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Code No: RT22045 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June - 2015
ANALOG COMMUNICATIONS
(Electronics and communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain the need of modulation in communication system?
   b) Describe VSB modulation and give its applications?
   c) Define the following terms?
      i) Carrier swing ii) Frequency Deviation iii) Percent Modulation
   d) What is threshold effect in an envelope detector? Explain?
   e) Write the main requirements of AM broadcast transmitters?
   f) Discuss the types of pulse Modulation. (3M+3M+4M+4M+4M+4M)

PART-B

2. a) Describe an expression for AM wave and sketch its frequency spectrum.
   b) Explain the square law detection of AM signals.

3. a) Prove that the balanced modulator produces an output consisting of sidebands only with the carrier removed.
   b) Explain the principle of coherent detector of DSB-SC modulated more with a neat block diagram.

4. a) For an FM modulator with a modulating signal m(t)= Vm sin300wt, the carrier Signal Vc(t)=8 $\sin(6.5\times10^{6})t$ and the modulator index $\beta = 2$. Find out the significant side frequencies and their amplitudes.
   b) Explain the difference between Narrow band FM and Wide band FM.

5. a) Calculate the figure of merit for a DSB-SC system.
   b) Prove that narrowband FM offers no improvement in SNR over AM.

6. a) Draw the block diagram of superhetrodyme receiver and the function of each block.
   b) Discuss the factors influencing the choice of intermediate frequency (IF) for a radio Receiver.

7. Write short notes on the following
   i) Double polarity PAM
   ii) Demodulation of PWM
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Code No: RT22045 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
ANALOG COMMUNICATIONS
(Electronics and communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain the need for modulator.
   b) Compare the DSB and SSB systems.
   c) Explain the terms of Narrow band FM and wide band FM
   d) Explain, how noise can be calculated in a communication system.
   e) What is the significance of Harmonic generator in transmitters?
   f) Write short notes on " Time division multiplexing". (3M+3M+4M+4M+4M+4M)

PART-B

2. a) Explain the generation of AM wave using square law modulator.
   b) A tone modulated AM-signal with a modulation index of "m" and base band signal Frequency of ω_m is detected using envelope detector, whose time constant is RC, for Effective demodulation, show that $(1/RC) \geq [m\ \omega_m/(\sqrt{1-m^2})]$.

3. a) Explain the concept of frequency translation using the spectrum of DSB-SC wave.
   b) In an AM-SC system, modulating signal is a single tone sinusoidal signal $4\cos 2\pi 10^3$,which Modulates carrier signal $6\cos 2\pi 10^6 t$. Write the equation of the modulated wave. Plot the two Sided spectrum of the modulated wave. Calculate the amount of power transmitted.

4. a) Give the phasor comparison of narrowband FM and AM waves for sinusoidal modulation.
   b) Compute the bandwidth requirement for the transmission of FM signal having a frequency Deviation of 75 kHz and an audio bandwidth of 10kHz.What will be the change in the Bandwidth, if modulating frequency is doubled? Determine the bandwidth when modulating Signal amplitude is also doubled.

5. a) Explain about pre-emphasis and de-emphasis.
   b) Explain the noise performance of SSB-SC receiver and prove its S/N ratio is unity.

6. a) List out the advantages and disadvantages of TRF receivers.
   b) What is an image frequency? How is image frequency rejection achieved?

7. a) Explain, how a PPM signal can be generated from PWM signal?
   b) Explain the generating and demodulation of PPM.
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Code No: RT22045 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
ANALOG COMMUNICATIONS
(Electronics and communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Derive P_t in Amplitude modulation.
b) Discuss Quadrture null effect of DSB-SC and SSB-SC.
c) Write short notes on Pre-emphasis and de-emphasis.
d) Define noise figure, noise equivalent temperature.
e) define sensitivity,selectivity,fedility.
f) Distinguish between TDM and FDM. (3M+3M+4M+4M+4M+4M)

PART-B

2. a) What is modulation? Why is modulation used in communication system?
b) What do you understand of modulation index? What is its significance?

3. a) With a neat block diagram explain the demodulation process of DSB-SC signal.
b) Prove that the balanced modulator produces an output consisting of sidebands only with the carrier removed.

4. a) An angle modulated signal has the forumv(t) = 100cos[2π $f_e t$ + 4 Sin $2000\pi t$] where fc=5MHz
i) Determine the average transmitted power ii) Determine the peak phase deviation
iii) Determine the peak frequency deviation iv) Is this FM or a PM signal? Explain
b) Explain the detection of FM wave using balanced frequency discrimination.

5. a) Prove that the figure of merit for SSB-SC is 1.
b) Discuss the threshold effect for AM with envelope detector.

6. a) Mention the advantages of superhetrodyme receiver over TRF receiver
b) Distinguish between simple AGC and delayed AGC
c) Draw the block Schematic for FM broad cast receiver and explain the function of each unit.

7. Write short notes on
i) Single polarity PAM ii) Generation of PWM
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Code No: RT22045 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June - 2015
ANALOG COMMUNICATIONS
(Electronics and communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain the need for modulator.
   b) Discuss Quadrture null effect of DSB-SC and SSB-SC
   c) Explain the terms of Narrow band FM and wide band FM
   d) What is threshold effect in an envelope detector? Explain?
   e) Write the main requirements of AM broadcast transmitters?
   f) Distinguish between PAM & PWM. (3M+3M+4M+4M+4M+4M)

PART-B

2. a) Describe an expression for AM wave and sketch its frequency spectrum.
   b) Explain the square law detection of AM signals.

3. a) Explain the generation of double side band suppressed carrier (DSB-SC) modulator. Write the necessary equations,
   b) Discuss the effect of frequency and phase error in demodulation of DSB-SC wave using synchronous detector.

4. a) Give the phasor comparison of narrowband FM and AM waves for sinusoidal modulation.
   b) Compute the bandwidth requirement for the transmission of FM signal having a frequency deviation of 75 kHz and an audio bandwidth of 10kHz.What will be the change in the bandwidth, if modulating frequency is doubled? Determine the bandwidth when modulating signal amplitude is also doubled.

5. a) Derive an expression for the S/N ratio for an FM System.
   b) Explain the difference between DSB & SSB system.

6. a) Draw the block diagram of superhetrodyme receiver and the function of each block.
   b) Discuss the factors influencing the choice of intermediate frequency (IF) for a radio receiver.

7. a) Explain the PPM generation from PWM with a neat block diagram and necessary figures.
   b) Draw the circuit of PPM demodulator and explain the operation.
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Code No: RT22041 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June - 2015
ELECTRONICS CIRCUIT ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What is unity gain frequency of a BJT and derive an expression for it.
   b) Three amplifiers of gain 10dB, 20dB and 30dB are connected together. Find the overall gain in dB and in normal units.
   c) Show that the input resistance increases with series mixing.
   d) Draw the electrical equivalent of a crystal and derive expressions for series and parallel resonances.
   e) What are the advantages of push pull power amplifiers.
   f) What is staggering? State the advantages of stagger tuned amplifier.

(3M+4M+4M+4M+4M+3M)

PART-B

2. a) Draw the High frequency model of a Transistor. Derive the relationship between high frequency and low frequency parameters.
   b) Compare, CS, CH, and CD amplifier circuits at high frequencies. (8M+8M)

3. a) Derive an expression for the lower 3dB frequency of an RC coupled amplifier by taking the effect emitter bypass capacitor into account.
   b) What is fidelity of an Amplifier? Explain about Frequency response of an amplifier by considering different frequency regions (8M+8M)
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4. a) Give the block diagram of a general feedback amplifier. State the function of each block.
   b) If an input of 0.028V peak to peak given to an open loop amplifier, it gives fundamental frequency output of 36V peak to peak, but it is associated with 7% distortion. i) If the distortion is to be reduced to 1%, how much feedback is to be introduced and what will be required input voltage? ii) If 1.2% of output is feedback and the input is maintained at the same level, what is the output voltage? (7M+9M)

5. a) Discuss about frequency and amplitude stability of oscillators.
   b) Draw the circuit diagram of a FET based RC phase shift oscillator and derive the expression for frequency of oscillation and condition for sustained oscillations (7M+9M)

6. a) Draw the circuit diagram of a class A transformer coupled amplifier and derive an expression for it's conversion efficiency.
   b) In an Ideal Class B push pull amplifier, V_{CC}=20V, N_2=2N_1 and R_L=20 ohms. Find the output signal power, P_{0max} and collector dissipation in each Transistor, P_C under full power condition, Find P_{Cmax} also. (8M+8M)

7. Write short notes on
   a) Single Tuned amplifier b) Double Tuned Amplifier (8M+8M)

Code No: RT22041 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
ELECTRONICS CIRCUIT ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Draw the high frequency model of FET and derive an expression for Gain of common source amplifier at high frequencies.
   b) Show that the band width reduces with cascading of amplifiers.
   c) Define sensitivity and derive an expression of Desensitivity of a negative feedback amplifier.
   d) Define frequency and amplitude stability of an oscillator.
   e) Classify power amplifiers.
   f) Define Q-factor and compare various tuned amplifiers. (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Draw the equivalent diagram of a single stage CE amplifier at high frequencies. Derive the expression for gain under short circuited load conditions.
   b) When a Ge PNP transistor is biased at 2mA, 15V, it has a base width of 1 micron. Find C_e and f_T if D_B=47cm^2/sec.. (8M+8M)

3. a) The 3dB bandwidth of an amplifier extends from 10Hz to 10KHz. Find the frequency range over which the bandwidth of the overall amplifier varies when three stages has been cascaded. Find the overall voltage gain in Decibels if the gain of the single stage is 10.
   b) Draw the circuit for differential amplifier and derive the expression for CMRR. (8M+8M)

4. a) Show that Input impedance increases with series mixing and decreases with shunt mixing.
   b) Enumerate the steps in the linear analysis of the feedback amplifier. Draw the CE with Re Circuit and analyze the circuit. (7M+9M)

5. a) What is a clap oscillator and derive an expression for frequency of oscillations.
   b) Draw the circuit diagram of a BJT based RC phase shift oscillator and derive the expression for frequency of oscillation and condition for sustained oscillations (7M+9M)

6. a) Derive the expression for Max. Theoretical efficiency in the case of class B push pull amplifier. Why is it named so? What are its advantages and disadvantages?
   b) Design a class B power amplifier to deliver 30W to a load resistor R_L = 40 using a transformer Coupling. V_m = 30V = V_{cc} Assume reasonable data wherever necessary. (8M+8M)
7. a) Draw the circuit for single tuned capacitance coupled amplifier explain its operation
   b) Draw the circuit for Double Tuned Amplifier. Explain its working. What are the advantages of this amplifier? (8M+8M)
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Code No: RT22041 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
ELECTRONICS CIRCUIT ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain different Hybrid-π Capacitances and derive necessary expressions.
   b) Explain about the classification of Amplifiers based on type of coupling and bandwidth.
   c) Explain various basic amplifiers used in a negative feedback circuits.
   d) Why LC oscillators are not used at low frequencies?.
   e) What is cross over distortion? Explain how to eliminate it.
   f) What is a tuned amplifier? Explain how tuned amplifiers are classified.
   (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Given a Germanium PNP transistor whose base width is 10^{-4} cm. At room temperature and for a DC Emitter current of 2mA, find, i) Emitter diffusion capacitance ii) f_T.
   b) Explain how f_β and f_T of a BJT can be determined? Obtain the expression for the Gain Bandwidth product of a transistor. (8M+8M)

3. a) Derive an expression for the lower 3dB frequency of an RC coupled amplifier (using BJT and FET) by taking the effect Coupling capacitor into account.
   b) Draw the circuit for Cascode Amplifier. Explain its working, obtaining overall values of the circuit in terms of h-parameters. (8M+8M)

4. a) An amplifier has an open loop voltage gain of 1000 and delivers 10 watts output with 10% second harmonic distortion when the input is 10mV.If 40dB of negative feedback is applied, what is the value of distortion?. How much input voltage should be applied to get 10watts of output power?.
   b) Discuss quantitatively about the effect of negative feedback on
   i) Gain ii) Bandwidth iii) Distortion. (7M+9M)

5. a) What are the differences between an oscillator and an amplifier?. Explain the operating principle of an oscillator.
   b) Draw the circuit diagram of a Wien bridge oscillator and derive the expression for frequency of oscillation and condition for sustained oscillations (6M+10M)

6. a) A signal $i_b=i_m\cos wt$ is applied to a power amplifier with characteristics $i_c=G_1i_b+G_2i_b^2$. Show that the output contains a DC term, fundamental component, second harmonic component.
   b) Design a class A power amplifier to deliver 5V rms to a load of 8 Ohms using a transformer coupling. Assume that a supply of 12V is available. The resistance of the primary winding of the transformer also should be considered. (6M+10M)

7. a) Draw the frequency response. Derive the expression for L for maximum power transfer.
   b) Explain the principle and working of wide band amplifiers Draw the circuit for tapped single tuned capacitance coupled amplifier and explain its working. (8M+8M)
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Code No: RT22041 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June - 2015
ELECTRONICS CIRCUIT ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain various parameters of FET high frequency model.
   b) What is bandwidth shrinkage factor?
   c) Draw any two topologies of negative feedback circuits.
   d) Explain the why RC oscillators are not used at high frequencies.
   e) Explain how a power amplifier acts as a rectifier.
   f) Give the classification of tuned amplifiers. (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Derive the expressions for voltage gain, current gain, input and output resistances of a Common Drain amplifier at high frequencies.
   b) A single stage Common Emitter amplifier is measured to have a voltage-gain bandwidth f_H of 5 MHz with R_L = 500 ohm. Assume h_{fe}=100,g_m = 100 mA/V, $r_{bb'}$ = 1000, C_c = 1pf, and f_T = 400 MHz. Find the value of the source resistance that will give the required bandwidth. (8M+8M)
3. a) With the help of necessary waveforms, explain about the step response of amplifiers.
   b) What are the advantages of common collector amplifier? Explain how the input resistance of the CC amplifier can be enhanced further. (8M+8M)

4. a) Discuss quantitatively about the variation of output impedance with type of sampling.
   b) Preform the linear analysis of the common collector amplifier using feedback concept. (7M+9M)
5. a) Derive and explain Barkhausen criterion.
   b) Draw the circuit diagram and derive the expression for frequency of oscillation and condition for sustained oscillations of i) Colpitts oscillator ii) Hartley Oscillator (7M+9M)

6. a) Draw the circuit and explain the working principle of a complementary symmetry push-pull power amplifier and state its disadvantages?
   b) Derive the expressions for maximum Theoretical efficiency for (i) Transformer coupled (ii) Series fed amplifiers. What are their advantages and disadvantages? (8M+8M)

7. a) Discuss about the effect of cascading the tuned amplifiers on Bandwidth.
   b) Draw the circuit for single tuned inductively coupled amplifier. Draw its equivalent circuit and Derive the expression for (A/A_{res})? (8M+8M)

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Code No: RT22044 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Find the capacitance of a parallel-plate capacitor containing two dielectrics, $\varepsilon_{r1} = 2$ and $\varepsilon_{r2} = 3.3$, each comprising one-half of the volume. Here, A=4m^2 and d=10^{-3}m.
   b) Compare the boundary conditions of magnetic field with those of electric field.
   c) Explain about the characteristics of uniform plane waves.
   d) Write the difference between Conduction Current density and displacement current density.
   e) Define characteristic impedance and propagation constants of transmission lines.
   f) Explain about single stub matching. (4M+4M+3M+4M+3M+4M)

PART-B

2. a) Derive an expression for the electric field intensity due to a finite length line charge along the Z- axis at an arbitrary point Q(x,y,z)
   b) A line charge ρ_L= 200pC/m lies along the X- axis. The surface of zero potential passes through the point P(0,5,4). Find the potential at point (1,3,-2) (8M+8M)

3. a) State all Maxwell's equations in differential and integral form for time varying fields.
   b) Define and explain the terms: i) skin depth ii) intrinsic impedance of free space iii) phase constant. (8M+8M)

4. a) Derive the expression for attenuation and phase constants of uniform plane wave.
   b) If ε_r = 9, $\mu=\mu_0$ for the medium in which a wave with frequency f= 0.3GHz is propagating determine propagation constant and intrinsic impedance of the medium when i) σ =0 and ii) σ= 10 mho/m (8M+8M)

5. a) State and prove Poynting theorem.
   b) A plane wave travelling in air is normally incident on a material with μ_r = 1 and ε_r = 4. Find the reflection and transmission coefficients. (8M+8M)

6. a) Define and explain both lossless and distortion less transmission lines in terms of transmission line parameters.
   b) State the impedance relations, reflection coefficient and SWR for i) shorted line ii) open circuited transmission line (8M+8M)

7. a) Define Reflection coefficient and VSWR. Explain the relation between the two quantities in terms of their definition.
   b) Discuss the applications of Smith chart. (8M+8M)
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Code No: RT22044 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Give the limitations of Gauss Law.
   b) Define vector magnetic potential and magnetic scalar potential.
   c) Write about the wave propagation in a Lossless Media.
   d) What is meant by total internal reflection explain?
   e) Write in brief about the different types of transmission lines.
   f) Discuss in brief reflection coefficient of a transmission line. (3M+4M+4M+3M+4M+4M)

PART-B

2. a) State the applications of Gauss Law with respect to a) point charge b) infinite line charge
   b) Point charges 4 mC and -3 mC are located at (2, 1, -3) and (-1, -2, 4) respectively. Calculate the electric force on a 12 nC charge located at (0, 3, 1) and the electric field intensity at that point. (8M+8M)

3. a) Discuss the boundary conditions at the interface separating one dielectric and another.
   b) Region $y \leq 0$ consists of a perfect conductor while region $y \geq 0$ is a dielectric medium ($\varepsilon_{1r} = 2$). If there is a surface charge of 4 n C/m^2 on the conductor, determine E and D at (1, -3, 2) (9M+7M)

4. a) Derive the relation between E and H in uniform plane wave propagation.
   b) For a uniform plane wave in space λ =12cm. In a loss less material of unknown characteristics, λ=8cm. In this material E= 50V/m, H =0.1A/M find f, μ_r , ε_r (8M+8M)

5. a) State and prove Poynting theorem.
   b) For good dielectrics derive the expression for α, β, ν and η (8M+8M)

6. a) What are the major losses that occur in transmission lines? How is a lossless line characterized?
   b) What are the types of loading? A lossless transmission line having $Z_0 = 120\Omega$ is operating at 500M rad/s. If the velocity on the line is 2.4×10^8 m/s, find the distributed parameters L and C. (8M+8M)

7. a) Discuss the configuration of the Smith chart considering the two families of constant circles.
   b) What are the advantages and disadvantages of stub matching? (9M+7M)
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Code No: RT22044 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Define the terms electric field, electric displacement and electric flux density
   b) Write Maxwell's equations for electrostatic fields.
   c) Explain briefly about Biot-Savart's Law.
   d) What is meant by total internal reflection? Explain.
   e) Explain about the primary and secondary constants of transmission lines.
   f) Discuss in brief about the types of loading of a transmission line.
   (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Derive expression for electric field due to an infinitesimal electric dipole.
   b) On a flat conducting surface, if a surface charge density ρ_s = 1 coulomb per square meter is placed on it, what would be the value of the electric field strength E at its surface?
   (8M+8M)
3. a) State Ampere's circuit law. What are its applications?
   b) What is displacement current? A parallel plate capacitor with plate area of 6 cm^2 and plate separation of 4 mm has a voltage $50\sin 10^3 t$ V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$ (8M+8M)

4. a) Derive the relation between E and H in uniform plane wave propagation.
   b) A uniform plane wave in air with $\mathbf{H} = 4\sin(\omega t - 5x)\,\mathbf{a}_y$ A/m is normally incident on a plastic region with parameters $\varepsilon = 4\varepsilon_0$, $\mu = \mu_0, \sigma = 0$. Obtain the total electric field in air, and calculate the average power density in the plastic region. (8M+8M)

5. Prove that under the condition of no reflection at an interface, the sum of the Brewster angle and the angle of refraction is 90 degrees for parallel polarization for the case of reflection by a perfect conductor under oblique incidence, with neat sketches. (16M)

6. a) Show that a transmission line will be distortion free if CR= LG
   b) A high frequency line has the following primary constants L=1.2 mH/Km, C=0.05μF/Km. R = G = negligible. Determine the characteristics impedance and propagation constant of the line. (8M+8M)

7. a) Define the reflection coefficient and derive the expression for the input impedance in terms of reflection coefficient.
   b) Explain with sketches how the input impedance varies with the frequency (8M+8M)
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Code No: RT22044 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Derive the expression for capacitance of the spherical conductors.
b) Write short notes on Lorentz force equation
c) Explain briefly about Faraday's law for time varying fields.
d) What is meant by depth of penetration?
e) Describe the characteristics of UHF lines.
f) Draw the directions of electric and magnetic fields in parallel plate and coaxial lines
(4M+4M+4M+3M+4M+3M)

PART-B

2. a) Derive expression for magnetic field at any point on the axis at a distance 'h' from the centre of a circular loop of radius 'a' and carrying current 'I'.
b) Find the magnetic field strength, H on the Z- axis at a point P(0,0,4) due to a current carrying conductor loop, $x^2+y^2=a^2$ in Z =0 plane (8M+8M)

3. a) State and explain Biot Savart's law. Give expressions of Biot Savart's law for line, surface and volume currents.
b) Find an expression for the magnetic field produced by a straight current carrying conductor at a distance x from it. (8M+8M)

4. A plane wave with E=2.0 V/m and has a frequency of 300MHz is moving in free space impinging on thick copper sheet located perpendicular to the direction of the propagation . Find i) E and H at the plane surface, ii) Depth of penetration and iii) The surface impedance. (16M)

5. a) State and prove the critical angle theorem.
b) Derive an expression for reflection when a wave is incident on a dielectric obliquely with parallel polarization. (8M+8M)

6. a) Derive the relationship between secondary constant and primary constants of a transmission line.
b) What is meant by inductive loading? What are its advantages and disadvantages? (8M+8M)

7. a) Explain the significance and utility of $\lambda/8$,$\lambda/4$ and $\lambda/2$ lines
b) A low transmission line of 100Ω characteristics impedance is connected to a load of 400Ω. Calculate the reflection coefficient and standing wave ratio. (8M+8M)

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Code No: RT22043 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June - 2015
MANAGEMENT SCIENCE
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. Write short notes on the following:
   a) Management.
   b) EOQ.
   c) Recruitment.
   d) Vision.
   e) Business Ethics.
   f) Just-In-Time. (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Describe the nature and importance of Management.
   b) Explain Mc Gregor’s theory of Motivation. (8M+8M)

3. a) Define Method study. How do you carry it out?
   b) Explain PERT and its importance in Network analysis. (8M+8M)

4. a) Evaluate On-the-Job and Off-the-Job training methods.
   b) Explain the stages in Product Life Cycle with the help of diagram. (8M+8M)

5. a) What is Mission? What are the characteristics of a Mission statement?
   b) Explain SWOT analysis. Analyze how SWOT analysis can be used to evolve appropriate corporate strategy. (8M+8M)

6. What do you meant by “Business Ethics”? Discuss critically ethical responsibilities of a business. (16M)

7. a) Explain the importance of Six Sigma in production.
   b) How is Bench Marking useful? (8M+8M)
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Code No: RT22043 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
MANAGEMENT SCIENCE
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. Write short notes on the following:
   a) Motivation.
   b) Control Charts.
   c) Production Planning.
   d) Mission.
   e) Business Ethics.
   f) MIS. (3M+4M+4M+4M+4M+3M)

PART-B

2. a) What is Management? What are the functions of Management?
   b) Discuss the steps in decision making process. (8M+8M)

3. a) What is meant by Inventory? What is the need for inventory control at different stages of production?
   b) Differentiate between CPM and PERT. (8M+8M)

4. a) Identify and briefly discuss the functions of Marketing.
   b) Explain the aims and advantages of Job Evaluation. (8M+8M)

5. Discuss the essential steps in Corporate Planning. (16M)

6. What is Business Ethics? What are the ethical responsibilities of business? (16M)

7. a) How does Just-In—Time (JIT) help in reducing costs.
   b) Describe the importance of Total Quality Management. (TQM) (8M+8M)

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Code No: RT22043 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
MANAGEMENT SCIENCE
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. Write short notes on the following:
   a) Leadership.
   b) Work Study.
   c) Marketing.
   d) Goal.
   e) Business Ethics.
   f) Total Quality Management (TQM). (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Define Management and discuss its nature and importance.
   b) Evaluate Democratic Leadership Style. (8M+8M)

3. a) Explain the importance of Statistical Quality Control in industry.
   b) What is the need of classifying inventories? Discuss ABC analysis in this regard. (8M+8M)

4. a) Describe briefly the functions of Financial Management.
   b) What are the functions of channels of distribution? (8M+8M)

5. What is a Strategy? List out the steps in Strategy formulation, implementation and evaluation. (16M)

6. Define Business Ethics. Describe the ethics to be followed by the management of an orgtanisation. (16M)

7. a) What is JIT and what are its benefits.
   b) Explain the concept “Business Process outsourcing. (BPO) (8M+8M)
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Code No: RT22043 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June - 2015
MANAGEMENT SCIENCE
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. Write short notes on the following:
   a) Organisation.
   b) Project Management.
   c) Job Evaluation.
   d) Strategy.
   e) Ethics in HRM.
   f) Business Process Outsourcing (BPO). (3M+4M+4M+4M+4M+3M)

PART-B

2. a) "Management is getting things done through other people." Discuss.
   b) Illustrate any three types of organization structures. (8M+8M)

3. a) Define Work Study and explain the need for work study in an enterprise.
   b) A company is requiring 10,000 units of raw material per annum. The cost per order is estimated to be Rs. 50. The storage cost is estimated to be Rs. 15 per unit of average inventory. What quantity should be ordered so that the total cost in minimum. (8M+8M)

4. a) Explain and evaluate any four methods of Merit rating.
   b) Analyze the features of different methods of production. (8M+8M)

5. a) Briefly explain about environmental analysis.
   b) How do you formulate and implement a strategy? Explain. (8M+8M)

6. What is Business Ethics? What are the ethics that business organisations should follow towards various stakeholders? (16M)

7. Explain what different levels mean under Capability Maturity Models. (16M)

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Code No: RT22042 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June - 2015
RANDOM VARIABLES AND STOCHASTIC PROCESSES
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What are the conditions for a function to be a random variable?
   b) Prove that the zeroth central moment is always one.
   c) Define marginal distribution function.
   d) Prove that $R_{xx}(\tau)$ is an even function.
   e) Find whether given power spectrum $\frac{\cos 8\omega}{2+\omega^4}$ is valid or not.
   f) What are the causes of thermal noise?

PART-B

2. a) Explain about the distribution and density functions of exponential RV with neat sketches.
   b) The random variable X has the discrete variable in the set {-1,0.5,0.7,1.5,3}, the corresponding probabilities are assumed to be {0.1,0.2,0.1,0.4,0.2} plot its distribution function.

3. a) State and prove the properties of variance of a random variable.
   b) A random variable X has a pdf

$$f_X(X) = \begin{cases} \frac{1}{2}\cos x \quad for -\frac{\pi}{2} < x < \frac{\pi}{2}. \\ 0 \qquad otherwise \end{cases}$$

Find the mean value of the function $g(x)=4x^2$

|''|||'|''||'''|''|
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4. a) Explain central limit theorem with equal and uneual distributions.

   b) The joint density function for X and Y is

$$f_{X,Y}(x,y)=\begin{cases}\frac{xy}{9} \; for \; 0<x<2, 0<y<3\\ \\ 0 \qquad\qquad otherwise\end{cases}$$

   Find the conditional density functions.

5. a) With neat sketches explain the classification of random process based on time t and amplitude of random variable x .

   b) Consider a random process $X(t)=A\,Cos\omega t$, where ω is a constant and A is a random variable uniformly distributed over (0,1). Find the auto correlation and auto covariance of X(t).

6. a) Define power density spectrum and write down its properties.

   b) The PSD of X(t) is given by

$$S_{XX}(\omega)=\begin{cases}1+\omega^2 \text{for} |\omega|.<1\\ 0 \qquad otherwise\end{cases},$$

7. a) List out the properties of band-limited random process.

   b) Find the mean square value of the output response for a system having $h(t)=e^{-t}u(t)$ and input of white noise $N_o/2$.

Code No: RT22042 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
RANDOM VARIABLES AND STOCHASTIC PROCESSES
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Give example for continuous random variable and discrete random variable.
   b) What is the physical significance of variance?
   c) State central limit theorem.
   d) Define cross covariance function.
   e) Find whether given power spectrum $\frac{\omega^2}{\omega^6 + 3\omega^2 + 3}$ is valid or not.
   f) Define noise figure.

PART-B

2. a) Explain about the distribution and density functions of Gaussian RV with neat sketches.
   b) If the probability density of a random variable is given by

$$f_X(x) = \begin{cases} x & for\ 0 < x < 1 \\ (2 - x) & for\ 1 < x < 2 \end{cases}$$

   Find (i) P{0.2< x <0.8} (ii) P{0.6< x <1.2}

3. a) State and prove the properties of the characteristic function of a random variable.
   b) Let X be a random variable which can take on the values 1,2 and 3 with respective probabilities 1/3, 1/6, 1/2. Find its third moment about the mean.

4. a) Define joint probability density function. list out its properties.
   b) The joint density function of X and Y is given by

$$f_{XY}(x, y) = \begin{cases} a\, x^2 y & for\ 0 < x < y < 1 \\ 0 & elsewhere \end{cases}$$

   i) Find 'a' so that the function is valid density function ii) find the marginal density functions.
~~~~~~

5. a) Explain stationary and ergodic random processes.
   b) Prove that the random process X(t)= Cos(ω_ct+Θ) is WSS if it is assumed that ω_c is a constant and Θ is uniformly distributed variable in the interval (0,2π).

6. a) Define cross power density spectrum. List out its properties.
   b) Consider the random process X(t)=A cos(ω_0t+Θ), where A and ω_0 are real constants and Θ is a uniformly distributed on the interval (0,π/2). Find the average power of X(t).

7. a) Find output response of cross correlation when random process X(t) is applied to an LTI system having input response h(t).
   b) Find the noise band width of a system having the transfer function $|H(\omega)|^2 = \frac{1}{1+(\omega/\omega_0)^4}$, where ω_0 is a real constant.

Code No: RT22042 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
RANDOM VARIABLES AND STOCHASTIC PROCESSES
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What are the applications of Poisson's random variable?

   b) If K is a constant, then for a random variable X, prove that $Var(KX)=K^2var(X)$.

   c) What is the probability density function of sum of two random variables?

   d) State the conditions for a WSS random process.

   e) Find whether given power spectrum $e^{-(w-1)^2}$ is valid or not.

   f) Illustrate transfer function of idealized system.

PART-B

2. a) Explain about the distribution and density functions of Binomial RV with neat sketches.

   b) If the probability density of a random variable is given by

$$f_X(x)=\begin{cases} C.\exp\left(-\frac{x}{4}\right) & for\ 0\le x<1 \\ 0 & otherwise \end{cases}$$

   Find the value of 'C' evaluate $F_X(0.5)$.

3. a) What is meant by expectation? State and prove its properties.

   b) If X is a discrete random variable with probability mass function given as below table

X	-2	-1	0	1	2
P(X)	1/5	2/5	1/10	1/10	1/5

   find (i)E(X) (ii)$E(X^2)$ (iii)E(2X+3) (iv)$E[(2X+1)^2]$
~~~~~~

4. a) Prove that sum of two statistically independent random variables is equal to the convolution of their individual density functions.

   b)The joint PDF of a bi-variate (X,Y) is given by

   $f_{XY}(x, y) = \begin{cases} k\ xy & for\ 0 < x < y < 1 \\ 0 & otherwise \end{cases}$ where k is a constant. (i)find the value of k (ii)are X and Y are independent.

5. a) What is random process? Explain Gaussian random process.

   b) Given E[X]=6 and $R_{XX}(t, t+\tau)=36+25\exp(-\tau)$ for a random process X(t). Indicate which of the following statements are true. (i) is Ergodic (ii) is wide sense stationary.

6. a) Derive the relation between cross power spectrum and cross correlation function.

   b) Find the average power of the WSS random process X(t) which has the power spectral density, $S_{XX}(\omega) = \frac{\omega^2 - 17}{(\omega^2 + 49)(\omega^2 + 16)}$.

7. a) Derive the expression for effective noise temperature of a cascaded system in terms of its individual input noise temperature.

   b) Prove that $S_{YY}(\omega)=|H(\omega)|^2 S_{XX}(\omega)$.

Code No: RT22042 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June - 2015
RANDOM VARIABLES AND STOCHASTIC PROCESSES
(Electronics and Communications Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) List out any two properties of conditional density function.
   b) State Chebychev's inequality.
   c) Define correlation coefficient of joint random variable.
   d) Distinguish between stationary and non-stationary random processes.
   e) Find whether given power spectrum $\cos^2(\omega)\exp(-8\omega^2)$ is valid or not.
   f) Draw power spectrum of a band limited process.

PART-B

2. a) Explain about the distribution and density functions Rayleigh RV with neat sketches.
   b) Let x be a continuous random variable with density function

$$f_X(x)=\begin{cases}\frac{x}{9}+k & \text{for } 0\le x\le 6\\ 0 & \text{other wise}\end{cases}$$

(i) Find the value of k (ii) Find $P\{2\le x\le 5\}$

3. a) State and prove properties of moment generating function.
   b) Find the variance of X for a uniform probability density function.

4. For two random variables X nad Y, $f_{XY}(x,y)=0.3\,\delta(x+1)\,\delta(y)+0.1\,\delta(x)\delta(y)+0.1\delta(x)\,\delta(y-2)+0.15\delta(x-1)\,\delta(y+2)+0.2\delta(x-1)\,\delta(y-1)+0.15\delta(x-1)\,\delta(y-3)$ Find (a) the correlation (b) the covariance (c) the correlation coefficient of X and Y (d) Are X and Y either uncorrelated or orthogonal.

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5. a) What is auto correlation function. List out its properties.

   b) A random process is described by $X(t)=A^2\cos^2(\omega_c t+\Theta)$ A and ω_c are constants and Θ is a random variable uniformly distributed between $\pm\pi$. Is X(t) wide sense stationary.

6. a) Power spectrum and auto correlation functions are a Fourier transform pairs. Prove this statement.

   b) A WSS random process X(t) which has the power spectral density,

   $$S_{XX}(\omega)=\frac{\omega^2}{(\omega^4+10\omega^2+9)}.$$

   Find the auto correlation and mean square value of the process.

7. a) Find output response of auto correlation when random process X(t) is applied to an LTI system having input response h(t).

   b) Find the overall noise figure and equivalent input noise temperature of the system shown below. Assume the temperature is 27^0C

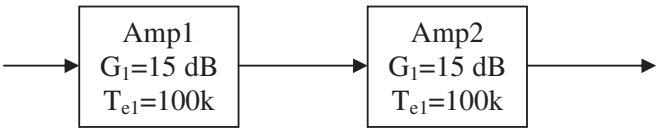

Figure : Two stage amplifier

Code No: RT22022 **R13** SET - 1

II B. Tech II Semester Regular Examinations, May/June – 2015
SWITCHING THEORY AND LOGIC DESIGN
(Com. to EEE, ECE, ECC, EIE.)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Represent +65 and -65 in sign magnitude, sign 1's complement and sign 2's Complement representation.
   b) Define prime implicant and essential prime implicants of a Boolean expression
   c) List the applications of Multiplexers.
   d) Implement the following Boolean function using PROM
   $F_1(A_1,A_0)= \sum m(1,2)$ $F_2(A_1,A_0)= \sum m(0,1,3)$
   e) Write the differences between combinational and sequential circuits.
   f) Sketch Mealy circuit and explain.
   (4M+4M+3M+3M+4M+4M)

PART – B

2. Implement the following functions using NAND gates.
   a) F_1= A (B+C D) + (B C)^{l}
   b) F_2=w x^{l}+x^{l}y (z + w^{l}) (8M+8M)

3. Minimize the following function using K-map and also verify through tabulation method.
   F (A, B, C, D) =$\sum m(1,4,5,7,8,9,12,14)$+d (0, 3, 6, 10). (16M)

4. a) Define decoder. Construct 3x8 decoder using logic gates and truth table.
   b) Define an encoder. Design octal to binary encoder. (8M+8M)
~~~~~~

5. a) Derive the PLA programming table for the combinational circuit that squares a 3 bit number.
   b) Implement the following Boolean functions using PAL.
   W (A, B, C, D) = $\sum m(0,2,6,7,8,9,12,13)$
   X (A, B, C, D) = $\sum m(0,2,6,7,8,9,12,13,14)$
   Y (A, B, C, D) = $\sum m(2,3,8,9,10,12,13)$
   Z (A, B, C, D) = $\sum m(1,3,4,6,9,12,14)$ (8M+8M)

6. Convert the following
   a) JK flip-flop to T flip-flop
   b) RS flip-flop to D flip-flop (8M+8M)

7. A clocked sequential circuit is provided with a single input x and single output z, whenever the input produces a string pulsed 111 or 000 and at the end of the sequence it produces an output z=1 and overlapping is also allowed.
   a) Obtain state diagram and state table.
   b) Find equivalence classes using partition method and design the circuit using D flip-flop. (8M+8M)

Code No: RT22022 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June – 2015
SWITCHING THEORY AND LOGIC DESIGN
(Com. to EEE, ECE, ECC, EIE.)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Perform $(24)_{10} – (56)_{10}$ in BCD using 9's complement
b) State De Morgans's theorems.
c) Design 2x4 decoder using NAND gates.
d) Give the comparison between PROM, PLA and PAL.
e) What are applications of Flip-Flop?
f) Write capabilities and limitations of Finite- State machine.

(4M+3M+4M+4M+3M+4M)

PART – B

2. Find the complement of the following Boolean functions and reduce them to minimum number of literals.
a) $(b c^{l}+a^{l}d) (ab^{l}+cd^{l})$
b) $(b^{l}d+ a^{l}b c^{l}+a c d+ a^{l}b c)$ (8M+8M)

3. Simplify the following Boolean expressions using K-map and implement it by using NOR gates.
a) $F(A,B,C,D)=AB^{l}C^{l}+AC+A^{l}CD^{l}$
b) $F(W,X,Y,Z)=w^{l}x^{l}y^{l}z^{l}+ w x y^{l} z^{l} + w^{l}x^{l}yz + wxyz$ (8M+8M)

4. a) Design and implement a two bit comparator using logic gates.
b) Implement full adder using decoder and OR gates. (8M+8M)

5. a) Design a BCD to excess-3 code converter and implement using suitable PLA.
b) Implement the following functions using a PROM
i) $F(w,x,y,z)= \Sigma(1,9,12,15)$
ii) $G(w,x,y,z)= \Sigma(0,1,2,3,4,5,7,8,10,11,12,13,14,15)$ (8M+8M)
~~~~~~

6. a) Draw the logic diagram of a JK flip- flop and using excitation table explain its operation.
   b) What do you mean by triggering? Explain the various triggering modes with examples.

(8M+8M)

7. Find the equivalence partition and a corresponding reduced machine in a standard form for a given machine.

PS	NS	Z
	X=0	X=1
A	B,0	E,0
B	E,0	D,0
C	D,1	A,0
D	C,1	E,0
E	B,0	D,0
F	C,1	C,1
G	C,1	D,1
H	C,0	A,1

(16M)

II B. Tech II Semester Regular Examinations, May/June – 2015
SWITCHING THEORY AND LOGIC DESIGN
(Com. to EEE, ECE, ECC, EIE.)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART– A

1. a) Convert $(97.75)_{10}$ to base 2.
   b) Prove that OR-AND network is equivalent to NOR-NOR network.
   c) Realize full adder using two half adders and logic gates.
   d) Design a 4x2 PROM with AND-OR gates.
   e) Define the following terms of flip flop.
   i) Hold time ii) Setup time iii) Propagation delay time
   f) Distinguish between Moore and Mealy Machines.

(3M+4M+4M+3M+4M+4M)

PART– B

2. a) Convert the given expression in standard SOP form
   f(A,B,C)=AC+BA+BC
   b) Convert the given expression in standard POS form
   y=A.(A+B+C) (8M+8M)

3. a) Reduce the following function using k-map technique
   $F(A,B,C,D)=\prod(0,2,3,8,9,12,13,15)$
   b) Minimize the expression using k-map
   $y=(A+B+C^{I})(A+B+C)(A^{I}+B^{I}+C^{I})(A^{I}+B+C)(A+B+C)$

(8M+8M)

4. a) Design BCD to gray code converter and realize using logic gates.
   b) Design a 1:8 demultiplexer using two 1:4 demultiplexer. (8M+8M)

5. a) Implement the following Boolean functions using PLA.
   $A(x,y,z)=\sum m(1,2,4,6)$
   $B(x,y,z)=\sum m(0,1,6,7)$
   $C(x,y,z)=\sum m(2,6)$
   b) Design a combinational circuit using PROM that accepts 3-bit binary number and generates its equivalent excess-3 code. (8M+8M)
~~~~~~

6. a) Draw the logic diagram of a SR latch using NOR gates. Explain its Operation using excitation table.
   b) Convert D flip-flop into T and JK flip-flops. (8M+8M)

7. a) Convert the following Mealy machine into a corresponding Moore Machine.

8. PS	9. NS	a. Z
	10. X=0	11. X=1
12. A	13. C,0	14. B,0
15. B	16. A,1	17. D,0
18. C	19. B,1	20. A,1
21. D	22. D,1	23. C,0

   b) Convert the following Moore machine into a corresponding Melay Machine

24. PS	i. NEXT STATE		25. OUTPUT 26. Z
	27. X=0	28. X=1	
29. A	30. D	31. B	32. 0
33. B	34. B	35. C	36. 1
37. C	38. C	39. D	40. 0
41. D	42. D	43. B	44. 0

(8M+8M)

Code No: RT22022 **R13** SET - 4

II B. Tech II Semester Regular Examinations, May/June – 2015
SWITCHING THEORY AND LOGIC DESIGN
(Com. to EEE, ECE, ECC, EIE.)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Convert$(2468)_{10}$ to $(\ )_{16}$
   b) What are the advantages of tabulation method over K-map?
   c) Implement the following functions using Demultiplexer.
   $F_1(A,B,C)=\sum m(0,3,7)$ $F_2(A,B,C)=\sum m(1,2,5)$
   d) Write a brief note on PLDs
   e) Give the comparison between synchronous sequential and asynchronous sequential circuits
   f) Draw and explain Moore circuit.

(3M+4M+4M+3M+4M+4M)

PART – B

2. a) Given the 8bit data word 01011011, generate the 12 bit composite word for the hamming code that corrects and detects single errors.
   b) Perform the following addition using excess-3 code.
   i)386+756 ii)1010 + 444 (10M+6M)

3. Simplify the following using tabulation method
   $y(w,x,y,z)=\sum m(1,2,3,5,9,12,14,15)+d(4,8,11)$ (16M)

4. a) Design a excess-3 adder using 4-bit parallel binary adder and logic gates.
   b) What are the applications of full adders? (12M+4M)
~~~~~~

5. a) Illustrate how a PLA can be used for combinational logic design with reference to the functions
   $F_1(A,B,C)=\sum m(0,1,3,4)$ $F_2(A,B,C)=\sum m(1,2,3,4,5)$
   Realize the same assuming that a 3x4x2 PLA is available.
   b) Reliaze the following four Boolean functions using PAL.
   $F_1(w,x,y,z)=\sum m(0,1,2,3,7,9,11)$ $F_2(w,x,y,z)=\sum m(0,1,2,3,10,12,14)$
   $F_3(w,x,y,z)=\sum m(0,1,2,3,10,13,15)$ $F_4(w,x,y,z)=\sum m(4,5,6,7,9,15)$
   (8M+8M)

6. a) Construct a JK flip flop using a D flip flop, a 2x1 multiplexer and an inverter.
   b) Draw the schematic circuit of RS master slave flip flop. Give its truth table and justify the entries in the truth table. (8M+8M)

7. a) Draw the diagram of Mealy type FSM for serial adder.
   b) Draw the circuit for Moore type FSM. (8M+8M)