised learning 2M
 - b. Draw the basic model of a Madaline network 2M
 - c. What is fuzzy inference system ? 2M
 - d. List the various types of cross-over and mutation techniques 2M
 - e. Mention the role of fitness function in GA 2M
 - f. What is the principle of center of gravity method of defuzzification 2M
 - g. What is hybrid intelligent control 2M
2.
 - a. Explain in detail about artificial neuron model with its activation function 7M
 - b. Differentiate between soft computing and hard computing 7M
3.
 - a. Discuss back propagation learning method and algorithm in detail 7M
 - b. What is self organizing map and discuss the algorithm and features of kohonen's map? 7M
4. Explain the different types of defuzzification techniques with suitable examples 14M
5.
 - a. Differentiate between Mamadani FIS and Tagaki Sugeno FIS 7M
 - b. Discuss the methods of aggregation of fuzzy rules 7M
6.
 - a. What is the basic principle involved in the operation of Genetic Algorithm? Explain. 7M
 - b. Discuss in detail about various methods involved in the reproduction operation.
7.
 - a. Write short notes on Single point cross over, Multi point cross over and uniform cross over. 7M
 - b. With the help of flow chart explain the computational process of GA. 7M
8.
 - a. Write a short note on hybrid soft computing 4M
 - b. What are the various components of Fuzzy logic system? Explain each of them in detail. 10M

[B16EE4107]

[B16EE4201]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
POWER SYSTEM OPERATION AND CONTROL
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1.
 - a. what is heat rate input and incremental input? 2M
 - b. write briefly about the constraints in Unit commitment problem. 2M
 - c. Draw the AGC block diagram of a two area system. 2M
 - d. what is the purpose of stabilizing transformer in Automatic voltage control 2M
 - e. List out few factors affecting the power system security. 2M
 - f. what is the importance of center of inertia with respective power system control. 2M
 - g. Define the term Long-term frequency dynamics. 2M

2.
 - a. Derive the necessary condition for optimally load sharing of load among generators when transmission losses are taken into account. Explain the computational procedure with the help of a flow chart. 7M
 - b. The incremental fuel cost in Rs/MWhr for a plant consisting of 2 units are 7M
$$\frac{dC_1}{dP_{g1}} = 0.25 P_{g1} + 40 ; \frac{dC_2}{dP_{g2}} = 0.30 P_{g2} + 30 ;$$
Assume both units are operating at all the time and the total load varies from 40MW to 250MW. How will the load be shared for a total load of 200MW? What is the corresponding value of the plant incremental cost.

3.
 - a. Discuss in detail the problem formulation of hydro thermal coordination? 7M
 - b. Derive the general losses formula or B-coefficients and incremental transmission loss and also represent the transmission loss formula for three generating plants in B-coefficients 7M

4.
 - a. What is dynamic programming approach? Solve the unit commitment problem using dynamic programming with a suitable example. 7M
 - b. Discuss in detail about the gradient method for solving optimal power flow problem. 7M

5.
 - a. Derive the model of a speed governing system and represent it by block diagram. 7M
 - b. A 100 MVA synchronous generator operates at full load at a frequency of 50 Hz. The load is suddenly reduced to 40 MW due to the time lag in the governing system, the steam valve begins to close after 0.4 sec. What is the change in system frequency that occurs in this time? Take inertia constant H to be 6 KW-sec/KVA of generator capacity. 7M

- | | | | |
|----|----|---|----|
| 6. | a. | Explain about Tie-line power modeling in two area system and draw neat sketch | 7M |
| | b. | Two generators are operating in parallel with 4% and 5% drop characteristics of their respective governors sharing a load of 600MW. Find the load shared by the machines and the system for this load. The normal frequency of the system was 50Hz. | 7M |
| 7. | a. | Explain and derive the line outage distribution and generator outage distribution factors? | 7M |
| | b. | Explain the contingency analysis procedure with neat sketch? | 7M |
| 8. | a. | Explain briefly about the Stability Enhancement methods. | 7M |
| | b. | Derive the center of Inertia and explain about the average system frequency. | 7M |

[B16EE4201]

[B16EE4202]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
ADVANCED POWER ELECTRONICS
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1. Write short notes on the following:
 - a. Draw the block diagram of MCT & MTO 2M
 - b. Draw the block diagram of ETO & IGCT 2M
 - c. Write a short note on off-line PWM. 2M
 - d. Write a short note on phase disposition techniques. 2M
 - e. Explain voltage control in single phase inverters 2M
 - f. Describe PWM inverter 2M
 - g. Give the methods for reduction of harmonics 2M

2. Explain the operation and draw the waveforms of
 - a. Voltage Commutated Chopper 7M
 - b. Current Commutated Chopper 7M

3. Explain the operation of
 - a. Switched mode D.C. and A.C. power supplies. 7M
 - b. Resonant D.C and A.C. power supplies. 7M

4.
 - a. Explain the operation of Cosine wave crossing technique. 7M
 - b. Derive the Output voltage equation of Cycloconverter. 7M

5. Explain the operation of
 - a. Single phase to single phase Cycloconverter 7M
 - b. Three phases to single phase Cycloconverter 7M

6. Explain the operation of
 - a. Modified McMurray inverter 7M
 - b. Modified McMurray Bedford inverter 7M

7. Explain Briefly the following
 - a. Operation of flying capacitor multilevel inverter. 7M
 - b. Operation of diode clamped multilevel inverter. 7M

8.
 - a. Explain the Switched mode D.C. and A.C. power supplies. 7M
 - b. Explain the Resonant D.C and A.C. power supplies. 7M

[B16EE4202]

[B16EE4203]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
ELECTRICAL DISTRIBUTION SYSTEMS
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

1.
 - a. What are the factors affect the distribution system planning in the near future? 2M
 - b. How do you fix the rating of a distribution sub-station? 2M
 - c. What are the significances for voltage drop calculations? 2M
 - d. What are the different types of faults that can occur on distribution network? 2M
 - e. What is the justification for p.f improvement? 2M
 - f. What is the effect of series capacitor on voltage control? 2M
 - g. What is the basic function of booster transformer? 2M

2.
 - a. Define and explain the following terms with suitable examples: (i) load factor, (ii) loss factor , (iii) Contribution factor and (iv) diversity factor. 7M
 - b. A substation supplied the following loads: 175MW, 100MW, 75MW, 50MW and 10MW. The station has a maximum demand of 250MW. Determine the following, if annual load factor of the station is 45% (i) Number of units supplied annually (ii) Diversity factor (iii) Demand factor. 7M

3.
 - a. What are the various factors that are to be considered in selecting primary feeder rating? Give a neat sketch of typical primary distribution feeder. 7M
 - b. Derive the percentage voltage drop of a substation service area with 'n' number of primary feeders. 7M

4.
 - a. Obtain the expression for voltage drop and power loss for uniformly radial type distribution load. 7M
 - b. If $Z_1 = 15 \angle -300$, $Z_2 = 20 \angle 800$ and $Z_3 = 20 \angle +900$ are the impedances connected in the form of delta and the supply voltage is 400V. Assume the RBY sequence and so find the phase currents, line currents and the total power absorbed. 7M

5.
 - a. How is the coordination between main fuse and sectional fuse achieved with neat diagram? 7M
 - b. What are the common faults in a single phase, 2-wire and 3-wire system? Explain how fault current is computed with single line diagram. 7M

6.
 - a. How is economical p.f arrived at for a given distribution system with different loads. 7M
 - b. Give the best values of capacitor banks to improve the load p.f. from 0.75 to 0.9 from the following data: Load 800 kVA, operating voltage 3.3 kV (i) Star connection and 7M

(ii) Delta connection.

7. a. Explain the necessity of voltage control and p.f. correction in distribution systems. 7M
- b. What are the numerous ways to improve the distribution system's overall voltage regulation? How is line drop compensation made? 7M

8. a. Describe the effect of series capacitor on voltage control for distribution systems with necessary diagrams. 7M
- b. Explain the methodology for optimal location of substations and indicate the benefits derived through this approach. 7M

[B16EE4203]

[B16EE4204]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
HIGH VOLTAGE DIRECT CURRENT
ELECTRICAL & ELECTRONICS ENGINEERING
MODEL QUESTION PAPER

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

All Questions Carry equal marks

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

- | | | | |
|----|----|---|-----|
| 1. | a. | Write a short note on harmonic present in hvdc transmission systems. | 2M |
| | b. | Write a short note on advantages of hvdc transmission systems. | 2M |
| | c. | Write a short note on of hvdc multi terminal dc transmission systems. | 2M |
| | d. | Write a short note on of back to back hvdc transmission systems | 2M |
| | e. | Write a short note on Interactions between AC and DC Systems? | 2M |
| | f. | Write a short note on filters used in Hvdc transmission Systems | 2M |
| | g. | Write a short note on commutation technique used in hvdc transmission system | 2M |
| 2. | a. | Give a detailed note on general considerations of hvdc transmission systems | 7M |
| | b. | Explain about power handling capabilities of hvdc transmission systems. | 7M |
| 3. | | Explain about 3pulse and 6 pulse converters in hvdc transmission systems. | 14M |
| 4. | | Explain about 12 pulse converters and operation of rectifier and inverter in hvdc transmission systems. | 14M |
| 5. | a. | Explain in detail about harmonics in hvdc transmission systems | 7M |
| | b. | Explain in detail about filters to eliminate harmonics in hvdc transmission systems | 7M |
| 6. | | Explain in detail about Constant current and constant extinction angle control in hvdc transmission systems | 14M |
| 7. | | Explain in detail about equidistant angle control and dc power flow in hvdc transmission systems | 14M |
| 8. | a. | Explain in detail about Interaction between hvdc and hvac systems | 7M |
| | b. | Explain in detail about Voltage interaction, Harmonic instability problems in hvdc transmission systems. | 7M |

[B16EE4204]