5E5041

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**5E5041**

**B.Tech. V Semster (Main/Back) Examination, Nov./Dec. - 2017**
**Electrical & Electronics Engineering**
**5EX1A Power Electronics**
**EX, EE**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Main : 26**
**Min. Passing Back : 24**

**Instructions to Candidates :**

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

1. a) Explain and draw the switching characteristics of the power IGBT. **(8)**
   b) Describe the various commutation methods of thyristor. **(8)**

**OR**

1. a) Explain and draw the switching characteristics of the power GTO. **(8)**
   b) Explain the constructional details and working of power MOSFET. **(8)**

**Unit - II**

2. a) Explain and draw the switching characteristics of SCR. **(8)**
   b) Explain various turn ON methods of thyristor. **(8)**

**OR**

2. a) Explain the series and parallel operation of SCR. **(8)**
   b) A SCR with a rating of 1000V and 200A are available to be used in a string to handle 60 KV and 1 KA. Calculate the number of series and parallel unit required in case of derating factor is
      i) 0.1 ii) 0.2 **(8)**

**Unit - III**

3. a) Describe working of a 1 - $\phi$ full wave converter with RLE load through a waveform of a supply voltage, load voltage, load current and voltage across thyristor. Also derive the expressions for load voltage and output power. **(8)**

b) A 1 - $\phi$ half wave converter has resistive load 20 $\Omega$ input voltage 230 V, 50 Hz with $\alpha = 45°$ Determine the -

i) RMS value of output voltage

ii) Power delivered to the load

iii) Power factor **(8)**

**OR**

**3.** a) Explain the principle of 3-$\phi$ dual converter. **(8)**

b) A 1 - $\phi$ full wave converter has a RL load having L = 6.5 MH, R = 0.5 $\Omega$ and E = 10V. the input voltage is Vs = 120 V at (rms). 60 Hz. Determine -

i) The load current $I_{LO}$ at wt $= \alpha = 60°$

ii) The average thyristor current $I_A$

iii) The RMS thyristor current $I_R$

iv) The RMS output current $I_{RMS}$

v) The average output current $I_{dc}$. **(8)**

**Unit - IV**

**4.** a) Explain pulse width modulation control technique of power factor improvement along with circuit diagram and waveform. **(8)**

b) A 3 $\phi$, M - 3 converter is operated from 230V, 50Hz supply with load resistance R = 10$\Omega$. An average output voltage of 50% of the maximum possible output voltage is required. Determine.

i) Firing Angle

ii) Average and RMS value of load current.

iii) Rectification efficiency. **(8)**

**OR**

**4.** a) Describe the working principle of a single phase full wave semi converter with RL Load through the waveforms of supply voltage, load voltage, load current and voltage across thyristor. And also derive expressions of its. **(8)**

b) Explain in detail the extinction angle control scheme for power factor improvements. **(8)**

**Unit - V**

**5.** a) What is the principle of operation of a step up chopper. **(8)**

b) Explain the load commutated chopper along with relevant circuit diagram and waveform. **(8)**

**OR**

**5.** a) Derive the expressions for steady state maximum and minimum current for type A chopper. **(8)**

b) Explain multiphase chopper along with relevant circuit diagram and waveform. **(8)**

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**5E5042**

**B.Tech. V Semester (Main&Back) Examination, Nov./Dec. - 2017**

**Electrical Engineering**

**5EE2A Microprocessors & Computer Architecture**

**Time : 3 Hours** **Maximum Marks : 80**

**Min. Passing Marks : 26**

***Instructions to Candidates:***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

**1.** a) Explain the following terms with respect to 8085 Microprocessor. **(8)**

i) Address bus ii) Data bus iii) Control bus

b) Describe the Architecture of 8085 Microprocessor. **(8)**

**OR**

**1.** a) Describe the memory organization? Also explain various types of Interrupts. **(8)**

b) Explain the various types of Signals and Pins used in 8085 Microprocessor? **(8)**

**Unit - II**

**2.** a) What are Subroutines? How they are useful? **(8)**

b) Explain MVI and LXI instructions using suitable example? **(8)**

**OR**

**2.** a) Explain the Classification of the instruction set of 8085 microprocessor with suitable example. **(8)**

b) Write short note on Counters & Time delay. **(8)**

## Unit - III

3. Explain the 8279 to be used with the 8085 microprocessor? **(16)**

**OR**

3. a) Draw and explain the block diagram of 8257 DMA controller? **(8)**

   b) Draw and explain the block diagram of 8155 multipurpose programmable device. How does it differ from 8255. **(8)**

## Unit - IV

4. a) Give a brief discussion on Instruction set of 8086 microprocessor? **(8)**

   b) Explain Hardware and Software interrupts of 8086 microprocessor. **(8)**

**OR**

4. a) Explain the memory addressing and memory segmentation for 8086 Micro-processor? **(8)**

   b) Explain the Architecture of INTEL 8086? **(8)**

## Unit - V

5. a) Explain the following types of memory- **(8)**

   i) Volatile and non volatile memory.

   ii) Virtual and physical memory.

   b) Write short note on :- **(8)**

   i) RD RAM

   ii) DD RAM

**OR**

5. a) Explain the central processing Unit with the help of diagram. Also explain its need and applications? **(8)**

   b) Write short notes on: **(8)**

   i) Different types of ROM

   ii) Memory Latency and Memory seek time

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5E5043

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**5E5043**

**B.Tech. V Semester (Main /Back) Examination, Nov./Dec. - 2017**
**Electrical and Electronics Engg.**
**5EX3A Control System**
**Common With EE**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Marks : 26**

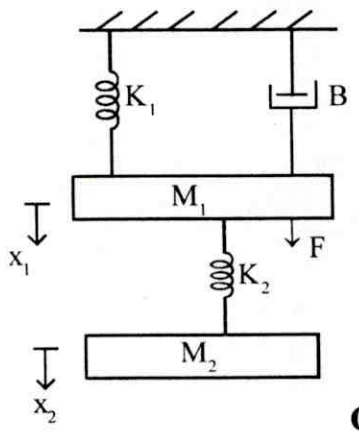
***Instructions to Candidates:***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

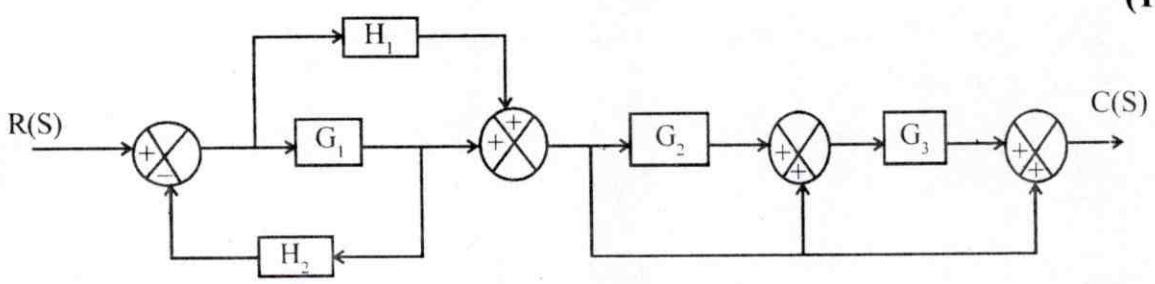
**1.** a) Differentiate between open loop & close loop control systems with suitable example of both. **(8)**

b) Draw the force - voltage analogy for the system. **(8)**




**OR**

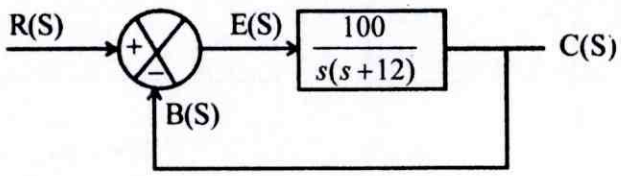
**2.** Simplify the block diagram and obtain the transfer function relating C(S) & R(S). **(16)**



## Unit - II

3. a) Perform the time response analysis of First order system with unit step input. **(8)**

   b) For the system described in the figure determine the time to reach peak over short and its peak overshort when a unit step signal is applied at input. **(8)**




**OR**

4. a) Explain the concept of steady state error and error constants. **(8)**

   b) For unity feedback system whose open loop transfer function is

$$G(S) = \frac{50}{(1+0.1s)(1+2s)}$$

   Find position, velocity and acceleration error constants. **(8)**

## Unit - III

5. a) Explain the importance of control system components. **(8)**

   b) Explain the principle of operation of Tachometer. **(8)**

**OR**

6. Sketch the root locus plot of unity feedback system with open loop transfer system

$$G(S) = \frac{K}{s(s+2)(s+4)}.$$ **(16)**

## Unit - IV

7. Sketch the Bode plot of $G(S) = \frac{K(s+3)}{s(s+1)(s+2)}$. **(16)**

**OR**

8. Write technical note on : **(8×2=16)**

   i) Nicholas chart

   ii) Gain & Phase Margin

## Unit - V

9. Which type of compensator improves the steady state error and transient response? Explain in detail. **(16)**

**OR**

10. Write technical note on PID controller. **(16)**

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5E5044

Roll No. _____ [Total No. of Pages : 2

**5E5044**

**B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017**
**Electrical & Electronics Engineering**
**5EX4A Database Management System**
**Common With EE**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Marks : 26**

***Instructions to Candidates:***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

1. a) What is DBMS? What are the need and goals of DBMS. **(8)**

   b) Explain relational data model in detail. **(8)**

**OR**

1. a) What is the concept of ER diagram? Differentiate between Entity sets and Relationship sets. **(8)**

   b) Explain primary, foreign and candidate key in detail. **(8)**

**Unit - II**

2. a) What do you mean by functional dependency? **(8)**

   b) Differentiate between primitive and composite datatype. **(8)**

**OR**

2. a) What is Normalization? Explain Boyce-codd normal form and 3 NF in detail. **(8)**

   b) Explain the concept of physical and logical databases in detail. **(8)**

**Unit - III**

3. a) Differentiate the functionality of SQL and dynamic SQL. **(8)**

   b) What is JDBC? Explain in detail. **(8)**

3. a) Explain the following : **(4 × 2 = 8)**

   i) Triggers ii) DDL

   iii) Group By iv) Database Mirroring

   b) How does SQL query is useful for form management and report writing? Explain in detail. **(8)**

**Unit - IV**

4. a) What is RDBMS? Why is it called relational database? **(8)**

   b) Explain multilist structures in detail. **(8)**

**OR**

4. a) What are indexes in SQL? Explain Non-clustered index in detail. **(8)**

   b) What are random and hashed files? **(8)**

**Unit - V**

5. a) What is Serializability? Explain conflict and views serializability in detail. **(10)**

   b) What is data concurrency? **(6)**

**OR**

5. Write short note on (Any 2) : **(2 × 8 = 16)**

   a) Transaction management

   b) Deadlock handling

   c) Recovery techniques in database.

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5E5045

Roll No. _____ [Total No. of Pages : 2

**5E5045**

**B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017**
**Electrical And Electronics Engineering**
**5EX5A Transmission & Distribution of Electrical Power**
**Common with EE**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Marks Main : 26**

***Instructions to Candidates :***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

1. a) Compare the cross-section area of a conductors for d.c. two wire system and 1-$\phi$ a.c. system assuming equal length, equal power and equal losses. **(8)**

   b) A 3$\phi$ 4 wire system is used for lighting compare the amount of conductor materials required with that needed for a 2-wire d.c. system with the same lamp voltage. Assume the same losses and balance load. The neutral is one half the cross section of one of the respective outers. **(8)**

**OR**

1. a) Show that at higher voltage and higher power factor the efficiency of transmission line will be increased. What are the limiting factor of high voltage transmission line. **(8)**

   b) Describe the main limitation of Kelvin's law. The cost of 3 - $\phi$ over head transmission line having cross - sectional area A $cm^2$ is Rs [500 + 2600 A] per KW. Calculate the most economical current density for the conductor if the rate of interest and depreciation is 12% per annum. The cost of energy wasted is Rs 0.05/kwh. The resistance of each conductor is 0.17/A ohm/kM. Take load factor for loss = 12%. **(8)**

**Unit - II**

2. a) Derive an expression for 50g and tension in a power conductor strung between two support of equal heights taking into account the wind and ice loading also.**(8)**

   b) What are the various types of line support? Discuss the suitability of each with reference to system voltage and span. **(8)**

**OR**

2. a) What do the vibration get generated in conductors? How are they damped. **(8)**

   b) A transmission line has a span of 15 m between level supports. The cross sectional area of the conductor is 1.25 $cm^2$ and weighs 100 kg / 100 m. The breaking stress is 4220 kg / $cm^2$. Calculate the factor of safety if the 50 g of the line is 3.5m. Assume a maximum wind pressure of 100kg/m. **(8)**

**Unit - III**

3. a) Derive an expression for the capacitance per unit length of 3 $\phi$ line completely transposed. What is the effect of earth on the capacitance of the line. **(8)**

   b) Find out the flux linkage of single phase two wire line and derive an expression for inductance per unit length. **(8)**

**OR**

3. a) Show that the inductance per unit length of an overhead line due to internal flux leakage is constant and is independent of size of conductor. **(8)**

   b) Derive formula to calculate the capacitance of a double circuit line. Also the conductors are of equal diameter and spaced hexagonalls. **(8)**

**Unit - IV**

4. a) Write and explain the expression for power loss due to corona. What factor affected the corona losses. **(8)**

   b) A 15 km long 3 $\phi$ overhead line delivers 5 mw at 11 Kv at 0.8 logging power factor. Line loss is 12% of power delivered. Line inductance is 1.1 MH per km per phase. Find sending end voltage and voltage regulation. **(8)**

**OR**

4. a) Draw the equivalent circuit of a long transmission line. Derive from fundamentals the following relationships between sending end and receiving end voltage and currents.

   $$V_S = AV_R + BI_R \;\&\; I_S = CV_R + DI_R$$ **(8)**

   b) What is ferranti effect? Explain it with the help of phasor diagram. **(8)**

**Unit - V**

5. a) Define string efficiency, Explain different method of improving string efficiency. **(8)**

   b) With neat diagram explain constructional features of various types of cable. **(8)**

**OR**

5. a) Derive a formula for the electric stress in a single core cable. Where is maximum stress? Where is it minimum. **(8)**

   b) A string of a 4 insulators has self capacitances equal to 4 times the pin to earth capacitance. Calculate.

   i) The voltage distribution across various unit as a percentage of total voltage across the string.

   ii) String efficiency. **(8)**

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5E5046

Roll No. _____ [Total No. of Pages : 3

**5E5046**

**B.Tech. V Semester (Main/Back) Examination, Nov. /Dec. - 2017**

**Electrical Engineering**

**5EE6.1A Optimization Techniques**

**Time : 3 Hours** **Maximum Marks : 80**

**Min. Passing Marks : 26**

**Instructions to Candidates :**

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

**1.** a) Write a brief note of the following :

i) Constraints

ii) Linear programming problem

iii) Geometric programming problems

iv) Quadratic programming problems **(8)**

b) A factory produces two grades of paper namely A4 and B4. It cannot produce more than 400 tons of grade A4 and 300 tons of B4 in a week. There are 160 production hours in a week. It requires 0.2 and 0.4 hours to produce a ton of products A4 and B4 respectively with corresponding profits of Rs. 200 and Rs. 500 per ton. Formulate the linear programming problem. **(8)**

**OR**

**1.** a) What is optimization? Explain ten engineering applications of optimization techniques. **(8)**

b) A company desires to devote the excess capacity of the three machines lathe, shaping and milling to make three products A, B and C. The available time per month in these machines are tabulated below :

| Machine | Lathe | Shaping | Milling |
|---|---|---|---|
| Available time per month | 200 hours | 110 hours | 180 hours |

The time (in hours) taken to produce each unit of the products A, B and C on the machines is displayed in the table below :

| Machine | Lathe | Shaping | Milling |
|---|---|---|---|
| Product A | 5 | 2 | 4 |
| Product B | 2 | 2 | Nil |
| Product C | 3 | Nil | 3 |

The profit per unit of the products A, B and C are Rs. 20, Rs. 15 and Rs. 12 respectively. Formulate the mathematical model to maximize the profit. **(8)**

## Unit - II

**2.** a) Find the extreme points of the function $f(x,y) = x^3 + 2y^3 + 3x^2 + 12y^2 + 24$, and determine their nature also. **(8)**

b) A rectangular sheet of metal has four equal portions removed at the corners and the sides are then turned up so as to form an open rectangular box. Show that when the volume contained in the box is maximum, the depth will be $\frac{1}{6}\left[(a+b)-\left(a^2-ab+b^2\right)^{1/2}\right]$ where $a$ and $b$ are original dimensions of rectangle. **(8)**

**OR**

**2.** a) Find the point on the plane x + 2y + 3z = 1, which is nearest to the point (–1, 0, 1) by Lagrange's multipliers method. **(8)**

b) A given quantity of metal is to be caste into a half cylinder. Show that, in order to have minimum surface area, the ratio of the length of the cylinder to the diameter of its semicircular ends is $\pi/(\pi+2)$. **(8)**

## Unit - III

**3.** a) Solve graphically the problem

$$\begin{aligned} &\textit{Max.} && z = 3x + 4y \\ &\textit{Subject to} && 5x + 4y \le 200 \\ & && 3x + 5y \le 150 \\ & && 5x + 4y \ge 100 \\ & && 8x + 4y \ge 80 \\ &\textit{and} && x, y \ge 0. \end{aligned}$$

**(8)**

b) Find the dual of the following LPP :

$$\begin{aligned} &\textit{Min.} && z_r = x_1 + x_2 + x_3 \\ &\textit{Subject to} && x_1 - 3x_2 + 4x_3 = 5 \\ & && 2x_1 - 2x_2 \le -3 \\ & && 2x_2 - x_3 \ge 5 \\ &\textit{and} && x_1, x_2 \ge 0,\ x_3 \textit{ is unrestricted in sign} \end{aligned}$$

**(8)**

**OR**

3. Solve the following problem by using Big-M method :

$$\begin{aligned} &\textit{Min.} && z = x_1 + x_2 \\ &\textit{Subject to} && 2x_1 + x_2 \geq 4 \\ & && x_1 + 7x_2 \geq 7 \\ &\textit{and} && x_1, x_2 \geq 0. \end{aligned}$$ **(16)**

**Unit - IV**

4. Find the maximum of $f(x) = x(5\pi - x)$ in the interval [0, 20] by Golden section method. **(16)**

**OR**

4. State Kuhn-Tucker conditions, and apply them to solve

$$\begin{aligned} &\text{Minimize} && f(x, y, z) = x^2 + y^2 + z^2 + 20x + 10y \\ &\text{Subject to} && x \geq 40, \\ & && x + y \geq 80, \\ & && x + y + z \geq 120. \end{aligned}$$ **(16)**

**Unit - V**

5. Minimize $f(x_1, x_2) = x_1 - x_2$

Subject to $g(x_1, x_2) = 3x_1^2 - 2x_1x_2 + x_2^2 - 1 \leq 0$

Using the cutting plane method (upto two iterations). Take the convergence limit in step 5 as $\varepsilon = 0.02$. **(16)**

**OR**

5. Minimize $f(X) = x^2 + 2y^2$

Subject to $2x + 5y - 10 \leq 0$

by using exterior penalty method and find solutions (in table) for $r = 1,5,10,50,100,500,1000$ and $r \to \infty$. **(16)**

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5E3128

Roll No. _____ [Total No. of Pages : 2

**5E3128**

**B.Tech. V Semester (Back) Examination, Nov./Dec. - 2017**
**Electrical Engineering**
**5EE6.1(O) Advanced Distribution Systems**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Marks : 26**

**Instructions to Candidates :**

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**Unit - I**

1. a) Explain the classification of different types of distribution system in brief. **(8)**

   b) Explain load growth factor in brief. **(8)**

**OR**

1. a) What do you mean by load forecasting? Describe the time series model of load forecasting. **(8)**

   b) Discuss the sources of errors in load forecasting. **(8)**

**Unit - II**

2. a) What is flickering? What measures can be taken reduce flickering? **(8)**

   b) What do you mean by harmonics? Write short note on harmonics filtering equipment. **(8)**

**OR**

2. Write short note on : **(4×4=16)**
   i) Correction of system voltage
   ii) Voltage regulation
   iii) Ferro-resonance
   iv) Means to reduce system losses

**Unit - III**

3. a) What is reactive power? Why should reactive power transfer over the lines be minimized? **(8)**

   b) Explain LT shunt capacitor in brief. **(8)**

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**OR**

3. a) Compare the operation of series and shunt capacitors. **(8)**
   b) Explain the reactive power compensation in distribution system. **(8)**

**Unit - IV**

4. a) Explain earthing of substation in details. **(8)**
   b) What is the purpose of earthing? Explain system earthing. **(8)**

**OR**

4. a) What do you mean by soil resistivity? Write and explain the factors that governs soil resistivity. **(8)**
   b) Explain the terms : **(8)**
      i) Earth electrode
      ii) Resistance of earthing Electrode.

**Unit - V**

5. a) What is distribution automation? Write the advantages of distribution automation? **(8)**
   b) Write short note on : **(8)**
      i) Radio communication
      ii) Supervisory control

**OR**

5. a) Explain the various components of SCADA. **(10)**
   b) Write short note on fibre optics. **(6)**

5E5047

Roll No. _____ [Total No. of Pages : 2

**5E5047**

**B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017**
**Electrical and Electronics Engg.**
**5EX6.2 A Principal of Communication System**
**Common with EE**

**Time : 3 Hours** **Maximum Marks : 80**
**Min. Passing Marks : 26**

***Instructions to Candidates :***

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

**Unit - I**

**1.** a) Explain cause and effects of atmospheric and solar noise. **(8)**

b) Define transistor signal-to-noise ratio and noise figure of a receiver. **(8)**

**OR**

**2.** a) An amplifier operating on a frequency range from 18-20MHz, MHz has a 10kΩ input resistance. Find the rms noise voltage at the input to this amplifier if the ambient temperature is 17°C. **(8)**

b) If each stage has a gain of 10dB and noise figure of 10dB. Determine the overall noise figure of a two stage cascaded amplifier. **(8)**

**Unit - II**

**3.** a) Derive the power relations of single tone amplitude modulated wave. **(8)**

b) Explain the square law diode modulation method for AM generation. **(8)**

**OR**

**4.** Prove that balanced modulator produces an output consisting of standards only. With the carrier removed. **(16)**

## Unit - III

5. a) Differentiate between narrow band and wideband FM. **(8)**

   b) Explain the varactor diode modulator in detail. **(8)**

**OR**

6. Write technical note on following : **(8×2=16)**

   a) Pre emphasis and de-emphasis

   b) PLL demodulator.

## Unit - IV

7. Explain the noise calculation for AM-systems. Also discuss the threshold effect in envelope defector. **(16)**

OR

8. Discuss the super heterodyne receiver. **(16)**

## Unit - V

9. a) Explain Nyquist rate and Nyquist interval with suitable example. **(8)**

   b) What is aliasing? How it is reduced. **(8)**

**OR**

10. Write technical note on : **(8×2=16)**

    a) PWM

    b) PPM