

[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 magnetostriction 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 magnetostriction 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]
- (a) State the limitations of axiomatic approach to probability.
 - (b) State the properties of distribution function.
 - (c) Show that $E(aX + b) = aE(X) + b$.
 - (d) Find the moment generating function of Poisson distribution
 - (e) Define rank correlation?
 - (f) Define Type-I-error and Type-II-error.
 - (g) 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]

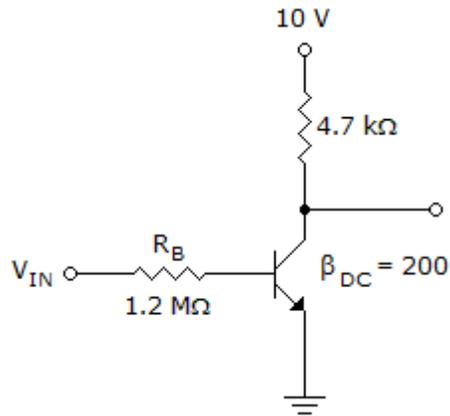
[B16 EC 1208]
I/IV B.Tech. DEGREE EXAMINATION
Second Semester
ELECTRONIC DEVICES AND CIRCUITS
MODEL QUESTION PAPER
(Department Subject-ECE)

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 $R = R_O / [1 - (V_{GS} / V_P)^2]$ 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.

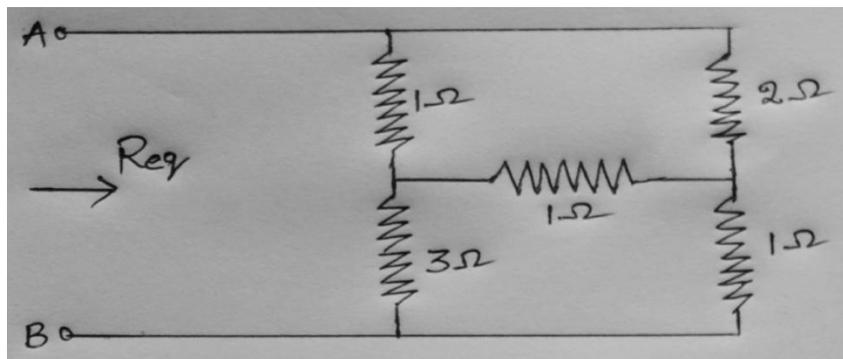
Max. Marks: 70

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

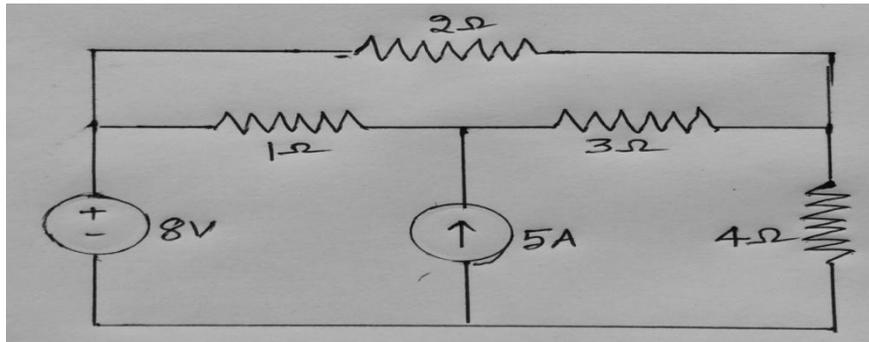
1. Write a short answer to the following [7x2 = 14 marks]

- 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?

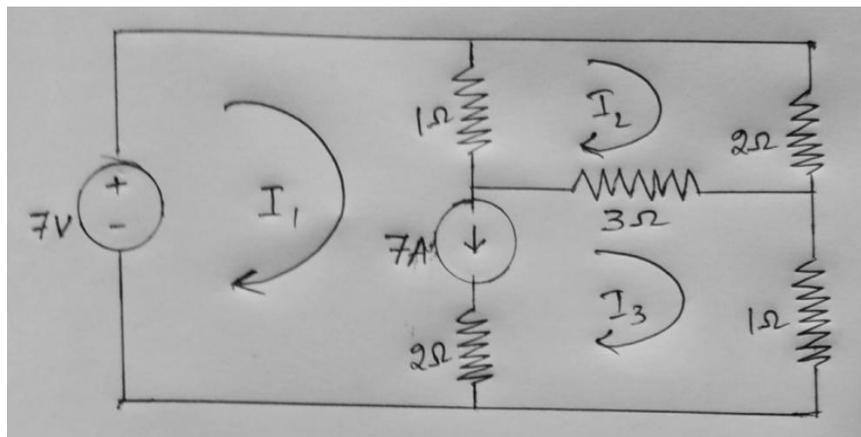
2. a) Find the equivalent resistance between the terminals A and B of the given network.



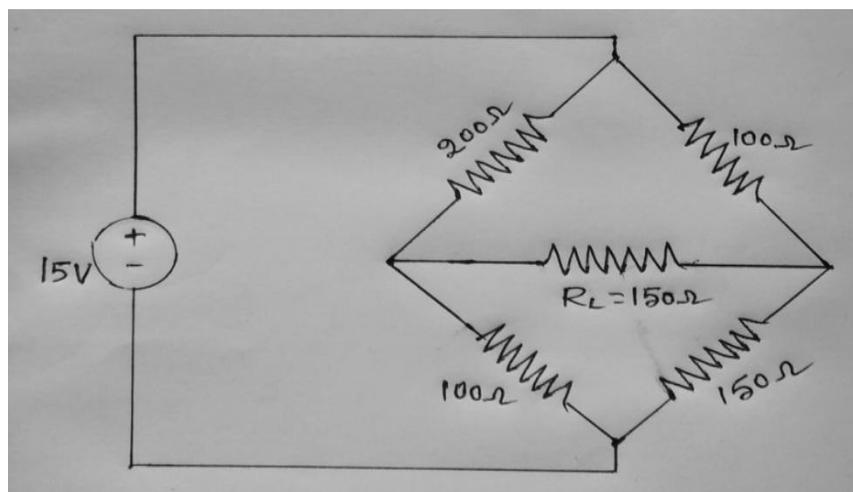
b) Using Nodal analysis find the currents and voltages in all the branches of the given network.



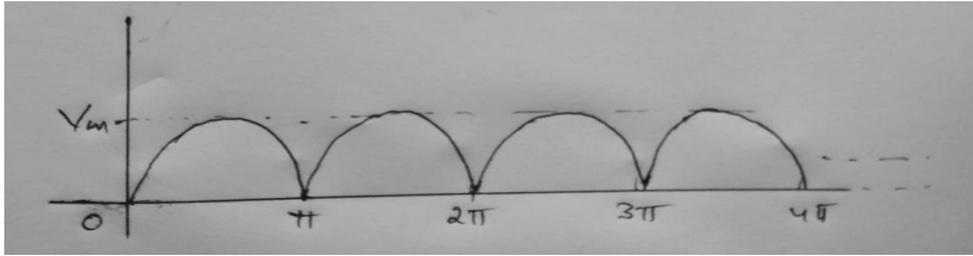
3.a) Find the mesh current I_1 in the given circuit using mesh Analysis.



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 $z\vec{i} - z\vec{j} + y\vec{k}$ in cylindrical polar coordinates.
- 5 (a) Solve the equation $py^3 + qx^2 = 0$ 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 2104]
II/IV B.Tech Degree Examination
Second Semester
CIRCUIT ANALYSIS & SYNTHESIS
MODEL QUESTION PAPER

Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

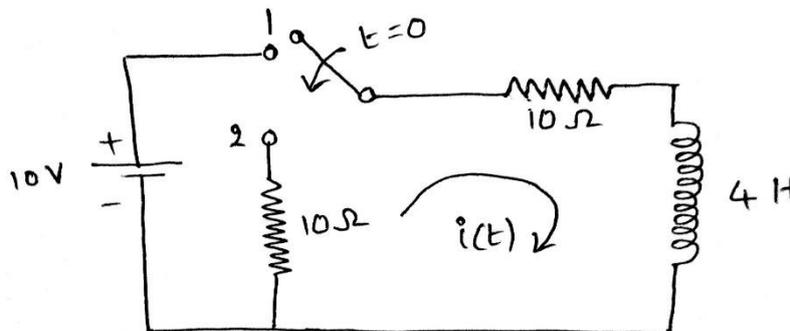
Question No. 1 is compulsory
Answer any FOUR questions from remaining
All questions carry equal marks
All parts of a question must be answered at one place only

(7*2=14M)

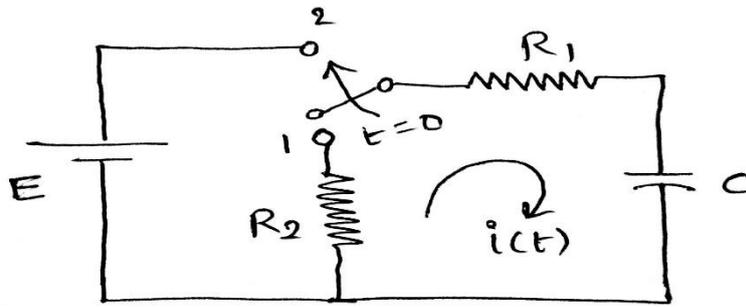
- 1.a) Distinguish between natural response and forced response.
- b) Write two properties of driving point functions.
- c) State final value theorem in Laplace domain.
- d) Define H-Parameter.
- e) Explain Dot convention for mutually coupled circuits.
- f) Write down the Hurwitz conditions for stability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

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)



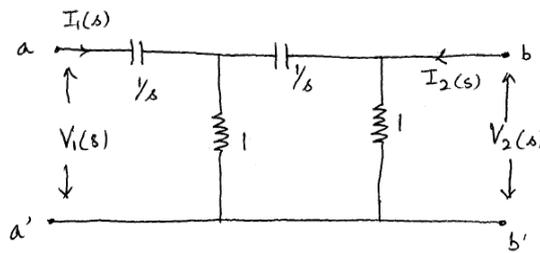
b) Derive the expression for $i(t)$ when the switch is moved from position 1 to position 2 at $t=0$ in the circuit shown. The switch was in position 1 for a long time. (7M)



3.a) Draw the pole zero diagram for the given network function and obtain the time domain response $i(t)$.

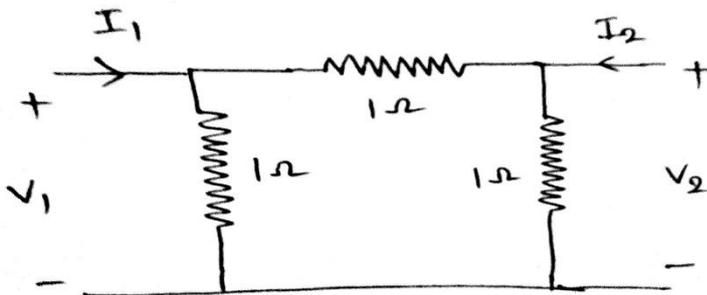
$$I(S) = \frac{5s}{(1+s)(s^2+4s+8)} \quad (7M)$$

b) Find the Z-parameters of the RC-ladder network shown in Figure.



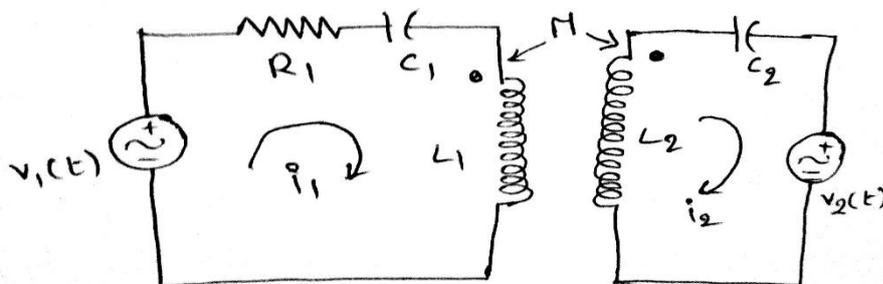
(7M)

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)



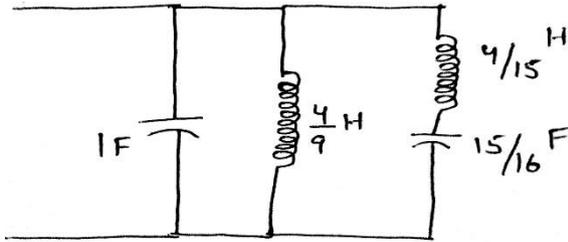
5. a) Determine whether the function $F(s) = \frac{(s^2+6s+5)}{(s^2+9s+14)}$ is positive real function? (7M)

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

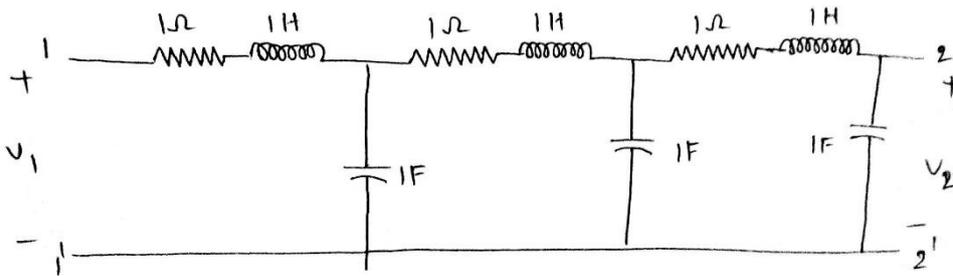
6.a) Find the Forster form 1 of the RL impedance function $Z(s) = \frac{(s+1)(s+4)}{(s+5)(s+3)}$ (7M) b) Draw the pole zero diagram of the impedance transformed function. (7M)

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

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) Explain the following terms with respect to transients: (4M)

- (i) Time constant
- (ii) Transient response and
- (iii) Steady state response.

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[B16 EE 2105]
II/IV B.Tech Degree Examination
Second Semester
ELECTRICAL TECHNOLOGY
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

Question No. 1 is compulsory
Answer any FOUR questions from remaining
All questions carry equal marks
All parts of a question must be answered at one place only
(7*2=14M)

1.
 - a) What is the purpose of core in a transformer?
 - b) Write short note on potential transformer?
 - c) Why series motor not operated on no-load condition?
 - d) Draw the speed torque characteristics of cage induction motor?
 - e) Briefly explain 'V' curve of a synchronous motor?
 - f) Why 1-phase induction motor is not self-starting?
 - g) Write the applications of 1-phase induction motors.

2.
 - a) Explain function of commutator in D.C Machines. (7M)

 - b) The armature of a 4-pole, lap wound d.c machine has a core length of 30cm, diameter is 40cm, total conductors are 500 and speed of the machine is 1200rpm with a current of 20A. For an average flux density of 0.5 Tesla, find the electromagnetic power developed and the internal torque. (7M)

3.
 - a) Explain Working principle and operation of a 1-phase transformer with neat diagram. (7M)

 - b) A 250V Compound generator has armature, series, and shunt field resistances of 0.4Ω , 0.2Ω , and 125Ω respectively. If this generator supplies 10KW at rated voltage, find the E.M.F Generated in the armature when the machine is connected, a) Long shunt b) Short shunt. Ignore armature reaction and allow 1V per brush for contact. (7M)

4.
 - a) Explain OC & SC Test on a 1-Phase Transformer. (7M)

 - b) A 400/200V 1-phase transformer is supplying a load of 50A at a p.f of 0.866 lagging. The no load current is 2A at p.f of 0.208 lag. Calculate the primary current and power factor. (7M)

- 5
 - a) Derive the condition for maximum torque in a three phase induction motor. (7M)

 - b) If a motor has a slip of 2 percent at normal voltage, deduce the approximate slip when developing same torque at 10% above normal speed. (7M)

- 6.a) Explain voltage regulation with help of synchronous impedance method. (7M)

- b) In a 50KVA, star connected, 440V, 3 phase, 50Hz alternator, the effective armature resistance is 0.25 ohm per phase. The synchronous reactance is 3.2 ohm per phase and leakage reactance is 0.5 ohm per phase. Determine at rated load and unity power factor (7M)

- 7. a)** Draw and explain all the characteristics of D.C Shunt Generator and D.C series motor with its applications. (7M)
- b)** Derive the EMF Equation of a transformer. (7M)
- 8. a)** Explain constructional details of stepper motor (7M)
- b)** Explain the principle of operation of universal motor (7M)

[B16 EC 2101]
II/IV B.Tech Degree Examination
First Semester
Analog Electronic Circuits
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

Question No. 1 is compulsory
Answer any FOUR questions from 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 π 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 centered on a center 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 $V_1 = 1 \text{ V}$, $V_2 = 2 \text{ V}$ and $V_3 = 3 \text{ V}$.
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.

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[B16 CS 2104]
II/IV B.Tech Degree Examination
FIRST Semester
ELEMENTARY DATA STRUCTURES
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

1. [7x2=14 M]
- (a) Explain initialization of two dimensional arrays.
 - (b) Explain pre-order traversal.
 - (c) Explain level and height of a tree.
 - (d) What is an abstract data type.
 - (e) Draw the binary tree for the expression $A*B-(C+D)*(P/Q)$.
 - (f) Explain quick sort.
 - (g) Explain pointer and chain of pointers
2. (a) What is the advantage of using array? Give the syntax for declaration, accessing and printing one dimensional array. [7 M]
- (b) Define file. What is the purpose of fopen() and fclose()? [7 M]
3. (a) Define Function? Explain about parameter passing mechanism in functions. [7 M]
- (b) Write a C program to calculate student wise total marks for three students using array of structures. [7 M]
4. (a) What do you mean by data structure? Explain about linear data structure. [7 M]
- (b) Discuss the applications of stack. [7 M]
5. (a) Write an algorithm to convert infix to postfix notation. [7 M]
- (b) Define graph. Explain graph traversal techniques? [7 M]
6. (a) Write a program to implement circular linked list. [7 M]
- (b) What is minimum spanning tree? Explain with an example. [7 M]
7. (a) Define Tree? Explain different tree traversal techniques? [7 M]
- (b) Differentiate binary tree and binary search tree with examples. [7 M]
8. (a) Explain basic search techniques. [7 M]
- (b) What is sorting? Write a program to implement Merge sort. [7 M]

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[B16 EC 2102]
II/IV B.Tech Degree Examination
First Semester
Probability Theory & Random Processes
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

1. (a) State Baye's probability theorem? 7x2=14M
(b) Define a Random Variable.
(c) Distinguish between Mean square and Square of mean.
(d) Define first order and second order central moments.
(e) Define the characteristic function.
(f) State Central limit theorem?
(g) Distinguish the terms Ergodicity and Stationarity.

2. (a) State axioms of probability. Define exclusiveness and independence. 7M
(b) In a class room, 70% are above average, 20% are average and 10% are below average. Suppose that 20% of above average, 10% of average and 20% of below average students fail in a subject. What is the probability that a randomly selected student is an average student who failed? 7M
3. (a) Define the distribution and density functions. List the properties of them. Prove any one property of each. 7M
(b) A random variable X has a probability density function

$$f_X(x) = \frac{c}{x^2+1} \quad -\infty < x < \infty$$

Find the constant 'c' and also find the probability distribution function of the random variable X. 7M

4. (a) The random variables X and Y have joint probability density function

$$f_{XY}(x, y) = \frac{1}{\pi}, \quad (x^2 + y^2) \leq 1$$

$$= 0 \quad \text{Otherwise}$$

Determine $f_X(x)$ and $f_Y(y)$. Are they independent? 7M

- (b) A random variable X has a Gaussian density function with mean '0' and variance '1'. Find the probability density function of the random variable Y defined as $Y = X^2$. 7M

5. a) A random variable has a probability density function

$$f_X(x) = \frac{5}{4}(1 - x^4) \text{ for } 0 < x \leq 1$$
$$= 0 \text{ elsewhere}$$

Find (i) $E(X)$ (ii) $E(4X+2)$ (iii) $E(X^2)$. 7M

(b) State and prove Chebyshev's inequality. 7M

6. (a) Compute the characteristic function for a random variable X with

$$f_X(x) = \frac{1}{2}e^{-|x|}, \quad -\infty < x < \infty.$$

(b) Prove that the random process $X(t) = A \cos(\omega_0 t + \theta)$ is wide sense stationary where A , ω_0 are constants and θ is uniformly distributed random variable on the interval $(0, 2\pi)$. 7M

7. (a) Define Autocorrelation and power spectral density for a random process. List their Properties. 7M

(b) State and prove Wiener-Kinchine theorem. Give its significance. 7M

8. (a) Show that the Narrow band noise process can be expressed as in phase and quadrature components. 7M

(b) Find the input autocorrelation function, output autocorrelation function and output spectral density of RC low pass filter, when the filter is subjected to a white noise of spectral density $N_0/2$. 7M

[B16 EC 2201]
II/IV B.Tech Degree Examination
Second Semester
Switching Theory and Logic Design
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

[7x2=14M]

1.
 - a) Convert 1096_{10} in to Binary, Octal and Hexadecimal numbers.
 - b) Realize two input X-OR Gate by using only NOR Gates.
 - c) Differentiate between Decoder and Encoder.
 - d) Define a sequential logic circuit.
 - e) Compare Synchronous and Asynchronous counters.
 - f) Define Static-1 hazard and Static-0 hazard.
 - g) What is a critical race?
2. (a) Simplify the following functions by using basic Boolean laws
 - i. $\bar{x}\bar{z} + xyz + x\bar{z} = Y$
 - ii. $\overline{A\bar{B}C} + (\bar{B}+\bar{C})(\bar{B}+\bar{D}) + \overline{(A+C+D)} = Y$
- (b) Simplify the function by using K-Map
 $f(a,b,c,d,e) = \pi M(0,1,4,5,6,7,9,11,15,18,25,30,31) + d(10,14,20)$
3. (a) Simplify the given function by using Quine–McCluskey method
 $F(w,x,y,z) = \Sigma m(1,2,4,6,7,8,9,10,12,14,15)$
- (b) Find standard POSE for $A+C+\bar{B}\bar{D} = Y$
4. (a) Design an 8:1 Multiplexer with only NAND Gates.
- (b) Implement the given functions by using a 3 to 8 Decoder and logic Gates.
 - (i) $f_1(A,B,C) = \Sigma m(0,1,5,7)$
 - (ii) $f_2(A,B,C) = \Sigma m(1,3,5,7)$
 - (iii) $f_3(A,B,C) = \Sigma m(1,3,5,6,7)$
5. (a) Design and draw a BCD to 7 segment Decoder circuit for active low outputs.
- (b) (i) Convert T-Flip-Flop in to a D-Flip-Flop
(ii) What is race around problem? How to avoid it?
6. (a) What is lockout in counters? Design a Mod-10 synchronous counter by using T-Flip-Flops.
- (b) Design a 3-bit right shift register and explain the modes SISO and PIPO.

7. (a) Design a Full adder and explain how to implement a 4 bit parallel adder.
(b) Explain the terms race, critical race and non critical race by taking an example.
8. (a) Design a Sequence detector which produces an output 0 every time the sequence 0101 is detected, an output 1 at all other times. Assume that overlapping sequence is allowed. Use D-FFs in your design.
(b) Explain the following:
 - i. Priority encoder
 - ii. Ring counter
 - iii. Error detecting and Error correcting codes

[B16 EC 2202]
II/IV B.Tech Degree Examination
Second Semester
Electromagnetic Field Theory and Transmission lines
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

1. 7X2=14M
- a) What is relaxation time?
- b) The vector magnetic potential due to a current distribution is $\vec{A} = (x\vec{a}_x + xy\vec{a}_y + xyz\vec{a}_z)$ wb/m. Find the magnetic flux density \vec{B} at (1,2,3).
- c) Write Maxwell's equations for time varying fields using phasor notation.
- d) Define Brewster angle and give an expression for it.
- e) A uniform plane wave travelling in a medium has $\vec{E} = 10 e^{-0.5x} \cos(10^8 t - 2x)\vec{a}_y$ V/m. Find propagation constant and velocity of wave propagation.
- f) A 50Ω transmission line is terminated by a 150Ω load resistance. Calculate reflection coefficient at the load and the voltage standing wave ratio on the line.
- g) What is dominant mode? Give the dominant mode for TM_{mn} modes.
2. a) Derive an expression for the energy stored in static electric field. 7M
b) Derive an expression for the electric field due to an infinite line charge. 7M
3. a) Obtain an expression for the magnetic field due to a finite current filament carrying current I along the Z - axis. 7M
b) Obtain the differential form of Ampere's circuital law. 7M
4. a) Derive Maxwell's equations in integral and differential form. 8M
b) In a lossless medium $\vec{E} = 10 \cos(10^8 t - 2z)\vec{a}_x$ V/m. Find the displacement current density and find \vec{H} using Maxwell's equations. Assume $\mu_r = 1$. 6M
5. a) Obtain the relation between E and H in a uniform plane wave. 8M
b) Derive wave equations for \vec{E} and \vec{H} for free space conditions and for a conductive medium. 6M
6. a) Discuss reflection of plane waves by a perfect dielectric for oblique incidence. 8M
b) A uniform plane wave at a frequency of 1 GHz is travelling in a conductive medium and has a phase shift constant of 2 rad/m and its amplitude is reduced by 20% for every one meter travelled. Calculate attenuation constant, skin depth and velocity of the wave. 6M
7. a) Obtain an expression for the input impedance of a transmission line with characteristic impedance Z_0 and terminating impedance Z_L . 8M
b) Define characteristic impedance and reflection coefficient at load for a transmission line and obtain expressions for them. 6M

- 8 a) Derive expressions for the electromagnetic field configuration for TE waves in a rectangular waveguide. 8M
- b) A rectangular waveguide measures 4.5 cm X 2 cm internally. For the TE_{10} mode, find cutoff frequency , cutoff wave length , guide wavelength , phase and group velocities and characteristic wave impedance. 6M

[B16 EC 2203]
II/IV B.Tech Degree Examination
Second Semester
Pulse and Digital Circuits
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

1. [7x2=14 M]
 - (a) What is meant by *Linear Wave shaping*?
 - (b) State *Clamping circuit theorem*.
 - (c) What do you mean by *storage time* in a transistor? How storage time can be reduced?
 - (d) What is *Synchronization*?
 - (e) What are the advantages of astablemultivibrators?
 - (f) Explain the terms *Propagation delay* and *Fan Out*.
 - (g) What is the need for commutating capacitors?
2.
 - (a) Derive the expression for rise time of the pulse waveform after passing through low pass RC circuit.
 - (b) A symmetrical square wave of $\pm 5V$ at a frequency of 5 kHz is applied in a high pass RC circuit
3.
 - (a) Draw the circuit diagram of slicer circuit using Zener diode and explain its operation with the help of transfer characteristics.
 - (b) Explain the transfer characteristics of the emitter coupled clipper and derive the necessary equation.
4.
 - (a) What do you understand by hysteresis? What is hysteresis voltage? Explain how it can be eliminated in a Schmitt trigger?
 - (b) Design an astablemultivibrators to generate a square wave if 5kHz frequency and with a duty cycle of 25%.
5.
 - (a) Draw a self-biased binary circuit and derive necessary relations for steady state analysis of the circuit.
 - (b) Design a monostable multivibrators to generate an output pulse of 250 μs duration. Assume $h_{fe}(\min) = 25$, $I_{cc}(\text{sat}) = 5\text{mA}$, $V_{CC} = 10V$ and $V_{BB} = -4V$.
6.
 - (a) Explain the working of a Millers time base generator with neat circuit diagram.
 - (b) Explain current time base generator with neat sketches.
7.
 - (a) What is Synchronization? Why it is necessary in waveform generators?
 - (b) How an astablemultivibrators can be synchronized? Illustrate with waveforms.
8.
 - (a) Compare the RTL and DTL logic families in terms of fan-in, fan-out, propagation delay, power dissipation and noise immunity.
 - (b) Find the component values of a bootstrap sweep generator given $V_{CC} = 18V$, $I_c(\text{sat}) = 2\text{mA}$ and $h_{fe}(\min) = 30$.

[B16 EC 2203]

[B16 EC 2204]
II/IV B.Tech Degree Examination
Second Semester
Analog Communications
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

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

- 1 (a) Explain need for modulation. 7x2=14M
(b) Calculate the percentage saving in power if only one side band transmission is used over the DSB-FC system at (i) 100% modulation (ii) 50% modulation
(c) Define phase deviation and frequency deviation.
(d) Give the classification of Radio transmitters.
(e) What is Pre-Emphasis and De-emphasis?
(f) Explain the need of Amplitude Limiter.
(g) Define Resistor Noise and Shot noise

- 2 (a) Describe one method of generating the amplitude modulation wave. Also sketch the spectrum of an AM signal. 7M
(b) Explain the coherent detection of DSB-SC modulated wave 7M

- 3 (a) Explain the advantages of SSB system. Describe a method of generating an SSB signal. 7M
(b) Give the block diagram of an Indirect method of FM generation and explain. 7M

- 4 (a) Describe the operation of a phase locked loop FM demodulator with a neat diagram. 7M

(b) In a FM system when the audio frequency is 500Hz and the AF voltage is 2.4 V, the frequency deviation is 4.8 kHz. If the AF voltage is increased to 7.2V, what is the new deviation? If the AF voltage is raised to 10V, while audio frequency is dropped to 200Hz, what is the deviation? Find the modulation index in each case. 7M

5. (a) Derive the expression for signal -to-noise ratio in DSB-SC system. 7M
(b) Derive the expression for signal -to-noise ratio in FM system. 7M

6. (a) Explain the operation of FM transmitter and draw the modified diagram for frequency stability. 7M
(b) Explain the special devices of Radio telephone transmitter clearly. 7M

- 7 (a) Explain the operation of an AM receiver with neat schematic block diagram. 7M
(b) What are the factors that govern the choice of Intermediate frequency? 7M

- 8 (a) Distinguish between AGC and Delayed AGC with the help of neat circuit diagrams 7M
(b) Draw the block diagram of a Communication receiver. And briefly explain each block. 7M

[B16 EC 2204]

[B16 EC 2205]
II/IV B.Tech Degree Examination
Second Semester
Signals and systems
MODEL QUESTION PAPER
Electronics and Communication Engineering

Time : 3 Hrs.

Max. Marks : 70

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

1. [7x2=14M]

- (a) Find and sketch the first derivative of the following signal
 $x(t) = u(t) - u(t - a), a > 0$.
- (b) Determine whether or not the following signal is periodic. If periodic, determine its Fundamental period. $x(t) = \cos t + \sin \sqrt{2} t$.
- (c) Determine whether the following signal is energy signal or power signal or neither
 $x(t) = A \cos(\omega_0 t + \theta)$
- (d) The input $x(t)$ and the impulse response $h(t)$ of a continuous LTI system are given by $x(t) = u(t); h(t) = e^{-at}u(t), a > 0$. Compute the output $y(t)$.
- (e) List any two properties of z-transform.
- (f) Define DFT and IDFT.
- (g) Determine the discrete Fourier series representation for $x[n] = \cos n \pi / 4$.

2. (a) Check whether the following systems are
- i) Static or dynamic
 - ii) Linear or non linear
 - iii) Causal or no causal
 - iv) Time invariance or time variant.

$$(1) y(t) \frac{d^2 y(t)}{dt^2} + 3t \frac{dy(t)}{dt} + y(t) = x(t)$$

$$(2) y(n) = x(n) \cdot u(n)$$

- (b) Find the natural response of the system described by the difference equation

$$y(n) - 1.5 y(n - 1) + 0.5 y(n - 2) = x(n)$$

$$y(-1) = 1; y(-2) = 0$$

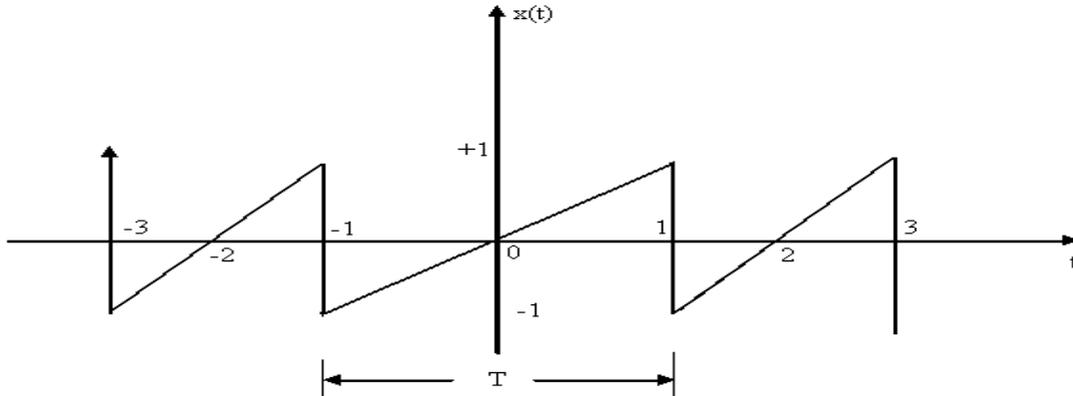
3. (a) Find the convolution of the following sequence
- $$x(n) = 2\delta(n + 1) - \delta(n) + \delta(n - 1) + 3\delta(n - 2)$$
- $$h(n) = 3\delta(n - 1) + 4\delta(n - 2) + 2\delta(n - 3)$$

- (b) Determine the stability of the system described by difference equations

v) $y(n) = 0.6 y(n - 1) - 0.08 y(n - 2) + x(n)$

vi) $y(n) = \frac{5}{2} y(n - 1) + y(n - 2) = x(n) - x(n - 1)$.

4. (a) Find the trigonometric Fourier series for the periodic signal $x(t)$ as shown in figure below



- (b) Find the average power of the signal

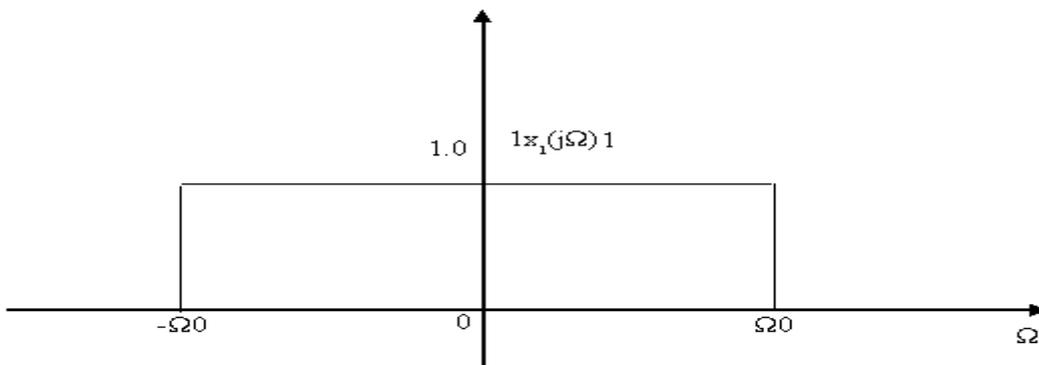
$$x(t) = 2 \sin^2(2500 \pi t) \cos(20,000 \pi t).$$

5. (a) Find the Fourier transform of the following:

(i) $e^{at}u(-t)$

(ii) $te^{-at}u(t)$

- (b) Find the inverse Fourier transform of $X(j\Omega)$ for the spectra shown in figure below.



6. (a) Find the convolution of the signals given below using Fourier transform

$$x_1(n) = \left(\frac{1}{2}\right)^n u(n); \quad x_2(n) = \left(\frac{1}{3}\right)^n u(n).$$

- (b) Compare Energy Spectral Density (ESD) and Power Spectral Density (PSD)

7. (a) A signal $x(t) = \sin c(150\pi t)$ is sampled at a rate of (i) 100Hz (ii) 200 Hz

(iii) 300Hz. For each of these cases, explain if you can recover the signal $x(t)$ from the sampled signal.

- (b) Find the z-transform and ROC for the following:

$$(i) x(n) = a^n u(n)$$

$$(ii) x(n) = -b^n u(-n-1).$$

8. (a) Find the inverse z-transform of the following:

$$(i) X(z) = 1 / (1 + 3z^{-1} + 2z^{-2}) \text{ ROC : } |z| > 2.$$

$$(ii) X(z) = (z + 1) / (z^2 + 5z + 4) \text{ ROC : } |z| < 2$$

(b) Solve the following difference equation for $y(n)$ using z-transform for the specified

Initial condition

$$y(n) - y(n-1) + \frac{1}{4} y(n-2) = x(n); n \geq 0$$

$$\text{where } x(n) = 2 \left(\frac{1}{8} \right)^n; y(-1) = 2 \text{ and } y(-2) = 4.$$

[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 is compulsory
Answer any FOUR questions from remaining
All questions carry equal marks
All parts of a question must be answered at one place only

1. Write short answers for the following:

- (a) 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 EC 3101]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
LINEAR ICS AND APPLICATIONS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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 the purpose of level translator in differential amplifier. 2M
 - b. Draw the V to I and I to V convertor. 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. Draw the block diagram of PLL and list out each block name 2M
 - g. What are the basic DAC techniques? 2M
2.
 - a. Explain different frequency compensation techniques of op-amp 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 a Wide Band Pass Filter with $f_L=200\text{Hz}$ $f_H=1\text{kHz}$ and pass band gain of 4 Calculate the value of Q for the filter. 7M
4.
 - a. Give the functional block diagram of VCO NE 565 and explain its working and necessary expression for free running or center frequency. 7M
 - b. Design RC phase shift oscillator for $f = 1\text{KHz}$. 7M
5.
 - 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
6.
 - a. Draw and explain the working of Successive Approximation A/D converter 7M
 - b. Draw the circuit of weighted resistor DAC and derive expression for output analog voltage V_o . 7M
7.
 - a. List Out DAC and ADC Specifications 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 $V_{in} = 1\text{V}(p-p)$ Find the values of V_{UT} and V_{LT} . 7M
8. Write a short note on
 - a. Switched Capacitance Filters. 5M
 - b. Analog Multiplexers. 5M
 - c. Any 2 Applications of PLL. 4M

[B16 EC 3101]

[B16 ENG 3101]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
PRINCIPLES OF ECONOMICS AND MANAGEMENT
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write short notes on 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 3101]

[B16 EC 3102]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
COMPUTER ARCHITECTURE AND ORGANIZATION
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write short notes on the following:
 - a. Write about the different Logical micro operations. 2M
 - b. List out the registers & their basic functions for digital computer 2M
 - c. Explain about micro instruction format with an example. 2M
 - d. Explain about stack instructions. 2M
 - e. Briefly explain about DMA. 2M
 - f. What is effective address. 2M
 - g. What is a control word? 2M

2.
 - a. Explain the operation of 4-bit adder-subtractor with a neat diagram. 7M
 - b. Describe the general register organization. 7M

3.
 - a. Explain about Timing and Control Unit design. 7M
 - b. With the help of a flowchart explain the operation of a basic computer during
1. Instruction cycle 2. Interrupt cycle 7M

4.
 - a. Write the merits and demerits of micro programmed control unit compared to a hardwired control unit. 7M
 - b. Explain the concept of microprogramming in detail with the help of an example. 7M

5.
 - a. With an example, explain various addressing modes and write how to calculate the address in each case. 7M
 - b. What are the characteristics of a RISC processor? What is CISC processor? 7M

6.
 - a. Explain Daisy Chain Interrupt Mechanism. List the advantages and disadvantages in this scheme. 7M
 - b. With the help of block diagram and truth table explain the operation of an I/O interface unit 7M

7.
 - a. A system employs RAM chips of 256bytes and ROM chips of 1024bytes. It needs 2KB RAM, 4KB ROM and four interface units with four registers each and memory mapped I/O used. The two highest order bits of address bus are 00 for RAM, 01 for ROM and 10 for interface registers. Draw a memory address map for the system 7M
 - b. What is Cache memory and explain two mapping methods in implementation of Cache. 7M

8. Answer the following 7M
 - a. Asynchronous Data transfer operation. 7M
 - b. Main memory
 - c. What are various modes of communication.

[B16 EC 3102]

[B16 EC 3103]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
ANTENNAS AND PROPAGATION
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write short notes on the following:
 - a. Define directive gain and directivity of an antenna. 2M
 - b. What are the limitations of Binomial arrays? 2M
 - c. State the principle of pattern multiplication. 2M
 - d. Design a Rhombic antenna at a frequency of 20MHz when the angle of elevation is 30° . 2M
 - e. Find the gain of a paraboloid antenna of 10 m diameter operating at 10 GHz when halfwave dipole feed is used 2M
 - f. Define critical frequency and MUF 2M
 - g. What are the conditions required for the formation of a duct? 2M
2. a. Show that the radiation resistance of a $\frac{\lambda}{4}$ - monopole is 36.5Ω . 7M
- b. Discuss in detail the directional properties of dipole antennas. 7M
3. a. What are Broadside and end fire arrays? Obtain expressions for BWFN and HPBW for both types of arrays. 7M
- b. An array contains 30 isotropic elements and the spacing between successive elements is $\frac{\lambda}{2}$. If the array is excited as a Broadside array, find BWFN and HPBW. If the same array is excited as an end fire array, find BWFN and HPBW. 7M
4. a. Explain in detail the Fourier transform method of synthesizing a line source. 7M
- b. Design a 10 – element, symmetrically excited Dolph – Chebychev linear array with a side lobe level of – 20 dB and a spacing of $\frac{\lambda}{2}$. 7M
5. a. Explain in detail the operating principles of a Helical antenna. 7M
- b. Compare travelling wave and standing wave antennas. 7M
6. a. Explain in detail the Fourier transform method of synthesizing a line source. 7M
- b. Explain in detail the method of measurement of Antenna impedance by slotted line method. 7M
7. a. Describe ground wave propagation in detail. 7M
- b. Obtain an expression for the refractive index of ionosphere. 7M
8. Write short notes on the following
 - a. Types of current distributions on antennas. 4M
 - b. Feed mechanisms of paraboloid antennas 5M
 - c. Fading in Ionospheric propagation and remedial measures. 5M

[B16 EC 3103]

[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.

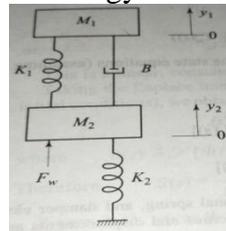
Answer any FOUR questions from the remaining.

All Questions Carry equal marks

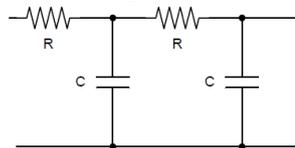
All parts of a question must be answered at one place only.

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

$$G(S) = \frac{25}{S(S+5)}$$
 - e. What is the SS error for unit ramp input? 2M
 - f. What is the advantage of 'Derivative control' action? 2M
 - f. Sketch the polar plot for $G(S)H(S) = \frac{1}{S^2(1+S\tau)}$. 2M
 - 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



- b. A unity feedback system is characterized by an open-loop transfer function $G(s) = K/S(S+10)$. 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 open loop transfer function of the system is $G(S)H(S) = \frac{K}{S(S+1)(S+2)}$ 7M
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 transfer function $G(S)H(S) = \frac{3}{S(S+1)^2}$. 14M
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 EC 3104]
III/IV B.Tech. DEGREE EXAMINATION
First Semester
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write short notes on the following:
 - a. Distinguish between accuracy and precision. 2M
 - b. List the advantages of Wheatstone bridge. 2M
 - c. What are the factors to be considered for selections of transducers? 2M
 - d. Explain piezo-electric effect. 2M
 - e. Define Gauge factor 2M
 - f. List the advantages of Digital Voltmeters over analog meters 2M
 - g. Explain 10:1 CRO probe 2M
2.
 - a. Discuss briefly the different types of static errors of a measuring instrument. 7M
 - b. Explain the working of a true RMS voltmeter with the help of a suitable block diagram. 7M
3.
 - a. Discuss the working of spectrum analyzer with its basic circuit. 7M
 - b. With a neat diagram explain the working of Square wave generator. 7M
4.
 - a. Explain the principle and working of a storage oscilloscope. 7M
 - b. Explain the Measurement procedure of Lissajous patterns with one example. 7M
5.
 - a. Explain the operation of Maxwell's Bridge and derive the condition for balance of a Bridge. 7M
 - b. In the case of Hay's Bridge one arm has resistance of $10K\Omega$.Another arm has a resistance of $6.7K\Omega$. The third arm $8K\Omega$ in series with a capacitor of $0.5\mu F$.Determine the values of the elements R_x and L_x in the fourth arm. Assume $\omega=2000$ rad/sec. 7M
6.
 - a. Draw the Linear variable differential Transducer and explain its working in detail. 7M
 - b. List out different types of Strain Gauges used Transducer and explain any one in detail. 7M
7.
 - a. Explain CRO with neat block diagram. 7M
 - b. What is piezo electric effect? Explain the working of Piezo electric transducer. 7M
8. Explain the following
 - a. Thermocouple 4M
 - b. Integrating type Digital Voltmeter 5M
 - c. DC Ammeter 5M

[B16 EC 3104]

[B16 EC 3201]

III/IV B.Tech. DEGREE EXAMINATION

Second Semester

MICROWAVE ENGINEERING

MODEL QUESTION PAPER

ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) Define directivity and coupling factor of a 4-port directional coupler. 2M
 - b) Draw the schematic diagram and explain how a circulator is used as a duplexer to connect the radar transmitter, receiver and antenna. 2M
 - c) Draw the schematic diagram and explain how the isolator is used to prevent the re-radiation from the local oscillator. 2M
 - d) List the applications of a TWT. 2M
 - e) Define terms VSWR, Reflection coefficients. 2M
 - f) List the properties of Scattering matrix. 2M
 - g) Differentiate MMICs from conventional ICs 2M
- 2**
- a) Explain the operations of directional coupler with the help s-parameters. 7M
 - b) Explain the operation of Magic-Tee and derive the S-parameters. 7M
- 3**
- a) Explain in detail about the limitations of conventional vacuum tubes at microwave frequencies. 7M
 - b) The operating frequency of a reflex klystron is 10GHz, it has a DC beam voltage of 200V, a repeller spacing of 0.1cm for $1\frac{3}{4}$ mode. Determine the maximum value of power and the corresponding repeller voltage for a beam current of 60mA. 7M
- 4**
- a) Explain the working of magnetron with neat diagram. 7M
 - b) Explain in detail the principle of operation of GUNN diode and detail different modes of operation of gunn diode. 7M
- 5**
- a) What is a scattering matrix? Write the properties of a scattering matrix for reciprocal device. 7M
 - b) Show that the 'S' matrix of a perfectly matched 2-port network is $\begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$ 7M
- 6**
- a) An air filled rectangular cavity resonator has $a=d=2\text{cm}$, and $b=1\text{cm}$ and is operated in the TE_{101} mode calculate
 - I. Resonant frequency.
 - II. If the cavity is filled with a dielectric of a relative permittivity 2.5, what is the resonant frequency? 7M
 - b) Explain the procedure for measurement of low and high VSWR with block diagram. 7M

- 7 a) Describe the ideal characteristics of substrate, conductor, dielectric and resistive film materials and that are used in MMICs. 7M
- b) Explain in detail about the fabrications Techniques of MMICs. 7M
- 8 a) Explain the procedure with a neat diagram to measure the coupling factor and directivity of a given directional coupler. 7M

[B16 EC 3201]

[B16 EC 3202]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
MICROPROCESSORS AND ITS APPLICATIONS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) Define T- state, machine cycle and instruction cycle. 2M
 - b) Distinguish between static RAM and dynamic RAM. 2M
 - c) Explain the execution of DAA instruction. 2M
 - d) Explain the function of ALE signal. 2M
 - e) What is pipelined architecture of 8086 microprocessor? 2M
 - f) List the advantages of memory segmentation in 8086. 2M
 - g) Explain the difference between 8086 and 8088 microprocessors. 2M
- 2**
- a) Draw the 8085 programmable registers and explain the function of each register. 7M
 - b) With a neat diagram explain the interrupt structure of 8085 microprocessor. 7M
- 3**
- a) Discuss all addressing modes of 8085 microprocessor with examples. 7M
 - b) Write an 8085 ALP to count the number of 1's and 0's in a 16 bit binary number. 7M
- 4**
- a) What is subroutine and explain how it is implemented in 8085 using CALL and RET instructions. 7M
 - b) Draw and explain 8085 timing diagram for the execution of OUT 80H instruction. 7M
- 5**
- a) Distinguish between I/O mapped I/O and Memory mapped I/O. 5M
 - b) With a neat diagram explain the function of Inter 8255 (PPI) and features of I/O in different modes of operation. 9M
- 6**
- a) Draw and explain the functional block diagram of Intel 8086 microprocessor. 9M
 - b) Draw the flag register structure of 8086 and explain the function of each flag. 5M
- 7**
- a) Explain the data addressing modes of 8086 with examples. 7M
 - b) Write an 8086 assembly language program to multiply to 16 bit binary numbers stored in memory locations C010H and C012H. Store the result at memory location C014H onwards. 7M
- 8** Write short notes on the following.
- a) 8086 minimum and maximum modes. 7M
 - b) 8086 memory banks. 7M

[B16 EC 3202]

[B16 EC 3203]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
DIGITAL COMMUNICATION

MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) The error probability of BPSK is less than that of BFSK, explain why? 2M
 - b) What is flat top sampling & Natural sampling? 2M
 - c) Explain the term “White Noise”. 2M
 - d) What is a correlator? 2M
 - e) Write short notes on Equalizer. 2M
 - f) What is a DS spread spectrum signal? 2M
 - g) Define Noise bandwidth? 2M
- 2**
- a) Explain the modulation and demodulation techniques for pulse time modulation systems. 7M
 - b) Explain about delta modulation(DM) system and design an Adaptive Delta Modulation(ADM) system to eliminate the drawbacks generated in DM system. 7M
- 3**
- a) Explain how a binary signal can be transmitted and received by using a BPSK system? 7M
 - b) With the help of an example, explain the method of generating a phase continuous MSK signal. 7M
- 4**
- a) Explain the role of a QPSK transmitter and receiver in serial data transmission and reception. 7M
 - b) In a DPSK Receiver, the received bit sequence $b(t)$ is 01101100 then
 - i) Find reconstructed bit sequence $d(t)$ 7M
 - ii) Due to presence of noise $b(t)$ is recovered as 01111100 then detect $d(t)$ and identify the bits which are wrongly detected. Use EX-OR logic.
- 5**
- a) Derive the expression for output SNR when the binary signal is transmitted using BPSK in a PCM system. 7M
 - b) Derive the relation for output noise power spectral density as $G_{no}(f) = |H(f)|^2 G_{ni}(f)$ where $G_{ni}(f)$ is input noise power spectral density of a filter with transfer function $H(f)$. 7M
- 6**
- a) What is the function of a base band signal receiver and derive its probability of error ? 7M
 - b) Derive the expression for transfer function $H(f)$ for an optimum filter. 7M
- 7**
- a) Explain in detail about Frequency Hopping spread spectrum technique. 7M
 - b) Explain the methods of generating PN sequence. 7M
- 8** Answer the following
- a) Companding 4M
 - b) Probability of error for BFSK 5M
 - c) Effect of filtering on probability density of Gaussian noise 5M

[B16 EC 3203]

[B16 EC 3204]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
RADAR & NAVIGATION
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) What are the important variables in a Radar Equation. Relate them 2M
 - b) Define the blind speed. 2M
 - c) Explain about the integration of radar Pulses briefly. 2M
 - d) What is the Non-coherent Radar. Explain briefly 2M
 - e) Give the function of STALO and COHO in MTI radars 2M
 - f) Distinguish between ECM and ECCM. 2M
 - g) What are the Inland Shipping Aids. 2M
- 2**
- a) Draw the block diagram of a basic Radar system and explain its operation. 7M
Discuss the system losses in Radar briefly.
 - b) Define minimum detectable signal Give the factors that affecting the minimum detectable signal 7M
- 3**
- a) Explain the principle of operation of an MTI Radar with a neat block schematic diagram. 7M
 - b) Give the various limitations to the MTI radar performance. 7M
- 4**
- a) Discuss the Airborn Doppler Radar 7M
 - b) Draw the block diagram of a Mono Pulse Tracking Radar system and explain its operation. 7M
- 5** Give the structure and explain the active aperture array radar 14M
- 6** Illustrate the working of ILS in brief. 14M
- 7**
- a) Describe the sailent features of VOR 7M
 - b) What is meant by LORAN and explain 7M
- 8** Write short notes on:
- a) Radar Displays 4M
 - b) Distance Measuring Equipment 5M
 - c) Radio Altimeter 5M

[B16 EC 3204]

[B16 EC 3205]
 III/IV B.Tech. DEGREE EXAMINATION
 Second Semester
INFORMATION THEORY AND CODING
 MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION ENGINEERING

Time: 3 Hrs.

Max. Marks: 70

Question No. 1 compulsory.

Answer any FOUR questions from the remaining.

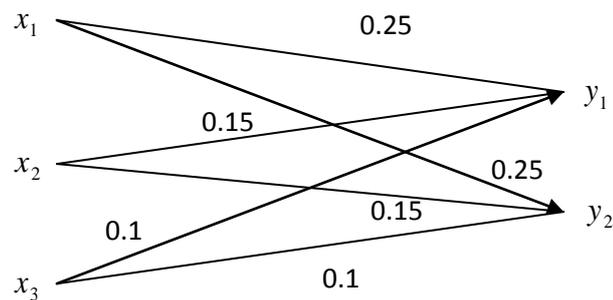
All Questions Carry equal marks

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

- 1 Write Short notes on the following
 - a) Write the binary entropy function & sketch it. 2M
 - b) Define mutual information & explain its significance. 2M
 - c) What is the channel capacity for a teleprinter channel with a 300 Hz bandwidth and a signal to noise ratio of 3 dB 2M
 - d) List the advantages of binary cyclic codes over linear block codes. 2M
 - e) Define code rate & constraint length of a convolutional code. 2M
 - f) Mention the applications of Trellis codes & Concatenated codes. 2M
 - g) Cite the advantages of LDPC codes over Turbo codes. 2M

- 2 a) An analog signal is band limited to 800 Hz, sampled at the Nyquist rate, and the samples are quantized into four levels. The quantization levels are assumed independent and occur with probabilities (1/8, 1/8, 3/8, and 3/8). Find the entropy $H(X)$ and information rate R of the source. 7M
- b) A source emits messages with probabilities (1/2, 1/4, 1/8, 1/16, 1/32, and 1/32). Calculate (i) entropy of the source, (ii) Apply Shannon-Fano algorithm to devise a binary code for this source and find its coding efficiency and redundancy. 7M

- 3 a) Find the mutual entropy $H(X;Y)$ for the channel shown below. Joint probabilities $P(XY)$ are given. Assume source symbols are equally likely. 7M



- b) State & explain the Shannon's noisy channel coding theorem. Find the channel capacity of a binary symmetric channel. 7M

- 4 a) Explain the generation of a linear systematic (n, k) block code using generator matrix. Define minimum Hamming distance d_{\min} of a code. What is the relation between d_{\min} and the error correcting capacity of a code? 7M

- b) Demonstrate that (7,4) Hamming code can correct a single error & can detect a double error by syndrome decoding. 7M
- 5 a) Find the generator polynomial & parity check polynomial for a linear (7,4) systematic cyclic code. Use them to code and decode a message 1010. 7M
 b) Write about BCH codes & CRC codes. 7M
- 6 a) Draw the structure of a rate 1/2 Convolutional coder for $g_1 = [1\ 0\ 1]$ and $g_2 = [0\ 1\ 1]$. 7M
 Explain the encoding process. Construct the state diagram, trellis diagram & code tree. Find the coder output for input data = [1 0 1 0 1].
 b) Distinguish between exhaustive search method and Viterbi decoding of Convolutional codes. Explain how the decoding complexity increases with the constraint length? 7M
- 7 a) Discuss the Burst error correction using RS codes & interleaving. 7M
 b) What is a MIMO system? Explain Space-Time Coded MIMO system using 2-transmit Alamouti STBC code. 7M
- 8 a) Describe Turbo codes structure, encoding & advantages. 7M
 b) Write short notes on: LDPC codes, Tanner graphs & applications. 7M

[B16 EC 3205]

[B16 CS 3210]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
OBJECT ORIENTED PROGRAMMING
MODEL QUESTION PAPER
COMPUTER SCIENCE & 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. Answer the following.
 - a) Write about virtual base class in C++.
 - b) Explain about Class Template.
 - c) Give an example of an Inline function.
 - d) When do you use Friend functions?
 - e) What is virtual destructor?
2.
 - a) Explain concepts of Object Oriented Programming.
 - b) Discuss Operator overloading concept with complex number addition example.
3.
 - a) Explain all kinds of inheritance in C++ with examples.
 - b) Write a program using class templates to sort an array of integers and an array of float numbers.
4.
 - a) What is Constructor and explain the types of constructors in C++?
 - b) Write a program using virtual functions. Your program contains two classes, base class by name College, derived class by branch derived both will contain a function display () that displays their respective details.
5.
 - a) What is an abstract class? Explain the differences between abstract class and an interface
 - b) Explain the pointer to objects with an example.
6.
 - a) Discuss Exception handling mechanism in C++.
 - b) Write a program for file copying using file streams in C++.
7.
 - a) Explain formatted and unformatted i/o operations with an examples.
 - b) Write a program to calculate the no of characters in given file.
8.
 - a) Differentiate the usage of access specifiers in c++ and their scope.
 - b) Explain virtual function with an example.

[B16 CS 3210]

[B16 CS 3211]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
WEB TECHNOLOGIES
MODEL QUESTION PAPER
COMPUTER SCIENCE & 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. Explain the following 14M
 - A. Order list & unordered list.
 - B. Cell spacing & Cell padding.
 - C. Universal Selector.
 - D. Differentiate GET & POST Methods.
 - E. DOM Levels
 - F. Cookie
 - G. Display today date using PHP.

2.
 - A. Explain about frames and forms with suitable examples. 7M
 - B. Explain about types of CSS with examples. 7M

3.
 - A. Difference between HTML and DHTML. 7M
 - B. Explain about Prompt, Alert, Confirm boxes with examples. 7M

4. Develop a java script to validate user email id and phone number. 14M

5.
 - A. Explain about name space with example. 7M
 - B. Write a XML schema of supermarket. 7M

6.
 - A. Write a PHP program to find and display factorial of a given number. 7M
 - B. Illustrate the usage of arrays in PHP. 7M

7. Write a HTML program to insert a record into the database. (USING PHP) 14M

8. What is session tracking? What are the ways to do session tracking?
How session tracking is done in PHP. 14M

[B16 CS 3211]

[B16 CS 3212]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
SOFTWARE ENGINEERING
MODEL QUESTION PAPER
COMPUTER SCIENCE & 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. Explain the following in Brief.
 - a. Software Quality Factors
 - b. Characteristics of Software Process
 - c. Requirement Review
 - d. Software Architecture
 - e. Software Engineering Team Structure
 - f. Object Oriented Design Concepts
 - g. Error, Fault and Failure
2. What is Software Engineering? Explain about various phases in Software Development Process?
3. Explain about
 - a. Waterfall Model
 - b. Time Boxing Model
4. What is Requirement Specification? Explain about the Characteristics and Components of SRS?
5. Write a short notes on Process planning and Explain about the Project Scheduling.
6. Explain clearly the concepts of Cohesion and Coupling. Are there some systems that cannot be made functionally cohesive? Why or why not?
7. Discuss the differences between Black Box Testing and White Box Testing? Discuss how these testing models may be used together to test a program module?
8. Explain the following
 - a. Architecture Views
 - b. Effort Estimation Models

[B16 CS 3212]

[B16 EC 3206]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
DIGITAL SIGNAL PROCESSING
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) What is aliasing? Why does it occur? How it can be eliminated? 2M
- b) Determine the Z-transform and region of convergence of the sequence $x(n) = [2^{-n} + 2^n]u(n)$. 2M
- c) State the relation between Z-transform, DTFT and DFT of a signal $x(n)$. 2M
- d) Compute the frequency response of a DT-LTI system with impulse response, $h(n) = (0.5)^n u(n)$ & sketch its magnitude/phase for $|\omega| \leq \pi$ 2M
- e) Compare the computational efficiency of FFT over DFT? What are the properties of DFT that permit this fast implementation? 2M
- f) Explain the effect of Window selection & filter length on FIR digital filter's frequency response? 2M
- g) How the fractional sampling rate conversion of a discrete signal $x(n)$, is achieved? 2M
- 2** a) Find the Z-transform of the signal $x(n) = 2^n u(n) - 3^n u(-n-1)$ and its region of convergence. 7M
- b) Show the series & parallel canonical realizations of the following digital transfer function: $X(z) = \frac{z^2 + 2z + 4}{(z - 0.8)(z^2 - 0.9z + 0.14)}$ 7M
- 3** a) Determine the inverse Z-transform of $X(z) = \frac{z(z^2 - 4z + 5)}{(z-1)(z-2)(z-3)}$ for $1 < |z| < 2$ 7M
- b) Determine the transfer function $H(z)$, impulse response $h(n)$, & step response $s(n)$ for the system described by a linear difference equation. Assume that the system is at rest initially. $y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1)$ 7M
- 4** a) Show that $\sum_{n=0}^{N-1} |x(n)|^2 = \frac{1}{N} \sum_{k=0}^{N-1} |X(k)|^2$, where $X(k)$ is the N-point DFT of $x(n)$. 7M
- b) Obtain the circular convolution of the two sequences given below using DFT method: $x_1(n) = (1, 2, -4)$ and $x_2(n) = (2, 3, 0, -3)$ 7M

- 5 a) Derive the decimation in frequency(DIF) FFT algorithm used to compute the DFT of a signal $x(n)$. 7M
- b) Compute the DFT of the following sequence using Radix-2 DIT FFT flow graph. Show the all intermediate stage results: $x(n) = (0,1,2,0,-2,-1,0,0)$. 7M
- 6 a) Compare FIR & IIR digital filters.Explain the Bilinear transformation method of designing IIR digital filters. 7M
- b) Design a linear-phase low pass FIR digital filter to meet the following specifications: (i) Pass band = 0 to 10 kHz (ii) Sampling frequency = 100 kHz(iii) Filter order =10. Compute the impulse response of the desired FIR digital filter using Hamming window. 7M
- 7 a) Illustrate the operation of up-sampler, down-sampler, Interpolator and Decimator in time and frequency domains with neat sketches. 7M
- b) What is a digital filter bank? Describe its operation & applications. 7M
- 8 a) Explain how Subband coding of speech signals reduces the bit rate. 7M
- b) Write short notes on the following: Finite precision arithmetic effects in the realization of digital filters. 7M

[B16 EC 3206]

[B16 EC 3207]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
EMBEDDED SYSTEMS & MICROCONTROLLERS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
 - a) Define embedded system and write any two examples. 2M
 - b) What is complex testing in embedded systems? 2M
 - c) What are the important goals of design process. 2M
 - d) Draw and explain the structure of PSW. 2M
 - e) Explain the instruction MOVX A,@DPTR. 2M
 - f) Explain about RTOS? 2M
 - g) Explain about Interrupt Latency. 2M

- 2**
 - a) Explain about hardware and memory units of embedded system. 7M
 - b) Explain about sharing data problem and Interrupt latency. 7M

- 3**
 - a) Draw and explain Round-Robin Architecture with example. 7M
 - b) Define
 - a) Semaphores and 7M
 - b) Shared Data

- 4**
 - a) Explain about Interrupt Routines in RTOS Environment. 7M
 - b) Write about Message Queues, Mailboxes, Pipes. 7M

- 5**
 - a) What are the Laboratory Tools used for Debugging. 5M
 - b) Explain about getting Embedded Software into the Target System 9M

- 6**
 - a) What is meant by Instruction Set Simulators in embedded system. 9M
 - b) What is message passing system give an example. 5M

- 7**
 - a) With neat diagram explain about architecture of 8051. 7M
 - b) Draw the pin diagram of 8051 and explain about each pin. 7M

- 8** Write a short notes on the following.
 - a) Arithmetic instructions of 8051. 7M
 - b) Logical instructions of 8051. 7M

[B16 EC 3207]

[B16 EC 3208]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
MICRO ELECTRONICS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
 - a) Define oxidation. 2M
 - b) Define ion implantation. 2M
 - c) Compare NMOS and CMOS. 2M
 - d) Draw CMOS inverter and explain its voltage transfer characteristics. 2M
 - e) Write about PLA? 2M
 - f) What are the applications of shift registers? 2M
 - g) Distinguish synchronous and asynchronous counters. 2M

- 2**
 - a) Explain about bipolar transistor fabrication with relevant cross-sectional diagram. 7M
 - b) Discuss about the characteristics of IC components. 7M

- 3**
 - a) Explain the operation of MOSFET as a switch. 7M
 - b) Explain the structure of CMOS circuit and draw the CMOS NAND & NOR gates 7M

- 4**
 - a) How do you synthesize a logic function using multiplexers? Give one example. 7M
 - b) Realize a n-bit parity generators with n no. one bit cells 7M

- 5**
 - a) Write notes on PLA 5M
 - b) Write notes on PAL and PLD's 9M

- 6**
 - a) Discuss the operation of 4-bit synchronous counter with D-flip-flop with relevant diagram. 9M
 - b) Write short notes on ring counter and Johnson counter 5M

- 7**
 - a) Discuss about carry look ahead adder with relevant example. 7M
 - b) Distinguish between ripple carry adder and carry select adder 7M

- 8** Write short notes on the following.
 - a) Applications of shift register 4M
 - b) Current mirrors 5M
 - c) Microelectronic circuit layout 5M

[B16 EC 3208]

[B16 EC 3209]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
TELECOMMUNICATION SWITCHING SYSTEMS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) What is the function of a cross bar switch in an exchange? 2M
 - b) What is the need for different stages in switching? 2M
 - c) Differentiate between micro programmed control and hard wired control. 2M
 - d) Define and Explain 1 ERLANG. 2M
 - e) Define what is grade of service and blocking probability. 2M
 - f) What is the difference between in channel signaling and common channel signaling? 2M
 - g) Write about different signaling in ISDN. 2M
- 2**
- a) Explain the detail functioning about touch tone dial telephone . 7M
 - b) Explain in detail about cross bar technology 7M
- 3**
- a) What is a stored program control? 7M
 - b) Draw and explain the function of N X N three stage network. 7M
- 4**
- a) Explain various types of Time division switching methods. 7M
 - b) Explain about TS and ST switching in detail. 7M
- 5**
- a) Write about dual processor configuration in centralized SPC . 5M
 - b) Explain about n stage combination switch. 9M
- 6**
- a) Explain in detail about different signaling system in common channel signaling. 9M
 - b) Derive the expression to find Erlang B formula. 5M
- 7**
- a) Explain the network and protocol architecture of ISDN. 7M
 - b) Write about Internetworking and various ISDN standards. 7M
- 8**
- a) Explain in detail about broad band ISDN? 7M
 - b) Write about different signaling systems in ISDN 7M

[B16 EC 3209]

[B16 EC 3210]
III/IV B.Tech. DEGREE EXAMINATION
Second Semester
DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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** Write Short notes on the following
- a) What is interpolation and decimation? 2M
 - b) Write about different computational errors in DSP processors 2M
 - c) State different types of data and memory addressing modes. 2M
 - d) Define dynamic range and precision. 2M
 - e) Write about the interrupt of TMS320C54XX. 2M
 - f) Draw the block diagram of the digital signal processing system. 2M
 - g) Briefly explain about micro signal architecture. 2M
- 2** Discuss in brief about the data addressing capabilities of programmable DSP devices with examples. 14M
- 3** Describe the following on-chip peripherals of TMS320C54xx processors.
- a) Hardware Timer 7M
 - b) Host port interface 7M
- 4** a) Write a brief note on Micro Signal architecture. 6M
b) Explain in detail about Blackfin processor. 8M
- 5** a) Draw and explain the block diagram of memory interface for TMS320C5416 processor. 5M
b) How does DMA help in increasing the processing speed of a DSP processor? 9M
- 6** a) Explain in brief about errors in A/D conversion process. 9M
b) Explain the concept of Pipelining for speeding up the execution of a instruction. 5M
- 7** a) Describe the operation of the following instructions: 7M
(i) MAS *AR3-, *AR4+, B, A
(ii) MAC *AR1+, *AR2-, A
b) Discuss in brief about the basic peripherals in analog devices family of DS devices. 7M
- 8** Write short notes on any **TWO** of the following: 14M
- a) Parallel I/O Interface
 - b) Memory map of TMS320C5416
 - c) Barrel Shifter

[B16 EC 3210]

[B16EC4101]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
DIGITAL IMAGE PROCESSING
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) Define Digital Image? 2M
 - b) Write the expression for Guassian noise. 2M
 - c) What is meant by Image Restoration? 2M
 - d) What is the need of Image Compression? 2M
 - e) List the hardware oriented color models? 2M
 - f) What are the steps involved in DIP? 2M
 - g) Write the applications of segmentation 2M

2.
 - a) Explain various steps involved in digital image processing. 7M
 - b) Discuss image sampling and quantization. 7M

3.
 - a) Explain about smoothing using frequency domain filters. 7M
 - b) Compare Butterworth and Gaussian filters. 7M

4.
 - a) Describe various noise modals. 7M
 - b) Explain about inverse filtering techniques. 7M

5.
 - a) Explain image restoration with a neat block diagram. 7M
 - b) Discuss wiener filtering. 7M

6.
 - a) Explain the need for compression. 7M
 - b) Discuss about variable length coding. 7M

7.
 - a) Explain HSI color modal. 7M
 - b) Discuss color slicing and tone corrections. 7M

8.
 - a) What is need for segmentation explain in detail. 7M
 - b) What is thresholding and how do you achieve in segmentation. 7M

[B16EC4101]

[B16EC4102]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
VLSI DESIGN
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) State Moor's Law. 2M
 - b) What are the advantages of n-well CMOS circuits over p-well CMOS circuits? 2M
 - c) Draw the stick diagram for NMOS inverter 2M
 - d) What is scaling? 2M
 - e) What is DRC? 2M
 - f) What is meant by switch logic? 2M
 - g) What are contact cuts? 2M
2.
 - a) Derive the relationship between drain to source current I_{ds} versus drain to source voltage V_{ds} in non-saturated and saturated region. 6M
 - b) What are the steps involved in the nMOS fabrication? Explain with neat sketches. 8M
3.
 - a) Write about E-beam masks? What are the advantages of E-beam masks? Explain the approaches to design of E-beam machines. 7M
 - b) Explain the p-well process for a CMOS inverter with neat diagrams. 7M
4.
 - a) Draw and explain two-input NMOS NOR gate using circuit diagram, stick diagram and lay out diagrams? 7M
 - b) What is stick diagram? Draw the stick diagram and layout for a CMOS inverter. 7M
5. Draw and explain the procedure for stick diagrams using CMOS Design style by taking as an example the design of a 1-bit shift register cell and draw its lay-out diagram. 14M
6.
 - a) Explain the sheet resistance and layer capacitance for MOS transistor and inverter. 7M
 - b) What are the limitations of scaling on Substrate doping and Miniaturization? 7M
7. Explain different forms of CMOS logic 14M
 - (i) Pseudo NMOS logic
 - (ii) Dynamic CMOS logic
 - (iii) CMOS domino logic
8.
 - a) Explain about Built-in-self-test (BIST) with neat diagrams. 10M
 - b) Distinguish between CMOS, Bipolar and GaAs technologies. 4M

[B16EC4102]

[B16EC4103]
IV/IV B.Tech. DEGREE EXAMINATION
First Semester
FIBER OPTIC COMMUNICATIONS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) What is total internal reflection? 2M
 - b) What is meant by refractive index of a material? 2M
 - c) Define numerical aperture of a step index fiber. 2M
 - d) Define fiber coupler. 2M
 - e) What are the advantages of photodiodes? 2M
 - f) What is meant by population inversion? 2M
 - g) What is WDM? 2M
2.
 - a) Discuss briefly the advantages of optical fiber communication. 7M
 - b) Derive the Numerical Aperture of a step index fiber (SIF) from Snell's law. 7M
3. Define
 - a) Cut off wavelength
 - b) Mode Field Diameter
 - c) Effective Refractive Index 14M
4.
 - a) What is material dispersion? Derive an expression for material dispersion starting from the expression for group delay. 7M
 - b) An 8km optical link consists of multimode step index fiber with a core refractive index of 1.45 and relative refractive index difference of 1.2%. Estimate: 1) The delay difference between the slowest and fastest modes at the fiber output 2) The rms pulse broadening due to intermodal dispersion. 7M
5. Mention and explain different Splicing techniques. 14M
6.
 - a) Following are the parameters of a point-to-point optical link : i) Optical power launched: +2dBm ii) Sensitivity of detector: -22 dBm iii) Source/detector connector loss: 1 dB iv) Length of optical cable: 50 km v) Cable attenuation: 0.3 dB/km vi) Jumper cable loss : 2 dB vii) Connector loss at each fiber joint : 1 dB (two at each transmitter and receiver end because of the jumper cables) Compute the power margin of the link using spread sheet method. 7M
 - b) Derive an expression for the total system rise time budget in terms of transmitter fiber and receiver rise time. 7M
7. Explain about Probability of error, Quantum limit and Analog receivers in optical fiber receiver. 14M
8.
 - a) Draw and explain the output patterns of source to fiber power launching. 7M
 - b) Explain the principle of WDMs and explain different types of WDMs with suitable figures. 7M

[B16EC4103]

[B16EC4201]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
CELLULAR AND MOBILE COMMUNICATIONS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) Define Interference. 2M
 - b) How a cellular telephone call is made? 2M
 - c) What is handoff technique, discuss briefly. 2M
 - d) Explain frequency reuse concept. 2M
 - e) What is cell dragging? 2M
 - f) Why the basic cellular system is hexagonal in shape, explain. 2M
 - g) Write about the effect of fading in wireless communications. 2M
2.
 - a) Describe the principle of operation of cellular mobile system and Explain cellular concept with neat diagram. 7M
 - b) Write about Trunking and Grade of service. What are various types of Interference in cellular systems? 7M
3.
 - a) Explain in detail about the different techniques for improving coverage and capacity in Cellular systems. 7M
 - b) What is the need for frequency reuse concept in cellular Communication system and derive the equation for the frequency reuse ratio. 7M
4.
 - a) What is meant by hand off? Describe the classification of hand off process. 7M
 - b) What is CDMA? Why it is also called as spread spectrum and also explain how CDMA can reduce the effect of interference in wireless mobile communications. 7M
5.
 - a) What are the different types of GSM channels? Explain. 7M
 - b) Explain the frame structure of GSM, in detail. 7M
6.
 - a) Write a short note on TDMA, FDMA, SDMA, and CSMA. 7M
 - b) What is fading? How its effect the wireless mobile communication explain. 7M
7.
 - a) Name and explain various outdoor and indoor propagation models. 7M
 - b) What is large scale path loss explain. 7M
8. Write a short note on the following. 14M
 - (a) Packet Radio.
 - (b) AMPS.
 - (c) Diffraction.
 - (d) Scattering.

[B16EC4201]

[B16EC4202]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
COMPUTER NETWORKS
ELECTRONICS AND COMMUNICATION 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. Write any 4 uses of computer networks. 2M
 - b. Explain about Manchester encoding and Differential Manchester encoding. 2M
 - c. Explain about character stuffing and bit stuffing. 2M
 - d. Define 1-persistent CSMA and non-persistent CSMA. 2M
 - e. Explain about the functions of repeater and gateways 2M
 - f. Draw UDP header format. 2M
 - g. Explain about LAN. 2M
2.
 - a. Draw the neat diagram of ISO-OSI reference model and explain the function of each layer in detail. 7M
 - b. Explain about Topologies of networks in detail. 7M
3.
 - a. Write about Digital to Analog conversion techniques in detail . 7M
 - b. Explain about Circuit, Message and Packet switching's in detail. Compare Circuit Switching and Packet switching. 7M
4.
 - a. A bit stream 10011101 is transmitted using the standard CRC method .The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission .Show that this error is detected during transmission. 7M
 - b. Explain in detail about Go back n and Selective Repeat protocols. 7M
5.
 - a. Explain about pure ALOHA in detail. 7M
 - b. Explain about different types of Multiplexing's in Physical layer. 7M
6.
 - a. Explain the Leaky bucket algorithm for congestion control. 7M
 - b. Explain about IP addresses. 7M
7.
 - a. Discuss about TCP segment header in detail. 7M
 - b. Discuss about SMTP in detail. Explain about the role of MIME and POP in SMTP. 7M
8.
 - a. Draw the neat diagram of B-ISDN reference model and explain the function of each layer in detail. 7M
 - b. Explain in detail about General principles of congestion control. 7M

[B16EC4202]

[B16EC4203]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
INTERNET OF THINGS
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) What is IoT and how it differ from web of things? 2M
 - b) List the examples of IoT's 2M
 - c) Define smart objects and give any two examples. 2M
 - d) What is Zigbee and mention its applications. 2M
 - e) Name different IoT platforms. 2M
 - f) Write short notes on web networking basics. 2M
 - g) Define atoms and bits. 2M

2.
 - a) Write in detail about the case studies from retail and healthcare. 7M
 - b) Explain various protocols used in IoT? 7M

3.
 - a) Explain the modified stack for the IoT/M2M systems? 7M
 - b) Identify and explain various communication technologies. 7M

4.
 - a) Demonstrate IoT protocol architecture with Neat Sketch. 7M
 - b) Explain about agent and multi agent systems? 7M

5.
 - a) Mention and explain the cloud band services. 7M
 - b) Write about the basic components of sensor networks. 7M

6.
 - a) Discuss storage and computing using cloud platform. 7M
 - b) Explain the concept of prototyping of connected objects. 7M

7.
 - a) Discuss about challenges in IoT. 7M
 - b) Explain how IoT uses low power wireless technologies? 7M

8.
 - a) Explain about Raspberry Pi/Beagle board based Gateways? 7M
 - b) List and explain different technologies behind IoT. 7M

[B16EC4203]

[B16 EC 4204]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
DIGITAL SYSTEM DESIGN THROUGH HDL
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) Explain programming model of HDL. 2M
 - b) Explain the packages in HDL language. 2M
 - c) Give data types in HDL language. 2M
 - d) What is implicit and explicit in VHDL. 2M
 - e) Write a program for full adder using half adder IN Verilog. 2M
 - f) Write short notes on random test. 2M
 - g) What is Propagation delay. 2M

2.
 - a) Write short notes on concurrency and functional verification. 7M
 - b) Write a VHDL program for 16:1 multiplexer using 4:1 multiplexer in dataflow model with test bench. 7M

3.
 - a) Write a vhdl code for 4-bit ripple carry adder 7M
 - b) Write vhdl code for 4-bit up/down counter 7M

4.
 - a) Draw the block diagram, state graph and VHDL program for the behavioral Model of a 4-bit multiplier. 7M
 - b) Design a 4-bit BCD to binary converter. Draw the block diagram and VHDL code. 7M

5.
 - a) Write the Verilog code for basic functional unit of a dynamic shift register. 7M
 - b) Discuss briefly behavioral modeling of flip-flops and latches and Edge detection. 7M

6.
 - a) Explain about 'Mappin Process.' 7M
 - b) What is the purpose of 'constraints' in synthesis process? Explain. 7M

7.
 - a) Write a short note on testing of Logic Circuits. 7M
 - b) Explain random tests & built-in-self test. 7M

8.
 - a) Explain ASM & ASMD charts for behavioral modeling. 7M
 - b) Write a Verilog program on encoders & decoders using behavioral modeling. 7M

[B16 EC 4204]

[B16 EC 4205]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
BIO MEDICAL SIGNAL PROCESSING
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) What is Deterministic signal? 2M
 - b) What is meant by ergodicity? 2M
 - c) Write a note on spectral estimation in biomedical signals. 2M
 - d) List out a few physiological interferences that may be encountered while acquiring a signal of interest. 2M
 - e) Enumerate the origin of bio potentials with example. 2M
 - f) What is meant by Joint probability? 2M
 - g) Highlight the applications of EEG. 2M

2.
 - a) Discuss the electric activity of the heart. What is the significance of the Einthoven's triangle? 7M
 - b) Explain the use of computers in analysis of biomedical signals. 7M

3.
 - a) Explain how time frequency analysis is helpful in biomedical signal processing. 7M
 - b) Design an optimal filter to remove noise from a signal, given that the signal and noise processes are independent, stationary, random processes. 7M

4.
 - a) Comment on ICA. How it is applicable for cocktail party like problem as applied to EEG signals. 7M
 - b) Explain the principles of Adaptive noise canceller with an example. 7M

5.
 - a) Given a biomedical signal, identify discrete signal epochs and correlate them with events in the related physiological processes. 7M
 - b) Write a note on Joint Time-frequency analysis of biomedical signals. 7M

6.
 - a) Propose an algorithm to detect QRS complexes in an ongoing ECG signal. 7M
 - b) After applying the AZTEC algorithm to a signal, the saved data array is {2, 50, -4, 30, -6, 50, -6, 30, -4, 50, 2, 50}. 7M
 - (i) Draw the waveform that AZTEC would reconstruct from these data.
 - (ii) What is the amount of data reduction?
 - (iii) What is the peak-to-peak amplitude of a signal reconstructed from these data?

7.
 - a) Write down the classification of EEG rhythms based on the frequency bands. 7M
 - b) Mention the types of artifacts interfering with the EEG acquisition and the method by which they are processed. 7M

8.
 - a) Propose a method to detect the presence of the α rhythm in an EEG channel. How is it extended to detect the presence of the same rhythm simultaneously in two channels? 7M
 - b) With a suitable algorithm, substantiate the adaptive segmentation of EEG signals. 7M

[B16 EC 4205]

[B16 EC 4206]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
SATELLITE COMMUNICATION
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) List various frequency allocations for satellite services. 2M
 - b) Why uplink frequency is higher than down link frequency. 2M
 - c) What are Launch Vehicles give some examples. 2M
 - d) What are the functions of Telemetry, Tracking and Command Subsystem. 2M
 - e) Define the terms Apogee and Perigee. 2M
 - f) What are the functions of transponders? 2M
 - g) Differentiate multiplexing and multiple access technique. 2M

2.
 - a) Explain Kepler's laws of planetary motion. 7M
 - b) Describe look angle determination. 7M

3.
 - a) What are functions AOCS subsystem . 7M
 - b) Discuss the spin control satellite system. 7M

4.
 - a) Explain earth station with neat diagram. 7M
 - b) Discuss C/N ratio of link design. 7M

5.
 - a) Compare multiple access methods in satellite communication. 7M
 - b) Explain about spread spectrum communication. 7M

6.
 - a) Write a short note on INSAT. 7M
 - b) Discuss about satellite navigational system. 7M

7.
 - a) Explain various effects of rain on link margin. 7M
 - b) Write a short on direct broadcast satellites. 7M

8.
 - a) Discuss about sun transit outage. 7M
 - b) Explain various launching vehicles. 7M

[B16 EC 4206]

[B16 EC 4207]
IV/IV B.Tech. DEGREE EXAMINATION
Second Semester
DIGITAL TV
MODEL QUESTION PAPER
ELECTRONICS AND COMMUNICATION 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. Write Short notes on the following
 - a) What is meant by persistence of vision? 2M
 - b) Define dynamic range. 2M
 - c) List various coded signals 2M
 - d) What is the need for audio synchronization? 2M
 - e) Write the practical limitations of D/A conversion. 2M
 - f) What is aspect ratio? 2M
 - g) Differentiate multiplexing and multiple access technique. 2M

2.
 - a) Discuss principals of color vision. 7M
 - b) Explain various video compression techniques. 7M

3.
 - a) Explain about digital TV audio encoding. 7M
 - b) Discuss about digital TV transport system. 7M

4.
 - a) Explain about digital TV data transmission. 7M
 - b) Compare various audio decoding techniques. 7M

5.
 - a) Describe advanced television emergence. 7M
 - b) Explain why the industry moving towards digital TV. 7M

6.
 - a) How interoperability is achieved using ATV. 7M
 - b) Discuss about flexibility in digital transmission. 7M

7.
 - a) Explain various picture formats. 7M
 - b) Discuss about data multiplexing. 7M

8.
 - a) Write a short note on HANC multiplexing. 7M
 - b) Explain HDTV formats. 7M

[B16 EC 4207]