Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : BEE105 **COURSE TITLE : BASIC ELECTRICAL ENGINEERING**

[Time allotted: Three hours] **[Max. Marks : 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. State Thevenin Theorem.
b. Define bandwidth.
c. For a delta connected balanced load , the line current is 100 A. Find the phase current.
d. Draw the equivalent circuit of a transformer.
e. Explain the operating principle of a Transformer.
f. Write and explain the formula used to calculate the efficiency of a Transformer.
g. Explain the operating principle of a dc motor.
h. List the various types of losses in a dc machine.
i. Explain the operating principle of a single phase induction motor.
j. Explain the operating principle of a three phase induction motor.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Derive the expression for delta to star transformations.
b. Derive the expression for three phase power and power factor in two wattmeter power measurement method.
c. Draw the phasor diagram for a transformer loaded with leading power factor load.
d. Explain the operating principle of a three phase synchronous generator.
e. Explain the operating principle of a shaded pole single phase induction motor.
f. Explain the various losses in a transformer.
g. Derive the expression for speed of a dc motor.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** A 4-pole lap-wound dc shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 440 conductors and 0.055 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m. and the armature current is 50 A.
b. Two-Wattmeter method is used to measure the power taken by a three phase load. The wattmeter readings are 375W and 50W respectively. Calculate: **(i)** Total power consumed and **(ii)** Power factor of the load.

Q. 4. **a.** Derive the relation between line current and phase current for three phase delta connected balanced load.
b. A balanced Three Phase, star connected load has per phase impedance of (10+j20) Ω. If 440V, three phase supply is connected to this load, find **(i)** Phase current; **(ii)** Line current; **(iii)** Power supplied to the load.

Q. 5. **a.** Draw and explain the two types of constructions of a transformer.
b. Derive the condition for maximum efficiency of a transformer.

Q. 6. **a.** Derive the expression for emf equation of a dc generator.
b. Explain the various types of dc machines.

Q.7. **a.** Explain the various starting methods used for three phase induction motor.
b. Explain the construction and working of a capacitor start capacitor run single phase induction motor.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018
PROGRAM: B.TECH. FIRST SEMESTER

COURSE CODE : BEC106 **COURSE TITLE : BASIC ELECTRONICS ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. In which path will the electron travel in perpendicular E & M Fields?
b. List the different types of diodes studied in this course.
c. What is Breakdown Voltage?
d. What is the significance of arrow in BJT Electrical symbol?
e. What is the temperature dependence of voltage across the PN junction diode?
f. What is Law of Junction?
g. What is Exclusion Principle?
h. Define Regulation and write its significance.
i. List the applications of Schottky diode.
j. Write about Base Width Modulation.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. An electron starts at rest on one plate of plane-parallel capacitor whose plates are 4 cm apart. The applied voltage is zero at the instant the electron is released, and it increases linearly from zero to 5V in 0.1μsec.
   i. If the opposite plate is positive, what speed will the electron attain in 40 nsec?
   ii. With what speed will the electron strike the positive plate?
b. What are the similarities and dissimilarities of BJT and JFET diode?
c. Explain the operation of Center Tapped Full-wave rectifier with its waveforms.
d. Describe the operation of a clipper which can clip at two independent levels?
e. Explain the characteristics of UJT.
f. Explain the operation of positive clamper with its input and output waveforms.
g. What is Hall Effect? Explain its applications.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. a. Explain the Electro Static Deflection Sensitivity with a neat diagram? (8)
b. What is Magnetic Focusing? Explain the trajectory of electron path under the influence of magnetic field. (7)

Q. 4. a. Explain the Band structure of an Open-Circuited p-n Junction with neat diagram. (8)
b. Derive the expression for the contact difference of potential of p-n Juntion. (7)

Q. 5. a. Draw the characteristics, circuit symbol, and equivalent circuit of Tunnel Diode. (5)
b. Explain the Tunneling effect with the help of Energy band diagrams. (10)

Q. 6. A diode whose internal resistance is 20Ω is to supply power to a 1 KΩ load from a 110V (rms) Source of supply. Calculate:

i. The peak load current (3)
ii. The dc load current (3)
iii. The ac load current (3)
iv. The dc diode voltage (3)
v. The percentage regulation from no load to the given load (3)

Q. 7. a. Draw and explain the input & output characteristics of Bipolar Junction Transistor. (5)
b. Explain the working principle of Junction Field Effect Transistor. (6)
c. List the advantages and disadvantages of MOSFET (4)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JUNE-2018

PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : BEC106 **COURSE TITLE : BASIC ELECTRONICS ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. In which path will the electron travel in parallel E & M Fields?
b. What is pinch off voltage in a FET?
c. What is threshold voltage in a MOSFET?
d. What is the significance of arrow in JFET electrical symbol?
e. What is the temperature dependence of reverse saturation current?
f. What is Mass-Action Law?
g. What is Doping?
h. Define Ripple Factor.
i. List any 2 applications of photo diode.
j. Define αdc.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain what happens if an electron with & without initial velocity is placed in perpendicular electric field?
b. Compare Zener and avalanche breakdown.
c. Explain the operation of full wave rectifier.
d. Describe the operation of a negative clipper.
e. What is Hall effect?
f. Explain the operation of negative clamper with its input and output waveforms.
g. What is continuity equation? Explain its significance.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. a. Explain the Magnetic Deflection Sensitivity with a neat diagram. (9)
b. Explain transition and diffusion capacitance (6)

Q. 4. a. Explain the working of photo diode (5)
b. Explain the tunneling effect with the help of energy band diagrams. (10)

Q. 5. Explain the working of a transistor in common emitter configuration with input and output characteristics. (15)

Q. 6. a. Draw and explain the input & output characteristics of n channel EN MOSFET. (8)
b. Explain the working principle of BJT. (7)

Q. 7. Enlist and explain the types of LCD. (15)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

2/6/18

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM : B.TECH.(EE) SECOND SEMESTER

COURSE CODE : BEE105 **COURSE TITLE : BASIC ELECTRICAL ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain Norton Theorem.
b. What is Q- factor?
c. Find the value of current corresponding to half power frequencies for an RLC series circuit with voltage V.
d. For a balanced star connected load each phase has 10 Ω resister find equivalent delta resistance value.
e. Define eddy current losses.
f. Write and define the formula for Efficiency of a transformer.
g. Draw the circuit diagram of a dc shunt generator.
h. How can we minimize the hysteresis losses in a dc machine?
i. Write and define the formula for synchronous speed of a three phase induction motor.
j. Find the synchronous speed of a 4- pole three phase induction motor given 50 Hz three phase supply.

SECTION B

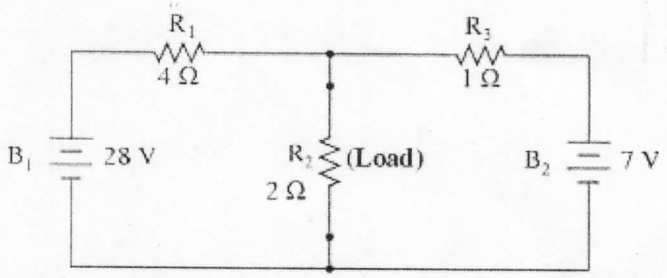
Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Derive the expression for star delta transformations.
b. Derive the expression for root mean square value of ac.
c. List and explain the various losses in a transformer.
d. Calculate the phase and line currents in a balanced delta connected load taking 75 KW at a power factor 0.8 from a 3- phase 440V supply.
e. An 8- pole dc generator has 500 armature conductors and a useful flux of 0.05 Wb. What will be the emf generated, if it is lap connected and runs at 1200 rpm? What must be the speed at which it is to be driven to produce the same emf , if it is wave wound ?
f. Explain the operating principle of a three phase synchronous motor.
g. Explain the operating principle of a permanent magnet moving coil instruments.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. a. Find the current through 2Ω resistor using Thevenin theorem in the given figure :-



b. Find the average value, rms value, form factor and peak factor for half-wave rectified ac and full wave rectified ac.

Q. 4. **a.** A balanced Three Phase, star connected load has per phase impedance of (15+j40) Ω. If 440V, three phase supply is connected to this load, find (i) Phase current (ii) Line current (iii) Power supplied to the load.

b. Derive the expression for the total power consumed and the power factor by Two Wattmeter Power measurement method.

Q. 5. **a.** Derive the expression for voltage regulation of a transformer.

b. Draw the phasor diagram of a transformer for leading power factor load.

Q. 6. **a.** Derive the emf equation for a dc machine.

b. An 8 pole lap wound armature rotated at 350 rpm is required to generate 260V. The useful flux per pole is 0.05 Wb. If the armature has 120 slots, calculate the number of conductors per slot.

Q. 7. **a.** Explain the operating principle, construction and working of a single phase capacitor start capacitor run induction motor.

b. Explain the construction and working of a stepper motor.

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B.Tech (EE/EC

Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JUNE-2018

PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : BEC106 **COURSE TITLE : BASIC ELECTRONICS ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. In which path will the electron travel in parallel E & M Fields?

b. What is pinch off voltage in a FET?

c. What is threshold voltage in a MOSFET?

d. What is the significance of arrow in JFET electrical symbol?

e. What is the temperature dependence of reverse saturation current?

f. What is Mass-Action Law?

g. What is Doping?

h. Define Ripple Factor.

i. List any 2 applications of photo diode.

j. Define αdc.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain what happens if an electron with & without initial velocity is placed in perpendicular electric field?

b. Compare Zener and avalanche breakdown.

c. Explain the operation of full wave rectifier.

d. Describe the operation of a negative clipper.

e. What is Hall effect?

f. Explain the operation of negative clamper with its input and output waveforms.

g. What is continuity equation? Explain its significance.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain the Magnetic Deflection Sensitivity with a neat diagram. (9)

b. Explain transition and diffusion capacitance (6)

Q. 4. **a.** Explain the working of photo diode (5)

b. Explain the tunneling effect with the help of energy band diagrams. (10)

Q. 5. Explain the working of a transistor in common emitter configuration with input and output characteristics. (15)

Q. 6. **a.** Draw and explain the input & output characteristics of n channel EN MOSFET. (8)

b. Explain the working principle of BJT. (7)

Q. 7. Enlist and explain the types of LCD. (15)

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20/6/18

Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM : B.TECH.(EE) **SECOND SEMESTER**

COURSE CODE : BEE105 **COURSE TITLE : BASIC ELECTRICAL ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain Norton Theorem.

b. What is Q- factor?

c. Find the value of current corresponding to half power frequencies for an RLC series circuit with voltage V.

d. For a balanced star connected load each phase has 10 Ω resister find equivalent delta resistance value.

e. Define eddy current losses.

f. Write and define the formula for Efficiency of a transformer.

g. Draw the circuit diagram of a dc shunt generator.

h. How can we minimize the hysteresis losses in a dc machine?

i. Write and define the formula for synchronous speed of a three phase induction motor.

j. Find the synchronous speed of a 4- pole three phase induction motor given 50 Hz three phase supply.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Derive the expression for star delta transformations.

b. Derive the expression for root mean square value of ac.

c. List and explain the various losses in a transformer.

d. Calculate the phase and line currents in a balanced delta connected load taking 75 KW at a power factor 0.8 from a 3- phase 440V supply.

e. An 8- pole dc generator has 500 armature conductors and a useful flux of 0.05 Wb. What will be the emf generated, if it is lap connected and runs at 1200 rpm? What must be the speed at which it is to be driven to produce the same emf , if it is wave wound ?

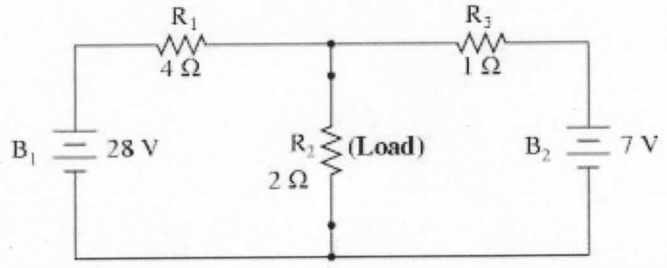
f. Explain the operating principle of a three phase synchronous motor.

g. Explain the operating principle of a permanent magnet moving coil instruments.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Find the current through 2Ω resistor using Thevenin theorem in the given figure :-



b. Find the average value, rms value, form factor and peak factor for half-wave rectified ac and full wave rectified ac.

Q. 4. **a.** A balanced Three Phase, star connected load has per phase impedance of (15+j40) Ω. If 440V, three phase supply is connected to this load, find (i) Phase current (ii) Line current (iii) Power supplied to the load.

b. Derive the expression for the total power consumed and the power factor by Two Wattmeter Power measurement method.

Q. 5. **a.** Derive the expression for voltage regulation of a transformer.

b. Draw the phasor diagram of a transformer for leading power factor load.

Q. 6. **a.** Derive the emf equation for a dc machine.

b. An 8 pole lap wound armature rotated at 350 rpm is required to generate 260V. The useful flux per pole is 0.05 Wb. If the armature has 120 slots, calculate the number of conductors per slot.

Q. 7. **a.** Explain the operating principle, construction and working of a single phase capacitor start capacitor run induction motor.

b. Explain the construction and working of a stepper motor.

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE/EE) THIRD SEMESTER

COURSE CODE: CEC203 **COURSE TITLE: ELECTRONIC CIRCUIT ANALYSIS-I**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions. **(2 x 10 = 20)**

a. What is Load Line? Explain its significance.
b. List the compensation techniques and state their requirement.
c. Give the formulae for g_m and $r_{b'e}$.
d. Draw High frequency Pi model of BJT?
e. What is the purpose of coupling capacitor in CE amplifier?
f. Draw the Low frequency model of JFET?
g. What is the effect of Voltage Shunt feedback on R_i & R_o?
h. Draw the block diagram of Voltage Amplifier?
i. Draw the equivalent circuit of crystal?
j. Give the expression for f_r of Hartley oscillator?

Section (B)

Q. 2. Attempt any 5 questions. Each question carries 7 marks. **(7 x 5 = 35)**

a. Derive the Stabilization factor for Collector to base bias and explain its significance?
b. What are the effects of feedback on various parameters of the amplifier?
c. List the different compensation techniques. Explain the one with sensistor.
d. Explain how the Sensistor could be used for compensation?
e. How the gain of an amplifier changes with respect to frequency and why?
f. Define Thermal Stability. What is Thermal Resistance? Draw the Power derating curve.
g. Draw the Equivalent circuit of Bootstrap amplifiers and write about it in brief?

Section (C)

Attempt any 3 questions. Each question carries 15 marks. **(15 x 3 = 45)**

Q. 3.

a. Design the Self Bias with stability factor less than 2, with I_C=5mA, V_{CC}=20V and h_{fe}=150? (8)
b. How the semiconductor devices could be used for compensation? Explain with an example? (7)

Q. 4.

a. Draw the CC amplifier using hybrid-pi model. (6)
b. Draw and explain the operation of Darlington amplifier (6)
c. What is Thermal Runaway? (3)

Q. 5.

a. Derive R_i, R_o, A_i and A_v of transistor amplifier using Exact hybrid model. (7)
b. Calculate various parameters of transistor amplifier using the exact model with h_{ie}=2.1kΩ, h_{re}=2.7x10^{-4}, h_{fe}=55 and h_{oe}=50μ℧. (8)

Q. 6.

a. Draw the block diagram & obtain its various parameters of Voltage shunt feedback amplifier? (8)
b. Give the practical example and explain the operation of Voltage shunt feedback amplifier? (7)

Q. 7.

a. Draw and explain the operation of Hartley Oscillator. (6)
b. Derive the expression for frequency of oscillations of Hartley Oscillator. (9)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH. (EE) THIRD SEMESTER

COURSE CODE : CEE203 **COURSE TITLE : ELECTRICAL MACHINES-I**

[Time allotted: Three hours] **[Max.Marks:100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain Electro-Mechanical energy conversion principle.

b. Explain Co-energy in Electro-Mechanical conversion system.

c. Explain the purpose of pole shoe and pole core.

d. Explain stray losses in DC machine.

e. What are various disadvantages of Swinburne's test.

f. Explain the need to a starter in DC motor.

g. What are various types of lamination used in transformer.

h. What is the use of bushings in transformer.

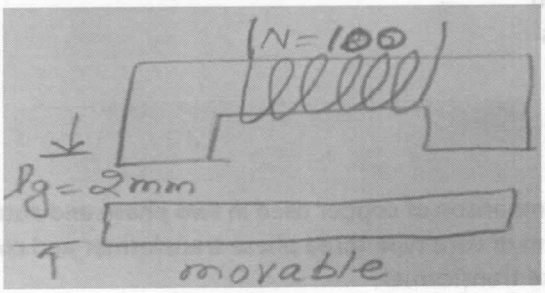
i. What are various application of three phase transformers.

j. Draw phasor diagram of star-star three phase transformer

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. A 100 turns coil has been wound on an electromagnet given below. The cross section of magnet is 3.5 cm x 4.5 cm.The air gap length lg is 2 mm. The average force of 90 N is required to lift the sheet of steel. Determine energy stored in Magnetic field and DC source voltage. The resistance of the coil is 5Ω.



b. Explain various ways to neutralize the effect of armature reaction in DC machine.

c. Explain and prove the condition of maximum efficiency in DC machine.

d. Explain compound DC generators with the help of diagram.

e. Explain the function of four point starter for DC motor with the help of pictorial.

f. What is voltage regulation of transformer. Explain with phasor diagram for unity and lagging power factor.

g. Explain shell type construction of 3 phase transformer with help of diagram.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** The air gap in magnetic field contains most of the energy. Derive it with help of diagram. (7.5)

b. Explain reluctance and mutual torque in doubly excited rotating magnetic system. (7.5)

Q. 4. **a.** A 4 pole 1500 rpm DC generator having wave wound armature has 55 slots. (7.5)
Each slot contains 19 conductors. Flux per pole is 3×10^{-3}weber. Calculate:

i. Total induced EMF.
ii. Torque generated when armature current is 10A.

b.Describe internal and external characteristics of shunt DC generator (7.5)

Q. 5. **a.** Explain speed-load and torque-load characteristics of DC series motor (7.5)

b. Hopkinson's test was performed on two similar DC machines. (7.5)
The following observations were recorded during the test:

Line Voltage : 100V
Motor current : 30A
Generator Current : 25A

Determine current drawn from the terminal and approximate efficiency of the each machine as motor and generator.
Please ignore field current and assume fixed losses are same in both machines

Q. 6. **a.** A single phase 10KVA 2400/240 volts transformer runs at has maximum efficiency of 98% at a load of 6.45 KVA.Transformer runs at load power factor of 0.8. Calculate: (7.5)

i. Efficiency at full load
ii. Efficiency at half load
iii. Fixed losses in transformer

b.Describe following in transformer with the help of diagram (7.5)

i. Core construction
ii. Cooling methods
iii. Breather
iv. Conservator
v. Type of winding

Q. 7. **a.** Derive the formula for comparison of copper used in two phase and auto transformer. (7.5)

b. Draw construction diagram of core type three phase transformer and connection diagram of star-delta and delta-star three phase transformer. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE) THIRD SEMESTER

COURSE CODE : CEC209 **COURSE TITLE : ELECTROMAGNETIC FIELDS & WAVES**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain the parameters of cylindrical co-ordinate system.

b. What is Stoke's theorem?

c. What do you understand by the equation $\nabla . D = \rho_v$

d. What is an electric dipole?

e. Do magnetic monopoles exist in nature? Justify your answer

f. What do you understand by torque?

g. Name the types of polarization of EM wave.

h. What are reflection coefficient and transmission coefficient?

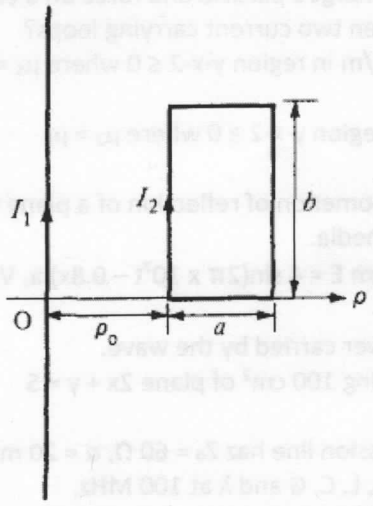
i. What is the difference between group velocity and phase velocity?

j. Define attenuation constant.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. A rectangular loop carrying current I2 is placed parallel to an infinitely long filamentary wire carrying current I_1 as shown in the figure. How much force is experienced by the loop?



b. Evaluate the electric field at a point P due to a surface charge using Coulomb's Law.

c. A small current loop L_1 with magnetic moment 5 $\mathbf{a}_z$ Am^2 is located at the origin while another small current loop L2 with magnetic moment 3 ay Am2 is located at (4,-3,10). Determine the torque on L2

d. Express the vector field H = xy2z ax + x2yz ay + xyz2 az in spherical and cylindrical coordinate systems.

e. Derive the Snell's Law of boundary conditions of electric field through dielectric-dielectric interface.

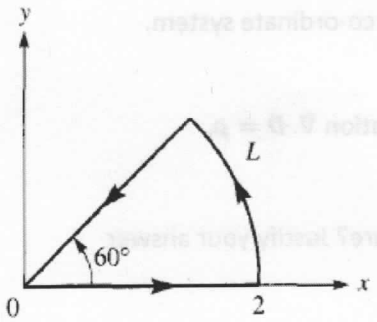
f. Explain the transmission line parameters. Describe how TEM travels through a transmission line.

g. What do you understand by displacement current? Derive the modified equation of Ampere's Circuital Law.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Calculate the circulation of $A = \rho \cos\varphi\, \mathbf{a}_\rho + z \sin\varphi\, \mathbf{a}_z$ around the edge L of the wedge defined by $0 \le \rho \le 2$; $0 \le \varphi \le 60^0$; $z = 0$ as shown in the figure below. (7.5)



b. Evaluate $\nabla \times (VA)$ when $V = \frac{1}{r^2}$ and $A = r\cos\Theta\, \mathbf{a}_r + r\sin\Theta\, \mathbf{a}_\Theta + \sin\Theta\cos\varphi\, \mathbf{a}_\varphi$ (7.5)

Q. 4. **a.** The finite sheet $0 \le x \le 1$, $0 \le y \le 1$on the $z = 0$ plane has a charge density $\rho_s = xy(x^2+y^2+25)^{3/2}$ nC/m^2. Find :-

(i) The total charge on the sheet.
(ii) The electric field at (0,0,8).
(iii) The force experienced by a -2 mC charge located at (0,0,8). (8)

b. What do you understand by electric flux lines? Find out the electric field due to an electric dipole at a point P (r,Θ,φ). (7)

Q. 5. **a.** Calculate the force on a charged particle and force on a current element due to a magnetic field B. What is the force between two current carrying loops? (7)

b. If $H_1 = -2\, a_x + 6\, a_y + 4\, a_z$ A/m in region $y\text{-}x\text{-}2 \le 0$ where $\mu_1 = 5\, \mu_0$, then calculate:-

(i) M_1 and B_1
(ii) H_2 and B_2 in region $y\text{-}x\text{-}2 \ge 0$ where $\mu_2 = \mu_0$ (8)

Q. 6. **a.** Explain the general phenomenon of reflection of a plane wave at normal incidence at a boundary between two different media. (7)

b. In a non-magnetic medium $E = 4 \sin(2\pi \times 10^7 t - 0.8x)\, a_z$ V/m then find :-

(a) ϵ_r and η
(b) The time average power carried by the wave.
(c) The total power crossing 100 cm^2 of plane $2x + y = 5$ (8)

Q. 7. **a.** A distortionless transmission line haz $Z_0 = 60\ \Omega$, $\alpha = 20$ mNp/m , $u = 0.6c$, where c is the speed of light in a vacuum. Find R, L, C, G and λ at 100 MHz. (7.5)

b. What do you understand by propagation constant. Derive its formula for a two conductor transmission line. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(CSE/EE) THIRD SEMESTER

COURSE CODE : CCS205/CEC205/CEE205 **COURSE TITLE : DIGITAL LOGIC DESIGN**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Write the expression for Exclusive Nor gate with truth table and logic diagram
b. Design the logic diagram with truth table for the compliment of expression (x + y)(xy' + x'y').
c. What do you mean by Gray code?
d. Draw logic circuit diagram of SR latch and also write its characteristics table.
e. Design 3 bit serial in serial out shift register.
f. Define memory element used in sequential circuit.
g. What is the importance of K-Map in digital electronics?
h. Define synchronous counter.
i. Explain register. What are the different type of registers?
j. Which combinational circuit is also known as data selector?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Find the complement of F = a'b'c' + ab'c + a'b'c. Show that $F\bar{F} = 0$ and $F + \bar{F} = 1$ (where F = wx + yz)
b. Explain the working of 2:1 magnitude comparator with logic circuit diagram.
c. Explain full subtractor with their logic diagram and characteristics table.
d. Simplify the given Boolean function with don't care condition $F(x, y, z) = \sum (0, 6, 8, 13, 14)$ and $d(x, y, z) = (2, 4, 10)$ and express the function in sum of minterms.
e. What is the importance of carry look ahead generator? Design its circuit.
f. Explain internal memory structure of RAM with Write and Read operation.
g. For the given state equation $A(t + 1) = Da(A, x, y) = \sum(1, 2, 5)$, $Z(A, x, y) = \sum(6, 7)$. Design Logic diagram for sequential circuit using one D flip flop with two input.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Define universal gate. Design all basic gate using NOR gate (7.5)
b. Design the logic diagram after minimization of $F = \sum (0, 2, 3, 4, 7)$ find the truth table and logic circuit. Also find its complement using De-Morgan's Theorem (7.5)

Q. 4. **a.** Explain the working of binary adder/subtractor with logic diagram. (7.5)
b. Design a combinational circuit with four input and one output whose output is one when binary value of input is odd number and summation of two binary number is less than ten. (7.5)

Q. 5. **a.** For given equation showing input output relationship of sequential circuit using two D Flip Flop. Find the state equation, state table and state diagram $A(t + 1) = Ax + B$, $B(t + 1) = xB'$ and $Y = A.B$ (7.5)
b. What do you mean by counter? Explain MOD-10 ripple counter with its timing diagram. (7.5)

Q.6. **a.** Define state equation, state table and state diagram for the analysis of sequential circuit? (7.5)
b. Explain the full adder with logic circuit diagram. Also design the full adder using two half adder and an OR gate. (7.5)

Q.7. **a.** Explain memory decoding? Also explain the internal structure of Memory cell with logic diagram (7.5)
b. What do you mean by shift register? Explain the working of serial input serial output (SISO) and serial input parallel output(SIPO). (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : B.TECH.(CSE / EE) THIRD SEMESTER

COURSE CODE : CCS205/CEE205 **COURSE TITLE : DIGITAL LOGIC DESIGN**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Determine the decimal number representation of following binary numbers

i. 110101

ii. 101101.10101

b. Express the decimal number into binary form: 10.625

c. Represent +14 and -14 in one's complement form.

d. Solve the following by using 2's complement method: 48 -23

e. Master-slave configuration is used in J-K Flip flop to eliminate_____.

f. Preset and clear inputs are used in flip flop for making Q=_____and _____respectively.

g. The minimum number of flip flops required for a decade counter is_____.

h. What are the differences between combinational and sequential logics?

i. For maximum possible security of a digital circuit_____ design is preferred.

j. The EPROM is erased by_____.

SECTION B

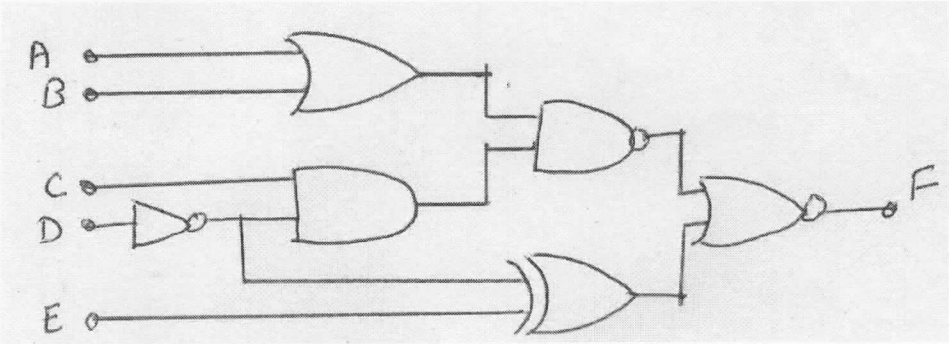
Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Prove the following using Boolean theorems.

i. $\overline{AB + \overline{AC} + A\bar{B}C(AB + C)} = 0$

ii. $A(\bar{A}+C)(\bar{C}+\bar{A}B) = 0$

b. Obtain the expression for F below:



c. Design a MOD13 counter and give its truth table

d. Minimize the following using K-Map

F(A,B,C,D,E)= ∑ m(0,3,5,7,9,11,12,14,16,18,20,22,24,26,28,29,30,31).

e. **(i)** What are universal gates? Why are they called so? Justify your answer.

(ii) What do you understand by don't care conditions? Is it an advantage or disadvantage? To include them in map? Explain with reasons.

f. Realize NOR and EXOR operations using NAND gates only.

g. F(wxyz)= ∑m(0,3,4,7,8) + ∑m(10,11,12,13,14,15)

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain how K map method can be used to minimize a 4- variable function. The variables are A, B, C and D. **(9)**

b. Draw the circuits of half adder and full adder. **(6)**

Q. 4. **a.** What are shift registers? How are they classified? List 3 major applications of shift registers. **(9)**

b. The content of a four bit registers is initially 0110. The register is shifted six times to the right with the serial input being 1011100. What is the content of the shift register after each shift? **(6)**

Q. 5. **a.** You are provided with a clock generator of 80MHz. Design a suitable circuit which gives you a pulse of 50nS. **(7)**

b. Design a 16:1 Multiplexer by using two 8:1 multiplexers. **(8)**

Q. 6. Design a circuit which converts BCD into seven segment display. **(15)**

Q. 7. **a.** What are PLD's? Give their advantages and disadvantages. **(8)**

b. Write short note on various types of memory's you know. **(7)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH. (ECE) FOURTH SEMESTER

COURSE CODE : CCE208 **COURSE TITLE : ANALYSIS OF STRUCTURES - I**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

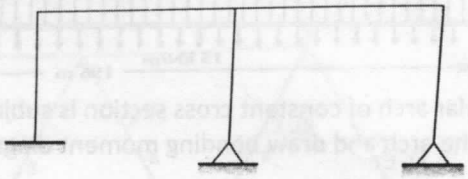
SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define structure and its importance.

b. Define static indeterminacy.

c. The degree of static indeterminacy, D_s, and the degree of kinematic indeterminacy D_k, for the plane frame shown below, assuming axial deformations to be negligible, are given by-



d. A simply support beam of span L draw a influence line diagram for shear force at a section located at a distance L/3 from the left end support.

e. Draw shear force and bending moment diagram for a cantilever beam of span "2L" fixed at right end and having clockwise moment "M" from free end.

f. Explain principle of superposition.

g. Define Maxwell's law of Reciprocal deflection.

h. Write down atleast four force methods and displacement method names.

i. Difference between shear force and shear stress.

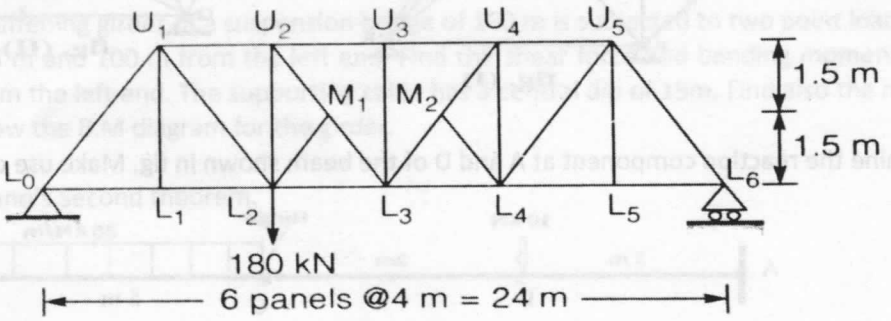
j. Explain different types of structural supports and associated reaction components.

SECTION B

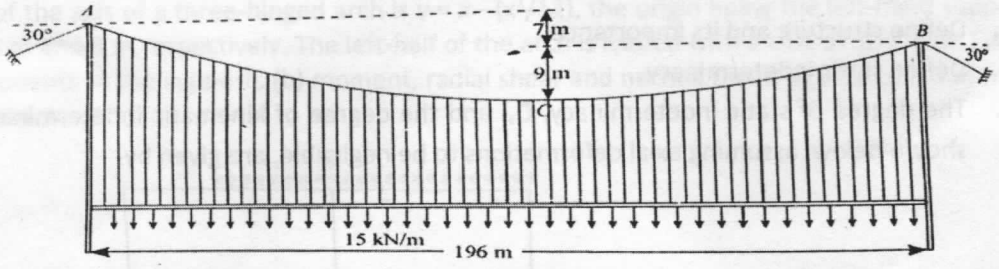
Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain thumb rules to find Zero members forces.

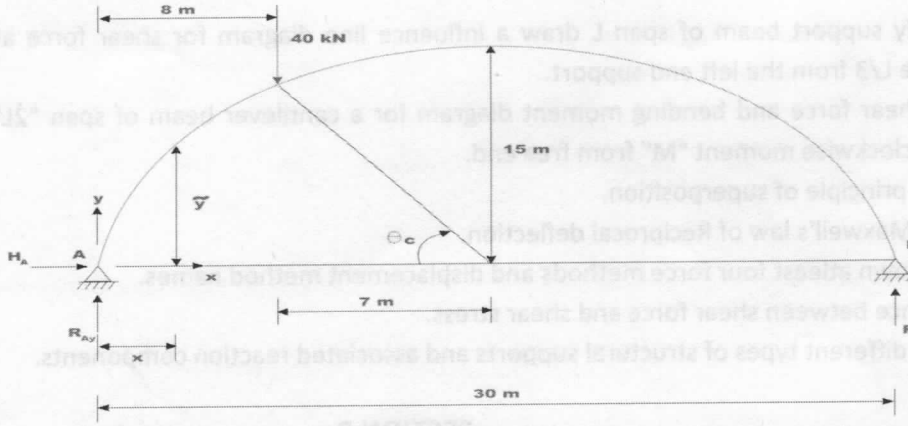
b. A truss as shown in the figure is carrying 180 kN load at node L_2. The force in the diagonal member M_2U_4 will be



c. A suspension cable is suspended from two piers 196m apart, one support being 7m above the other carries a UDL of 15 kN/m and has its lowest point 9m below the lower support. The ends of the cable are attached to a rollers at the top of the piers and the back stays which are straight are inclined at 30^0 to the horizontal. Determine (i) the maximum tension in cable (b) the tension in the back stays and (c) the vertical thrust on each pier.



d. A two hinged semicircular arch of constant cross section is subjected to a concentrated load as shown in Fig. Calculate reactions of the arch and draw bending moment diagram.



e. Check the stability, determinacy or indeterminacy of the following space trusses as shown in fig.

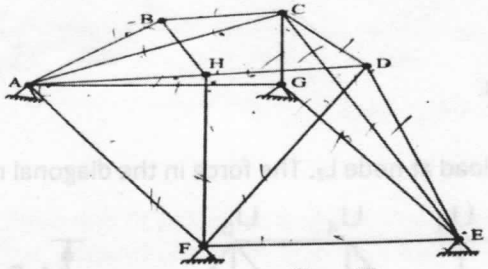


fig. (I)

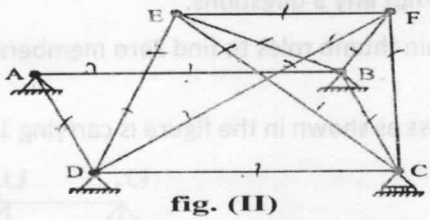
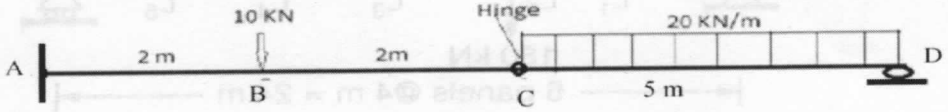
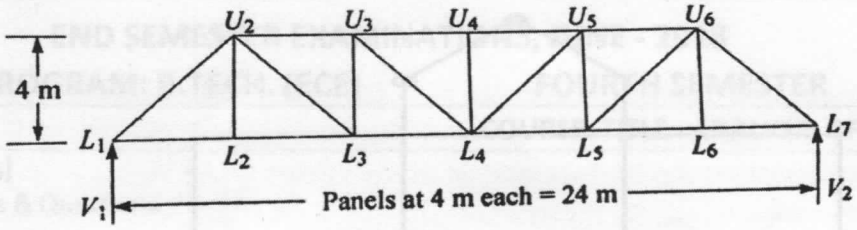


fig. (II)

f. Determine the reaction component at A and D of the beam shown in fig. Make use of F.B.D to obtain the result.



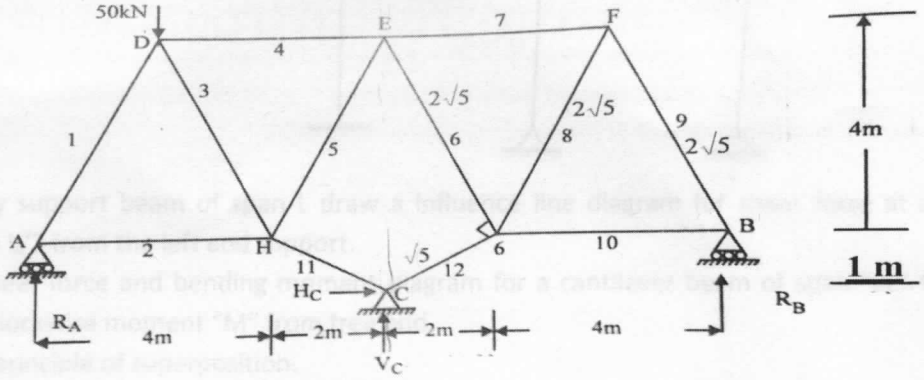
g. Draw influence line diagrams for Top chord members of the through type truss bridge as shown in fig.



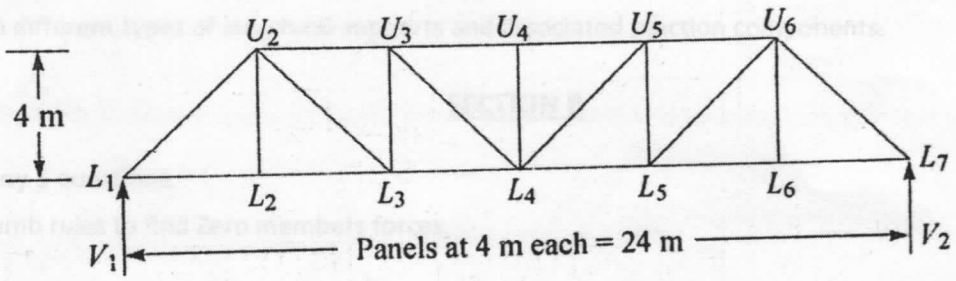
SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. Find force in all members of the compound warren truss as shown in fig.



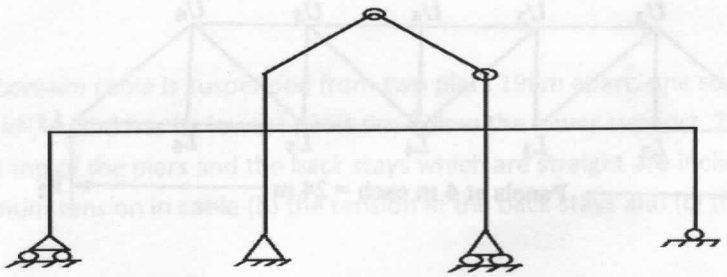
Q. 4. Draw influence line diagrams for the forces in the members of the through type bridge truss as shown in fig.



Q. 5. A three hinged stiffening girder of a suspension bridge of 160 m is subjected to two point load of 260 KN and 320 KN at distance 35 m and 100 m from the left end. Find the shear force and bending moment for the girder at a distance 50 m from the left end. The supporting cable has a central dip of 15m. Find also the maximum tension in the cable, and draw the B.M diagram for the girder.

Q. 6. **a)** Derive Castigliano's Second theorem.

b) Compute the overall static indeterminacies and kinematic indeterminacy of plane frame structure shown in fig.



Q.7. The equation of the axis of a three-hinged arch is $y = x - (x^2/12)$, the origin being the left-hand support. The span and rise are 12 m and 3 m respectively. The left-half of the arch is loaded with a UDL of 30 KN/m. Evaluate (a) the reaction components at the supports (b) moment, radial shear and normal thrust at a section 3 m from left-hand support with sketch.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH.(ECE) FOURTH SEMESTER

COURSE CODE : CEC206 **COURSE TITLE : ANALOG COMMUNICATION**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. In an FM system if modulation index is doubled and modulating frequency become half, what will be effect on the maximum deviation?

b. Write the expression to define relation between total power and unmodulated carrier power in case of AM and SSB modulated wave.

c. Explain the Carson rule for the approximate bandwidth of an FM wave.

d. What can be done to improve limiting performance of FM receiver?

e. What is the bandwidth required for an FM signal in which the modulating frequency is 2 kHz and the maximum deviation is 10 kHz?

f. What is the role of mixer in superheterodyne receiver?

g. What do you mean by vestigial side band?

h. Explain Pulse Amplitude Modulation with waveform.

i. Explain wide band Frequency modulation.

j. Draw the block diagram of Armstrong frequency modulation system.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. In a FM system when audio frequency is 500Hz and AF voltage is 2.4V, the deviation is 4.8 KHz. If the AF voltage is now increased to 7.2 V, What is the new deviation? If AF Voltage is further raised to 10 V while AF is dropped to 200 Hz what is the deviation? Find the modulation index in each case.

b. Explain FM demodulation method using Foster Seeley method.

c. Explain generation of frequency modulation wave by any one of direct method.

d. What do you mean by intermediate frequency? Explain its importance.

e. Explain the generation of amplitude modulated wave using low level modulation transmitter using block diagram.

f. What do you understand by AM threshold effect?

g. Define the term sensitivity, selectivity and image frequency.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** In a broadcast superhetrodyne receiver the loaded Q of antenna coupling circuit is 100. If the intermediate frequency is 455 kHz calculate i) image frequency and its rejection ratio at 1000 kHz and ii) image frequency and its rejection ratio at 25 MHz (7.5)

b. Explain how the balanced modulation is able to demodulate the signal by the help of circuit diagram. (7.5)

Q. 4. **a.** What are the advantages and disadvantages of SSB modulation over AM? Explain the coherent SSB demodulation with block diagram. (7.5)

b. What are the function fulfilled by the intermediate frequency amplifier in a radio receiver. (7.5)

Q. 5. **a.** What do you mean by pulse analog modulation technique? Explain different type of pulse analog modulation techniques with diagram. (7.5)

b. Describe the generation of SSB wave using either by analog multiplier or by phase discrimination method. (7.5)

Q. 6. **a.** The output current of a 30 % modulated AM generator is 0.75 A. To what value will this current rise if the generator is modulated additionally by another audio wave whose modulation index is 0.7? (7.5)

b. Explain the difference between frequency modulation and amplitude modulation, beginning with definition of each type and the meaning of the modulation index in each case. (7.5)

Q. 7. **a.** Explain receiver model of AM with block diagram. And also derive the expression to find its figure of merit. (7.5)

b. Explain receiver model of DSB-SC with block diagram. And also derive the expression to find its figure of merit. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM : B.TECH.(ECE / EE) FOURTH SEMESTER

COURSE CODE : CEC204 / CEE207 **COURSE TITLE : LINEAR INTEGRATED CIRCUITS**

[Time allotted: Three hours] **[Max. Marks : 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions. **(2 x 10 = 20)**

a. Explain binary weighted resistor technique of D to A convertor.

b. Define the duty cycle for astable multivibrator using IC 555.

c. List the six characteristics of an ideal OPAMP.

d. Why the FET OPAMP are better than BJT OPAMP?

e. Define a filter. How they are classified?

f. Draw the waveform of ideal integrator circuit when the input is
(i) Sine wave **(ii)** Step input **(iii)** Square wave

g. Which is the fastest ADC and why?

h. State any two applications of a monostable multivibrator.

i. State the advantages of IC regulators.

j. Why is open loop opamp not used in linear applications?

SECTION B

Q. 2. Attempt any 5 questions. **(7 x 5 = 35)**

a. Explain the binary weighted technique of D/A conversion.

b. **(i)** List the drawbacks of binary weighted technique of D/A conversion.
(ii) What are the different source of errors in DAC's.

c. Which is the fastest ADC and why?

d. Write a note on instrumentation amplifier.

e. Determine the output voltage of an OPMP for the input voltages of V1= 150μV and V2= 140μV. The amplifier has a differential gain of 4000 and the value of CMRR = 100 AND (II) 105.

f. Explain the functional block diagram of IC 555.

g. Compare Linear regulators with SMPS regulators.

SECTION C

Attempt any 3 questions. **(15 x 3 = 45)**

Q. 3. Draw and explain the commonly used three OPAMP instrumentation amplifier .

Q. 4. Draw and explain the linear ramp generator using IC 555.

Q. 5. Name the various types of ADC and make a comparative chart of its parameters.

Q. 6. Draw the circuit of second order high pass butterworth filter and give relations for its gain and R_f.

Q. 7. What is a switching regulator. Explain the principle of pulse width modulation.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : B.TECH.(ECE / EE) FOURTH SEMESTER

COURSE CODE : CEC212 / CEE212 **COURSE TITLE : SIGNALS AND SYSTEMS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections and Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define periodic signal with example.
b. Explain causal and non-causal signal.
c. What is final value theorem of z transform?
d. Write the expression for finding inverse Fourier transform.
e. Define ideal high pass filter with its transfer function.
f. Define discrete signal with example?
g. Write the expression to find convolution of two continuous time signals.
h. Find the Laplace transform of impulse function.
i. Write the expression for Laplace transform of periodic signal.
j. Find the Z transform of function x(n) = u[n] with ROC?

SECTION B

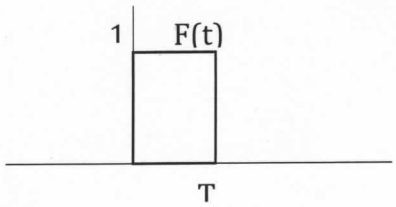
Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What do you understand by even and odd function? Explain with example.
b. Find the signal energy for $x(t) = e^{-4t} u(t)$.
c. Find the Laplace transform of hyperbolic Sine and Cosine function.
d. Explain the role of Z transform in signal analysis. Also explain its properties.
e. Determine Laplace transform of function $f(t) = t^3 + 3t^2 + 6t + 4$.
f. Define Causality and Poly-Wiener criterion for physical realization.
g. Explain the fundamental difference between continuous time and discrete time signal.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What do you mean by signal? Explain the classification of signal. (7.5)
b. Obtain the Trigonometric Fourier transform of given rectangular waveform (7.5)



Q. 4. **a.** What do you mean by LTI system? Derive the expression for response of LTI system (7.5)
b. Find inverse Z transform of function $X(z) = (z + 2)/(2z^2 - 7z + 3)$ using partial fraction. (7.5)

Q. 5. **a.** Find the Inverse Laplace of function $X(s) = 1/(s + 1)(s+ 4)$ When ROC i) $R_e(s) > -4$ i) $R_e(s) < -1$ (7.5)
b. What do you mean by sampling? Drive expression for reconstruction of signal. (7.5)

Q. 6. **a.** Define signal distortion in transmission. Also define amplitude and phase distortion. (7.5)
b. Derive the expression to show relationship between bandwidth and rise time. (7.5)

Q. 7. **a.** Determine convolution of two sequence x(n) = {2, 1, 0, 5} and h(n) = { 2, 2, 1 ,1} using Z transform. (7.5)
b. Explain Initial and Final value theorem of Laplace Transform. Also find the initial value and final of signal x(t) with $X(s) = (s + 1)/ \{s.(s + 5)\}$ (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH.(EE) FOURTH SEMESTER

COURSE CODE : CEE206 **COURSE TITLE : ELECTRICAL MACHINES - II**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Describe rotating magnetic field in 3Φ induction motor.

b. What is effect of adding rotor resistance on starting torque of 3Φ induction motor.

c. When would it be recommended to use Direct online method(DOL) method for starting a 3Φ induction motor. State the reason.

d. Why single phase induction motors are not self-starting.

e. What is need of synchronizing two alternators.

f. What is synchronizing power in a synchronous generator.

g. How a 3Φ synchronous motor can be made to self-start.

h. What is an overexcited synchronous machine.

i. What are various possible applications of stepper motor.

j. What are main characteristics of universal motor.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain principle of operation of 3Φ induction motor with help of diagram.

b. Explain auto transformer starting of 3Φ induction motor.

c. Describe cogging and crawling in induction motor.

d. Draw and explain equivalent circuit of single phase induction machine.

e. Explain synchronous impedance method for determination of voltage regulation of alternator.

f. Write a detailed comparison between synchronous and induction machine.

g. Explain applications and characteristics of AC series motor. How these motor are different from DC series motor.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** A 3Φ 60 Hz 24 pole induction motor runs at 280 rpm at full load.

Rotor standstill reactance is 0.01 Ω and resistance is 0.6 Ω respectively.
Maximum torque generated by motor is 8 NM. Calculate:

i. Motor torque at full load.

ii. Motor Speed at maximum Torque.

b. Calculate following for a three phase 60 Hz 8 pole induction motor:

i. Synchronous speed.

ii. Speed of rotor at 4% slip.

iii. Slip of rotor at speed of 800 rpm

iv. Rotor current frequency at a speed of 800 rpm.

Q. 4. **a.** Describe capacitor type single phase induction motors with help of diagram.

Write a short note on application of induction motor.

b. Describe direct online (DOL) starting of 3Φ induction motor with help of circuit diagram.

Q. 5. **a.** Two Identical 2500 KVA alternators A and B are operating in parallel. The drooping characteristics of alternator A is 3% and alternator B is 4%. Determine sharing of load of 4000 KVA. Determine system frequency at this load.

b. Determine EMF generated in a 3Φ 16 pole 375 rpm star connected alternator. It has 144 slots with 10 conductors/slot. The flux per pole is 0.01 wb/phase. Pitch factor K_p is 0.9 and distribution factor K_d is 0.95.

Q. 6. **a.** Explain principle of operation and starting of synchronous motor. What is a synchronous condenser?

b. A 100 KW 3Φ 50 Hz 4 pole star connected cylindrical rotor synchronous motor operates at 0.9 lagging power factor. The motor efficiency is 95% and synchronous reactance is 2.5 Ω. Determine:

- **i.** Mechanical Output
- **ii.** Arnature Current
- **iii.** Back EMF
- **iv.** Power angle

Q. 7. **a.** Explain construction and operation of AC series motor (universal motor). How is it different from DC series motor.

b. Explain the difference between permanent magnet and variable reluctance stepper motor.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH. (ECE) FOURTH SEMESTER

COURSE CODE : AMA202 **COURSE TITLE : PROBABILITY AND RANDOM PROCESSES**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q.1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is the density function of the uniform distribution?

b. If the trail of an experiment are not independent then which of the following distribution will be applicable

(i) Binomial **(ii)** Poisson **(iii)** Hyper geometric **(iv)** Multinomial

c. Find the variance of exponential distribution with the parameters $\alpha = 1$ and $\beta = 4$.

d. What is the auto correlation function of a random process $X(t)$.

e. Find $z_{0.05}$.

f. Find the probability that a random variable having the standard normal distribution will take on a value greater than -0.65.

g. For the Binomial distribution find $b(7; 19, 0.45)$.

h. What is the second moment about origin?

i. Under what condition a random process $X(t, s)$ will represent a random variable.

j. Given $f_1(0/1) = 0.4$ and $f_1(0) = 0.2$ then check whether random variables X_1 and X_2 are independent.

SECTION B

Q.2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. A quality control engineer inspects a random sample of 3 batteries from each lot of 24 car batteries. If such a lot contains 6 batteries with slight defects, what are the probabilities that the inspector's sample will contain

(i) None of the batteries with defects;

(ii) only one of the batteries with defects;

(iii) at least two of the batteries with defects.

b. The following table gives the probabilities that a certain computer will malfunction 0, 1, 2, 3, 4 times on any day. Find the mean and variance of the distribution.

x	0	1	2	3	4
f(x)	0.05	0.20	0.45	0.20	0.10

c. If the probability density of a random variable is given by

$$f(x) = \begin{cases} \frac{x}{4}, & 0 < x < 1 \\ \frac{3}{2}, & 1 < x < 2 \\ \frac{5-2x}{4}, & 2 < x < 3 \\ 0, & x \geq 3 \end{cases}.$$

Find the corresponding distribution function and use it to find the probability that the random variable will take on a value greater than 2.5.

d. The mileage (in thousands of miles) that car owners get with a certain kind of tire is a random variable having the probability density-

$$f(x) = \begin{cases} \frac{1}{20} x e^{-x/20} & for \ x > 0 \\ 0 & for \ x \leq 0 \end{cases}$$

Find the probabilities that one of these tires will last

(i) At most 10,000 miles; **(ii)** anywhere from 16,000 to 24,000 miles; **(iii)** at least 30,000 miles.

e. For the following joint probability density function find the probability that $0 < x < \frac{1}{2}$ and $1 < y < 2$,

$$f(x,y) = \begin{cases} \frac{3}{5}x(y+x), & 0 < x < 1,\ 0 < y < 2 \\ 0, & elsewhere \end{cases}.$$

f. The autocorrelation function for a stationary ergodic process with no periodic components is given by $R_{XX}(\varsigma) = \frac{63\tau^2 + 88}{7\tau^2 + 8}$. Find the mean and variance of the process.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. a. What is power spectral density? If the power spectral density of a Wide sense stationary process is given by-

$$s(\varpi) = \begin{cases} 1-\omega^2, & |\varpi| \le 1 \\ 0, & |\varpi| > 1 \end{cases}$$

Find the autocorrelation function of the process. **(8)**

b. Define ergodicity of a random process. Also, give a classification of a random process. **(7)**

Q. 4. a. Find the mean of hypergeometric distribution. **(6)**

b. If the distribution function of a random variable is given by- **(9)**

$$F(x) = \begin{cases} 0, & x \le 5 \\ 1 - \frac{25}{x^2}, & x > 5 \end{cases}$$

Find the corresponding density function and hence find the probabilities that this random variable will take on a value (i) beyond 10; (ii) less than 8; (iii) anywhere from 12 to 15. **(8)**

Q. 5. Two scanners are needed for an experiment. Of the five available, two have electronic defects, another one has a defect in the memory, and two are in good working order. Two units are selected at random.

a. Find the joint probability distribution of $X_1 =$ the number with electronic defects, and $X_2 =$ the number with a defect in memory.

b. Find the marginal probability distribution of X_1.

c. Find the conditional probability distribution X_1 given $X_2 . = 0.$ **(15)**

Q. 6. a. A businessman goes to hotels X, Y, Z 20%, 50%, 30% of the time, respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. **(9)**

(i) Determine the probability that the businessman goes to hotel with faulty plumbing;

(ii) What is the probability that businessman's room having faulty plumbing is assigned to hotel Z.

b. Find the probability of getting- **(6)**

(i) eight heads in a row with a balanced coin;

(ii) three 3's and then a 4 or a 5 in four rolls of a balanced die;

(iii) (iii) five multiple-choice questions answered correctly, if for each question the probability of answering it correctly is 1/3.

Q. 7. a. An agricultural cooperative claims that 90% of the watermelons shipped out are ripe and ready to eat. Find the probabilities that among 18 watermelons shipped out- **(7)**

(i) All 18 are ripe and ready to eat; **(ii)** at least 16 are ripe and ready to eat; **(iii)** at most 14 are ripe and ready to eat.

b.The probability that an electronic component will fail in less than 1000 hours of continuous use is 0.25. Use normal approximation to find the probability that among 200 such components fewer than 45 will fail in less than 1000 hours of continuous use. **(8)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE) FIFTH SEMESTER

COURSE CODE : CEC303 **COURSE TITLE : ANTENNA & WAVE PROPAGATION**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is directivity and gain of an antenna?
b. What is Axial Ratio for circular polarization?
c. Define the end-fire arrangement of antenna elements.
d. What do you understand by Grounded antennas?
e. Which antenna is used in Direct Comparison Method for gain measurement of a test antenna?
f. What do you understand by standing waves?
g. What are the two limiting cases for a helical antenna?
h. Name the types of lens used for the construction of lens antenna.
i. What do you mean by duct propagation?
j. What is Maximum Usable Frequency (MUF)?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Write short notes on the following :- (7)
  i. Dipole Antenna
  ii. HPBW and BWFN
  iii. E-Plane and H-Plane Sectoral Horn antennas
b. What do you understand by input impedance and radiation resistance of an antenna? Derive an expression for it. (7)
c. Explain in detail the process of antenna top loading and tuning. What is the need to do antenna loading? (7)
d. Derive an expression for electric field at a far point due to two point element antenna array when the sources have equal amplitude and phase. What are the advantages of an antenna array over a single antenna element? (7)
e. Describe the construction and working of Yagi Uda antenna. Write all the design equations. (7)
f. Explain the method of measurement of antenna efficiency of a test antenna in detail. (7)
g. Explain the phenomena of reflection and refraction of waves by the ionosphere. (7)

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain the following antenna parameters:-
(i) Radiation pattern showing all the lobes and beam widths with the help of an example.
(ii) All types of polarization of a uniform plane wave. (8)
b. Explain the operation of folded dipole antenna. How is resistance of a dipole antenna related to that of folded dipole antenna? Sketch the radiation pattern also. (7)

Q. 4. **a.** Describe a broadside array. Deduce an expression for the radiation pattern of a broadside array with n dipoles. Draw the radiation pattern for such an array with 4 dipoles. (8)
b. What is meant byDolph-Chebyshev distribution for a linear array? Show that such a distribution gives a minimum side lobe level for a given beam-width of a major lobe. (7)

Q. 5. **a.** Describe the process of phase measurement of a test antenna for near field and far field cases. (8)
b. Explain the whole process by which current is measured in a test antenna. (7)

Q. 6. **a.** Explain the construction and working of antennas with parabolic reflectors for receiving and transmitting modes. What are its applications? (8)
b. Give the fundamentals of slot antenna and microstrip antenna with the help of diagrams. (7)

Q. 7. **a.** Briefly explain the characteristics of all the modes of propagation of radio waves. (8)
b. Write short notes on :- (7)
(i) Fading of radio wave (ii) Troposphere Scattering (iii) Skip distance

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE/CSE) FIFTH SEMESTER

COURSE CODE: CEC302/CCS303 **COURSE TITLE: MICROPROCESSORS & PERIPHERAL DEVICES**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain SID and SOD pins of 8085 microprocessor.
b. Explain the function of Auxiliary Carry flag in 8086.
c. What do mean by vectored interrupt with one example of 8085.
d. Give three different characteristics of SHLD 2000 H instruction.
e. Explain Stack memory in case of 8085.
f. Explain the use of I.C. 8284, 8288 in case of 8086 system.
g. Write the difference between INR A and ADD A instructions of 8085.
h. What do you mean by assembler and assembler directives?
i. Explain the function of maximum mode pins of 8086.
j. Write a short note on physical address generation in 8086.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. With suitable diagram explain flag register of 8085 and function of each flag.
b. Write assembly language program for 8085 to find two's complement of 55H and store it into memory location 2020H. [Flow chart and assembly program required].
c. Compare 8085 and 8086 minimum 5 important characteristics.
d. If DS = 4000H, DI =1120H find the physical address of data segment memory, also explain effective address and base address.
e. Write a note on string instructions of 8086 and explain their operations.
f. Compare Handshaking and simple I/O mode of 8255.
g. Briefly explain interrupt structure of 8086 microprocessor.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Write an assembly language program for 5 byte block transfer from block A whose starting address is 4001H to block B starting address is 5001H for 8085 microprocessor. (7.5)
b. Explain why we require ADC and DAC interfacing explain one of them . (7.5)

Q. 4. **a.** Write a note on Importance of Segmented memory in case of 8086 (7.5)
b. Write a note on Instruction Cycle, Machine Cycle, and Execution Cycle with respect to 8085 microprocessor (7.5)

Q. 5. **a.** Write a assembly program for 8086 to add 3 bytes and transfer the sum to effective address 3502 of data segment, assume other required addresses (7.5)
b. Write the important characteristics of 8259 and 8254 interfacing I.C's. (7.5)

Q. 6. **a.** Explain various addressing modes of 8085 with examples (7.5)
b. Explain why architecture of 8086 is called as pipe line architecture & give its advantages. (7.5)

Q. 7. **a.** Explain stack operation using CNZ 3010H instruction of 8085 (7.5)
b. Explain MOD 2 operation of 8255. (7.5)

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE) FIFTH SEMESTER

COURSE CODE : CEC308 **COURSE TITLE : CONTROL SYSTEMS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is use of Mason's Gain formula? Write its formula.

b. Explain any 4 features of Open loop system.

c. Name and draw the standard test signals.

d. Write down the formula for: Percentage Overshoot and Rise time.

e. Explain the purpose of performance indices.

f. Discuss the conditions for stability of a system.

g. Calculate the magnitude of following Transfer function at ω =10: **G(s)= (s+3) / [s(s+1)(s+2)]**

h. How can the stability of system be judged from Gain margin and Phase margin?

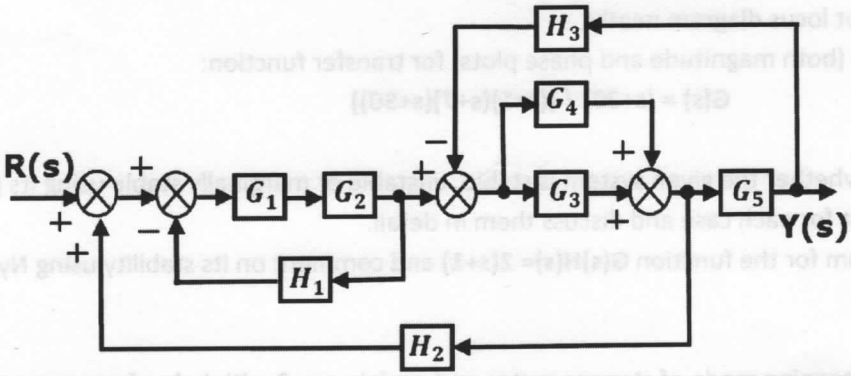
i. What are the applications (any 2) of stepper motor in control system?

j. Write the differences (any 4) between DC and AC servomotor.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Reduce the given Block Diagram to obtain final transfer function:



b. Explain the Derivative controller with its formula, diagram and its features.

c. Draw the Polar Plot for following functions: **i) G(s) = 1/s** and **ii) G(s)=1/(s+1)**

d. Calculate the gain cross over frequency, phase cross-over frequency, gain margin and phase margin for the following: **G(s)=1/(s+2) (s+4)**

e. With the help of neat diagram, explain the working of a Variable reluctance stepper motor with 3-phase, 6 stator poles and 4 rotor poles.

f. Calculate the 'jω' axis crossing of root locus and find the value of Gain 'K' at this crossing point for given transfer function: **$T(s) = K(s+3) / [s^4+7s^3+14s^2+(8+K)s+3K]$**.

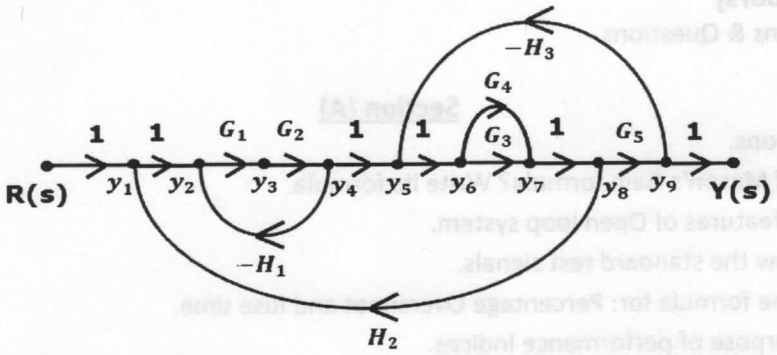
g. Using Routh-Hurwitz table find whether the given transfer function is stable or not:

$T(s) = 10/ (s^5+7s^4+6s^3+42s^2+8s+56)$

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What is a Signal Flow Graph? Find the transfer function for following Signal flow graph. **(7.5)**



b. Derive the expression of steady state error E(s) for closed loop system. Give expression for initial and final value theorems. Also derive values of steady state error for step, ramp and parabolic inputs. **(7.5)**

Q. 4. **a.** Explain the working of PID controller with help of proper diagram and equation. Explain the role of P, I and D term in PID controller. **(7.5)**

b. Calculate the following: i) Damping ratio, ii) Natural frequency iii) Damped frequency, iv) Percentage peak overshoot, v) Settling time, vi) Peak time and vii) Position constant Kp for given system:

$$G(s) = 20/ (s^2+8s+20).$$ **(7.5)**

Q. 5. **a.** Write down the steps to construct Root-Locus diagram for a given transfer function. Also show main components of a root locus diagram neatly. **(7.5)**

b. Construct Bode plot (both magnitude and phase plots) for transfer function:

$$G(s) = (s+20) / [(s+1)(s+7)(s+50)]$$ **(7.5)**

Q. 6. **a.** How can we check whether the given system is stable, unstable or marginally stable using its polar plot? Draw polar plot for each case and discuss them in detail. **(7.5)**

b. Draw Nyquist diagram for the function **G(s)H(s)= 2(s+1)** and comment on its stability using Nyquist stability criterion. **(7.5)**

Q. 7. **a.** Name the types of stepping mode of stepper motor and explain any 3 with help of sequence tables. **(7.5)**

b. What are Servo-motors? Explain AC servomotors and their types in detail. **(7.5)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : B.TECH.(ECE) FIFTH SEMESTER

COURSE CODE: CEC307 **COURSE TITLE: DIGITAL COMMUNICATION**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is line code? Explain with an example.

b. Explain Shannon capacity theorem, along with appropriate equation.

c. Mention the equations for μ law and A law companding and also mention typical values of μ and A.

d. Mention the condition for Granular error and slope overload error.

e. Mention the advantage of ADM. Also draw the block diagram.

f. Give the expression for Entropy.

g. Define pulse position modulation technique.

h. Explain in brief the use of frequency hopping spread spectrum

i. Give the full form of MSK and TDMA.

j. Define sampling theorem.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain the generation and detection of a MSK modulated signal. Also draw the block diagram and associated waveform.

b. Given a DMS with two symbol x1 and x2 and $P(x_1) = 0.6$, $P(x_2) = 0.4$, where Symbols x1 is encoded by 0 and x2 by 1. Find the efficiency and redundancy of this code.

c. Explain pulse code modulation technique.

d. What is Delta Modulation? Discuss in detail.

e. Signal m(t) band limited to 3 KHz is sampled at a rate 33.33% higher than nyquist rate. Maximum acceptable error is 0.5% of peak amplitude. Quantizer samples are binary coded. Find the minimum bandwidth of channel required to transmit encoded binary signal. If 24 such signals are TDMed, determine minimum transmission bandwidth required to transmit multiplexed signal.

f. The information in an analog waveform with maximum frequency is 3 kHz is to be transmitted over 16 level PCM system. Find the number of bits per sample and the minimum sampling rate for this transmission.

g. A memory-less source emits six messages with probabilities 0.3, 0.25, 0.15, 0.12, 0.1 and 0.08.

i. Construct the Huffman code and also find the code efficiency and redundancy. (3.5)

ii. For a channel having Bandwidth of 4KHz corresponding SNR is 15dB. Find channel capacity. (3.5)

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** Explain the importance of time division multiplexing in communication. What are its advantages over frequency division multiplexing? (7.5)

b. Explain different type of spread spectrum techniques. (7.5)

Q.4. **a.** Explain the generation and detection of a DPSK modulated signal. Also draw the block diagram and associated waveform. (7.5)

b. Compare basic parameters of Binary ASK, Binary FSK and Binary PSK. (7.5)

Q.5. **a.** Explain the model of a digital communication system with the help of a block diagram. Also mention the difference between Analog and digital communication system. (7.5)

b. Derive the expression for reconstruction of analog signal using Low Pass Filter. (7.5)

Q.6. **a.** Explain quantization and derive the expression to find the quantization error. (7.5)

b. A sinusoidal message signal is transmitted through PCM system such that maximum possible Q_e should be at most of 2% of peak to peak amplitude of message signal. Find minimum possible number of bit per sample required. (7.5)

Q.7. **a.** Explain the transmission and reception of a DPCM along with suitable block diagram. Also mention the advantage of ADPCM over DPCM. (7.5)

b. A message signal of $m(t) = 4\text{Cos } 4\pi \times 10^4 t$ is transmitted by using a 3 bit PCM system. Sampling rate is 5 times higher than Nyquist rate. (7.5)

1. Find all possible parameters of PCM
2. Given sample value (-3.6 V, -2.2V, 0.4V, 1.9V, 2.6V, 3.5)
3. Plot quantization characteristics.

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : B.TECH. FIFTH SEMESTER

COURSE CODE : CEC302 **COURSE TITLE : MICROPROCESSORS & PERIPHERAL DEVICES**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is the length of the address bus of 8085 & 8086 microprocessors?

b. Define active-high pin & give 2 examples.

c. Explain the function of overflow flag.

d. How will the offset address be calculated in relative plus index addressing mode?

e. Explain the function of this instruction: LDS CX, [1483H].

f. Describe DT assembler directive with an example.

g. What are the contents of .OBJ & .ASM files?

h. Write the abbreviation of PIC. How many pins does it have?

i. Define cycle stealing.

j. List the modes of operation of 8255.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Give the pin description of 8085 microprocessor.

b. What is Assembler directive? Explain any 10 of them.

c. Describe the following terms:

i. Machine cycle **ii.** Linker **iii.** Loader

d. Write an assembly language program to add two strings of numbers.

e. Draw and explain the operation of Digital to Analog Converter.

f. Explain the modes of operation of DMA Controller.

g. What is Interrupt controller? Draw and explain its system connections.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Draw and explain the architecture of 8086 microprocessor in detail. **(10)**

b. Explain the modes of operation of 8254. **(5)**

Q. 4. **a.** Draw the flow chart of key press detection and encoding. Explain it in detail **(10)**

b. List and explain the specifications of Digital to Analog Converter. **(5)**

Q. 5. **a.** Explain the differences between Minimum and Maximum modes of 8086 microprocessor. **(7)**

b. Explain the different handshaking methods using neat diagrams. **(8)**

Q. 6. **a.** Explain the block diagram of programmable timer/counter. **(7)**

b. Draw and explain the block diagram of programmable interrupt controller. **(8)**

Q. 7. **a.** Give the pin description of 8259. **(7)**

b. Depict the necessary actions to be done before executing the ISR. **(8)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH.(ECE) SIXTH SEMESTER

COURSE CODE : CEC310 **COURSE TITLE : MICROWAVE ENGINEERING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Write down the Maxwell's equations in differential form.

b. What do you understand by TE_{mn} and TM_{mn} modes?

c. Why is it necessary for the electrons to interact with the retarding field in a reflex klystron oscillator?

d. What do you understand by slow wave structures in TWT's?

e. What are S-parameters of a two-port network?

f. Give four examples of microwave junctions.

g. What are the applications of directional couplers?

h. What do you understand by a Microwave Circulator?

i. What does TRAPATT stands for? What are advantages of TRAPATT diode over IMPATT diode?

j. Briefly explain the GUNN effect.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. An air-filled circular waveguide is to be operated at a frequency of 6 GHz and said to have dimensions such that fc = 0.8f for the dominant mode. Determine:-

i. The diameter of the guide.

ii. The phase velocity in the guide.

b. Explain the bunching process in the Klystron amplifier and derive the expression for the distance from the buncher grid to the bunching center.

c. What is an H-plane Tee? Evaluate its scattering parameters.

d. Describe the formulation of scattering parameters using its various properties.

e. What is the historical background of GUNN diode?

f. Explain the operation of BARITT diodes. What are its applications?

g. Write all the microwave frequency bands. Mention at least 2 applications of each band.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain the excitation of modes in a rectangular waveguide (7)

b. An air-filled circular waveguide is to be operated at a frequency of 6 GHz and said to have dimensions such that $f_c = 0.8f$ for the dominant mode. Determine:-

i. The diameter of the guide **ii.** The phase velocity and wavelength in the guide. (8)

Q. 4. **a.** Explain the construction and working of four-cavity Klystron amplifier. What are it's advantages over a two-cavity Klystron amplifier? (8)

b. Describe the working principle of cylindrical eight-cavity Magnetron. Briefly explain the pi-mode in Magnetron oscillator. (7)

Q. 5. **a.** Explain the construction and operation of Microwave Isolator using Faraday Rotation. (8)

b. Describe the working of a Magic Tee with the help of its S-matrix. (7)

Q. 6. **a.** Explain the Ridley-Watkins-Hilsum theory with the help of proper energy diagrams. (8)

b. Derive the S-matrix of an E-Plane Tee. What are its applications? (7)

Q. 7. **a.** Explain the operation of IMPATT diode. Also explain how negative resistance region is obtained in IMPATT Diode. (7.5)

b. Draw and describe the three-valley model of InP diode. (7.5)

Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH. (ECE) SIXTH SEMESTER

COURSE CODE : CEC309 **COURSE TITLE : DIGITAL SIGNAL PROCESSING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Explain the difference between analog processor and digital processor with their advantages and disadvantages.

b. What are the advantages of FFT over DFTs.

c. What is convolution? What is its purpose?

d. Explain discrete unit step signal and show its relation with discrete impulse function.

e. What are the steps used in circular convolution?

f. Determine the z transform and the ROC of the x(n) = (1,2,2,1).

g. Determine the DFT of unit step function.

h. What will be W matrix for N = 4 in DFT?

i. Draw signal flow diagram for N=4 for inverse DIT FFT.

j. Write the expression for hamming window function.

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Find the inverse Z transform of function using partial fraction method

$X(z) = (z+2)/(2z^2 - 7z + 3)$, If the ROC are $|z| > 3$ & $|z| < 1/2$

b. By using approximation of derivative method convert the analog filter into IIR digital filter with system function $H(s) = 1/(s^2 + 16)$

c. For analog transfer function $H(s) = 1/\{(s + 1)(s + 2)\}$ determine H(z) Using impulse invariant technique. Assume T = 1s.

d. Find the N- Point DFT for $x(n) = a^n$ for a <n<1.

e. Compute the DFT of the sequence $x(n) = \cos(n\pi/10)$ for N= 4. Also verify the result using matrix method

f. An input signal sequence x(n) = {1,2} is applied to a DSP system with response h(n) = {1,2,4}. Find the output of the FIR filter.

g. What is an FIR system? Compare an FIR system with an IIR system.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Find output of the system with response h(n) = {0, 1, 2, 3} and x(n) = {1, 2, 2, 1} using DFT **(7.5)**

b. Find out linear convolution of two signal $x_1(n)$ = {3, 2, 2, 3} and $x_2(n)$ = {4, 2, 4, 1} and also verify your result using matrix method. **(7.5)**

Q. 4. **a.** Determine the Fourier series coefficient and power density spectrum of the aperiodic signal having N samples and define as $X(n) = A ; 0 \leq n \leq L - 1$

$= 0$; otherwise **(7.5)**

b. What are conditions for linear phase response of digital filter? Prove that filter with the following response has linear phase response h(n) = { 2 , 1, 1, 2 }. **(7.5)**

Q. 5. **a.** A desired frequency response of filter is $H_d(e^{j\omega}) = e^{-3j\omega}$ $-\pi/4 \le \omega \le \pi/4$
$= 0$ $\pi/4 \le |\omega| \le 0$.
Determine $H(e^{j\omega})$ for M= 5 using window function. **(7.5)**

b. Determine DFT of two real sequence using only one FFT flow graph $X_1(n) = \{2, 1, 2, 1\}$ and $X_2(n) = \{4, 2, 4, 2\}$. **(7.5)**

Q. 6. **a.** Using FFT and IFFT determine the output of system if input x(n) and impulse response h(n) are given as under $x(n) = \{2,2,4\}$ $h(n) = \{1,1\}$ **(7.5)**

b. Explain DIT FFT algorithm and make signal flow diagram for N = 8. **(7.5)**

Q. 7. **a.** For M = 11 determine the magnitude response and show that the phase and group delay are constant for the transfer function $H(z) = \sum h(n)z^{-n}$ for $0 \le n \le M-1$ **(7.5)**

b. What do you mean by FFT? Differentiate between DIT and DIF FFT algorithm. State and prove the symmetry and periodicity properties of complex exponential sequence W. **(7.5)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : B.TECH.(ECE) SIXTH SEMESTER

COURSE CODE : CEC311 **COURSE TITLE : VLSI DESIGN**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections and Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

Attempt all questions. Each question carries 2 marks.

a. What is Oxidation?

b. What is Ion Implantation?

c. Draw the four input pass transistor AND gate and give its output expression.

d. What are the aspects of MOS transistor threshold voltage?

e. What is stick diagram? Draw any one example.

f. What is demarcation line? Where do you find it?

g. What is the relationship between rise time and power supply?

h. Draw the fan-in and fan-out characteristics and comment on them.

i. What is a SHMOO plot? Give an example.

j. What is ATPG? Write its application.

SECTION B

Q.2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Draw the stick diagram of 3 input NOR gate.

b. An nMOS transistor has the following parameters: $\mu_n C_{ox}$ = 2 mA/V^2, V_{GS} = 2V, V_{tn} = 0.5V, W/L = 8. Find the drain current for V_{DS} = 1V & 1.5V.

c. Prove that delay is directly proportional to $Nf\tau$.

d. Derive the expression for overall delay τ_d and calculate it for the pass transistor chain having 4 sections with each section consisting of R = 2.2KΩ & C = 32nF.

e. List and explain the alternative forms of pull-up.

f. Write short notes on silicon debugging.

g. What are the various forms of Pull Up? Explain them in brief.

SECTION C

Attempt any 3 questions. Each question carries 15 marks. **(15 x 3 = 45)**

Q.3. a. Draw the p-well CMOS fabrication process steps. (8)

b. Explain the p-well CMOS fabrication process steps. (7)

Q.4. a. Determine the Zp.u./Zp.d ratio for an nMOS inverter driven by another nMOS inverter? (8)

b. Draw the circuit diagram and explain the operation of different BiCMOS inverter circuits (7)

Q.5. a. Draw the stick diagram and layout of 1-bit CMOS shift register cell. (8)

b. Draw the stick diagram and layout of Y = (AB+CD)'. (7)

Q.6. a. Draw the fan-in and fan-out characteristics and explain them. List the choice of layers. (8)

b. What are the basic circuit concepts? List all of them and explain them in brief. (7)

Q.7. a. What is BIST? Explain its usage in a system. (7)

b. Explain FPGA-assisted testing in a university environment? (8)

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END SEMESTER EXAMINATION, JUNE - 2018

PROGRAM : B.TECH. (ECE) SIXTH SEMESTER

COURSE CODE : CEC312 **COURSE TITLE : OPTICAL COMMUNICATION & NETWORKS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define numerical aperture of an optical fiber.

b. What are the different parts of an optical fiber?

c. Define material dispersion.

d. What are the two conditions for lossless transmission through an optical fiber?

e. What is the basic principle of operation in an LED?

f. What are internal and external photoelectric effects?

g. Define insertion loss due to WDM.

h. What are the applications of optical amplifiers?

i. How much system margin is taken generally while designing an optical link?

j. What is a point-to-point link?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What are the differences between graded index and step index fiber? Give applications of each.

b. Explain the bending losses that occur in an optical fiber.

c. What are the effects of intermodal and waveguide dispersion in an optical communication?

d. Compare surface emitter and edge emitter LEDs with examples of each.

e. Explain the process of photodetection using avalanche photodiode.

f. Explain the working of an optical isolator.

g. Describe the link power budget for an optical link.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain the principle of light propagation through an optical fiber. What are differences between single mode and multi mode optical fibers. **(8)**

b. What are the advantages and disadvantages of optical fibers? **(7)**

Q. 4. **a.** Explain all types of absorption losses that occur in an optical fiber with examples. **(9)**

b. Describe Rayleigh scattering in an optical fiber. What are its consequences on optical communication? **(6)**

Q. 5. **a.** Explain the basic principle of operation of a LASER in detail with all the energy level diagrams. What is a Distributed Feedback LASER? **(8)**

b. Describe the working of a PIN photodiode as a photodetector in an optical communication. **(7)**

Q. 6. **a.** Explain the working of EDFA optical amplifier with a neat diagram and what are its disadvantages? **(7)**

b. How does an optical circulator work in an optical communication? **(8)**

Q. 7. **a.** What are system considerations to be taken while designing an optical link? **(7)**

b. Explain wavelength division multiplexing and demultiplexing in an optical communication with an example. **(8)**

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END SEMESTER EXAMINATION, JUNE - 2018
PROGRAM: B.TECH.(ECE) SIXTH SEMESTER

COURSE CODE:CEC304 **COURSE TITLE: DIGITAL INTEGRATED CIRCUITS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections &Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Draw the circuit diagram of basic CMOS inverter circuit and also write its truth table.
b. Draw circuit diagram of AND gate using Diode logic only also write its truth table.
c. Define Fan in and Fan out.
d. What do you mean by library used in VHDL?
e. Explain entity used in VHDL programming.
f. Define combinational circuit with example.
g. What do you mean by propagation delay and transition time?
h. Explain noise margin in digital circuits.
i. What is role of comparator used in digital circuit?
j. What do you mean by counter?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. How CMOS work as inverter circuit? Explain with circuit diagram.
b. Explain the working of CMOS 2 input NAND gate with circuit diagram and function table.
c. Explain the working of ECL. What are its advantages?
d. Explain HDL based design flow with block diagram.
e. What do you mean by hierarchical architecture of VHDL
f. What is the role of VHDL test bench? Explain with example.
g. Define 4 bit magnitude comparator with VHDL program.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** Explain the effects of loading. Write about Unused Inputs. (8)
b. What will be the effect of resistive load on the behavior of CMOS inverter? (7)

Q.4. **a.** Explain the difference between data flow, behavioral and structure design element of VHDL with program. (7)
b. Write a dataflow style VHDL module for universal gates with test bench logic. (8)

Q.5. **a.** Define different tools used in HDL design suit. (8)
b. Explain working of decoder using VHDL program. Also write logic for the test bench. (7)

Q.6. **a.** How exclusive OR gates can be used as even and odd parity circuit? Explain with diagram. (7)
b. Explain the working of 4 X 4 combinational multipliers with an example. (8)

Q.7. **a.** Write about the 73x175 4-bit register, draw its logic diagram & symbol. (7)
b. Write the Dataflow VHDL architecture for the prime number detector. (8)

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE) SEVENTH SEMESTER

COURSE CODE : CEC402 **COURSE TITLE : COMPUTER NETWORK**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is the use of CIDR value in IP addressing?
b. Discuss the issues in transport layer.
c. What are the differences between message switching and packet switching?
d. Distinguish between peer-to-peer relationship and a primary-secondary relationship.
e. What is bit stuffing? And why it is needed in HDLC?
f. Define Masking.
g. Enumerate any four reasons for using layered protocols.
h. What are the functions of MAC?
i. Why are standards needed?
j. Define Gateway. How many Layers of OSI Reference Model used the gateway?

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain in detail, how communication is taking place starting from connection establishment, data transfer and connection termination in.
  i. Circuit switching
  ii. Packet switching
b. Given IP address 168.90.80.66 and mask 255.255.255.192, then find
  i. How many bits for network subnet or Host.
  ii. Total no. of Host.
  iii. Total no. of subnet.
  iv. Subnet address
  v. Broadcast address
c. Design the IPv4 datagram format. Explain each field of the format.
d. What is Router? Explain the distance vector Routing Protocols
e. What is Checksum? A sender needs to send the four data items 0x3456, 0xABCC, 0x02BC, and 0xEEEE. Answer the following
  i. Find the checksum at the sender site
  ii. Find the checksum at the receiver site if there is no error
  iii. Find the checksum at the receiver site if the second data item is changed to 0xABCE.
  iv. Find the checksum at the receiver site if the second data item is changed to 0xABCE and the third data item is changed to 0x02BA
f. Write down the Diskstra Algorithm.
g. What is Network Topology? Explain each networking topology in details.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. (7.5 x 2=15)

a. Imagine that you have trained your St. Bernard, Bernie, to carry a box of three 8-mm tapes instead of a flask of brandy. (When your disk fills up, you consider that an emergency.) These tapes each contain 7 gigabytes. The dog can travel to your side, wherever you may be, at 18 km/hour. For what range of distances does Bernie have a higher data rate than a transmission line whose data rate (excluding

overhead) is 150 Mbps? How does your answer change if (i) Bernie's speed is doubled; (ii) each tape capacity is doubled; (iii) the data rate of the transmission line is doubled.

b. A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces

i. 1000 frames per second **ii.** 500 frames per second **iii.** 250 frames per second.

Q. 4. A router has the following (CIDR) entries in its routing table: (15)

Address/mask	**Next hop**
135.46.56.0/22	Interface 0
135.46.60.0/22	Interface 1
192.53.40.0/23	Router 1
default	Router 2

For each of the following IP addresses, what does the router do if a packet with that address arrives?

i. 135.46.63.10
ii. 135.46.57.14
iii. 135.46.52.2
iv. 192.53.40.7
v. 192.53.56.7

Q. 5. Draw the flow diagram for four frames using the Stop-and-Wait ARQ Protocol for following time-out and round trip delay. Assume no data frame or control frame is lost or damaged. (15)

i. If the time-out is 6ms and the round trip delay is 4ms
ii. If the time-out is 4ms and the round trip delay is 6ms
iii. If the time-out is 4ms and the round trip delay is 6ms and the first frame (frame0) is lost.

Q. 6. Using $e = 13$, $d = 37$, and $n = 77$ in the RSA algorithm, encrypt the message "FINE" using the values of 00 to 25 for letters A to Z. For simplicity, do encryption and decryption character by character. (15)

Q. 7. Write a short notes on the followings:- (5 x 3=15)

a. File Transfer Protocol
b. HTTP
c. Electronic mail.

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH.(ECE) SEVENTH SEMESTER

COURSE CODE : EEC403 **COURSE TITLE : SATELLITE COMMUNICATION AND BROADCASTING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is the significance of G/T parameter?
b. What do you mean by equipment Space qualification and reliability in Satellite System?
c. What are the advantages of GEO stationary satellites?
d. What is System Noise Temperature?
e. Why codes(C/A and P) are used in GPS?
f. Which parameters effects the selection of satellite launch vehicle?
g. What is the bandwidth of a transponder? How bandwidth can be increased?
h. What is the significance of Noise Figure in earth station and how it is related to System noise temperature?
i. Write four applications of Satellite Communication.
j. What is the effects of Intermodulation in FDMA?

Section (B)

Q. 2. Attempt **any 5** questions: **(7 x 5 = 35)**

a. Explain different types of orbits used for satellite Communication?
b. What do you mean by multiple access technique? Explain Time Division Multiple Access in detail.
c. Explain three laws of Kepler's planetary motion in detail.
d. What is the purpose of Telemetry, Tracking, Command, and Monitoring in satellite communication? Explain in detail.
e. Which types of Antennas are used in Satellite system? Explain any one type.
f. In non-geostationary satellite systems describe the Delay and throughput consideration.
g. Write short notes on Demand Access Multiple Access (DAMA) system.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Explain following terms in detail regarding GPS.
(i) Signal levels **(ii)** Timing Accuracy
b. Write short notes on GPS Receivers with using simplified block diagram

Q. 4. **a.** Draw block diagram of earth station and explain each block in detail.
b. How many types of tracking systems are there in earth station? Describe each.

Q. 5. **a.** Explain how to compute uplink and downlink C/N ratios for a typical Satellite link.
b. Write differences between:
(i) Attitude control and orbital control **(ii)** FDMA and TDMA

Q. 6. **a.** List the orbital elements and explain each of them in detail. Also give their significance in Orbital maintenance.
b. Describe the earth's oblateness, sun and moon's effects on artificial satellite's orbit?

Q. 7. **a.** The EIRP from a satellite is 50dBW. Calculate (a) The flux density at a ground station for which the range is 36000 Km and (b) Power received at the earth station if the antenna gain is 48 dB. The downlink frequency is 3.9 GHz.
b. Write a short note on Transponder of a Satellite.

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END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM: B.TECH. (ECE) SEVENTH SEMESTER

COURSE CODE: CEC 401 **COURSE TITLE: DIGITAL IMAGE PROCESSING**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & questions.

Section (A)

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What do you mean by digital image?
b. List the basic elements of an image processing system.
c. How do we avoid aliasing in image?
d. What do you mean by enhancement of an image?
e. What do you mean by frequency in an image?
f. Explain the term image restoration.
g. Explain the difference between brightness and contrast enhancement of an image.
h. What do you mean by lossless compression technique
i. Find RLE compression of sequence 2225555556666.
j. Explain degradation model of an image.

Section (B)

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. What are the fundamental steps of Digital image processing? Explain with block diagram.
b. Explain sampling and quantization of digital image.
c. Explain the role of frequency transform in image processing. What are the advantages of transforming image in frequency domain?
d. Compare and contrast the low pass and high pass spatial filter.
e. Explain the role of 2-D DFT in processing of image.
f. Explain the function of Low pass frequency domain filter. Explain the working of Ideal low pass filter.
g. What do you mean by segmentation of image? Explain segmentation based on similarities.

Section (C)

Attempt **any 3** questions. **(15 x 3 = 45)**

Q.3. **a.** Explain histogram and the procedure to perform histogram equalization. Perform histogram equalization of the image. (7.5)

$$F(m,n) = \begin{bmatrix} 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

b. Differentiate between spatial domain and transform domain technique. What are the different image enhancement techniques in spatial domain? (7.5)

Q.4. **a.** Explain different type of point operation used in spatial domain enhancement technique. (7.5)
b. Explain edge detection in details. Also explain Sobel and Roberts Edge detection operator. (7.5)

Q.5. **a.** Explain image model. What do the illumination and reflectance components denote in image processing. (7.5)
b. Show that a high pass filtered image in the frequency domain can be obtained using the method of subtracting a low pass filtered image from original image. (7.5)

Q.6. **a.** Find the DFT of the Image using separability property of the image with pixels value. (7.5)

$$F(m,n) = \begin{bmatrix} 0 & 1 & 2 & 1 \\ 1 & 2 & 3 & 2 \\ 2 & 3 & 4 & 3 \\ 1 & 2 & 3 & 2 \end{bmatrix}$$

b. Explain median filter. Compute the median value of the marked bold pixels using 3 × 3 mask. (7.5)

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & \mathbf{128} & \mathbf{24} & \mathbf{172} & \mathbf{26} & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

Q.7. **a.** Explain the role of DCT in image processing. Explain the difference between the DFT and DCT. (7.5)

b. Find the DCT of given 4 × 4 image. (7.5)

2	4	4	2
4	6	8	3
2	8	10	4
3	8	6	2

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END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM : B.TECH.(ECE) EIGHTH SEMESTER

COURSE CODE : EEC418 **COURSE TITLE : INTRODUCTION TO MEMS**

[Time allotted: Three hours] **[Max. Marks : 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. What is the difference between isotropic and anisotropic etching?
b. Give some examples of negative photoresist material.
c. What do you understand by the term "diffusion" in microsystem fabrication?
d. What is the working principle of Piezoelectric Actuator?
e. What do you understand by sensing mechanism in MEMS?
f. What are the types of micromachining methods?
g. What is meant by the term "process flow" in design process?
h. Give some examples of positive photoresist.
i. What are the levels of packaging in MEMS
j. What is the principal objective of mechanical designing in MEMS?

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain how a MEMS device is fabricated using SLIGA process.
b. Give a description of construction and working of electrostatic actuator.
c. Describe the method of chemical vapor deposition used in microsystems.
d. Explain the multidisciplinary nature of MEMS.
e. What are the differences between microassembly and traditional assembly?
f. Explain the construction and working of chemical microsensors.
g. Describe the process of photolithography used in microsystems.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** What are the various advantages and disadvantages of MEMS devices over conventional devices? **(7.5)**
b. Briefly explain any 5 applications of MEMS in industries. **(7.5)**

Q. 4. **a.** Explain the construction and working of a linear micromotor. **(7.5)**
b. Explain the working and construction of a micropump. **(7.5)**

Q. 5. **a.** Explain the ion implantation process used for microfabrication. **(7.5)**
b. Describe the Sputtering process for fabrication of microsystems **(7.5)**

Q. 6. **a.** Describe how a MEMS device is fabricated using the technique of surface micromachining with the help of neat diagrams of each step involved. **(7.5)**
b. Explain the LIGA process for fabrication of microsystems. **(7.5)**

Q. 7. **a.** Explain any 4 design constraints in MEMS. Also give an overview of mechanical design in microsystems. **(7.5)**
b. What are the reasons for high cost associated with microassembly? **(7.5)**

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Enrol. No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH.(ECE) EIGHTH SEMESTER

COURSE CODE : EEC417 **COURSE TITLE : EMBEDDED SYSTEMS**

[Time allotted: Three hours] **[Max. Marks: 100]**

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions. **(2 x 10 = 20)**

a. Define Embedded System.
b. List any **TWO** constraints of Embedded System.
c. Explain ISR.
d. Define synchronous Communication.
e. Define Context Switching.
f. What is Exception Handler?
g. Define Class.
h. Define Inheritance.
i. Define Protocol with example.
j. Explain class, object, function in C++

SECTION B

Q. 2. Attempt **any 5** questions. **(7 x 5 = 35)**

a. Explain the Real-World Interfacing of an Embedded System.
b. Compare Embedded System and General Computing System.
c. List and explain the different I/O types briefly.
d. Define the following terms:
(i) Programmed Input **(ii)** Programmed Output
e. What are the merits and demerits of C Language?
f. Explain the basic concept of Process and its context with relevant diagrams.
g. Define thread and task? Compare both of them.

SECTION C

Attempt **any 3** questions. **(15 x 3 = 45)**

Q. 3. **a.** Write briefly about the choices available for the processor embedded into a system? (8)
b. Explain the Embedded System architecture with an example. (7)

Q. 4. **a.** Explain the following communication techniques:
(i) Synchronous **(ii)** Isosynchronous **(iii)** Asynchronous **(iv)** UART Mode ASC (8)
b. Explain the parallel port interfacing with an encoder and Stepper motor. (7)

Q. 5. **a.** Explain the concept of Interrupt-Driven Input and Output. (8)
b. Explain the Interrupt Service Routine Concept. (7)

Q. 6. Explain the following 'C++' Program Elements: (15)
(i) Header files **(ii)** Source files **(iii)** Preprocessor Directives
(iv) Data types **(v)** Data structures **(vi)** Loops **(vii)** Pointers

Q. 7. **a.** Why IPCs in a multi-processes systems are used? What are the functions of IPC? (8)
b. What are the contents of the Process Control Block? (7)

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