4TH SEM ./ ELECT & ETC/ ELECT. & MECH./ EE(I & C) /ETC & COMM/ ETC & TELE. COMM./AE & IE/ 2022(S)

Th1   Electrical Machine

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Write different types of losses in a single phase transformer?

   b.   What is the relationship between synchronous speed, actual speed and slip of the induction motor?

   c.   IF A=8+3J and B= 9+2J.Then what is A*B=?

   d.   An AC series circuit consist of a resistance of 5 ohm and a capacitance of 10 farad and applied across a 230v,50Hz supply. What is the impedance and current flowing in a circuit?

   e.   Why short circuit test is done in single phase transformer?

   f.   Write condition of parallel operation of transformer and what is its necessity?

   g.   Classify different types of dc generator with connection diagram.

   h.   Write two properties of conducting material.

   i.   State Q factor of AC series circuit.

   j.   What is transformation ratio?

2.   Answer **Any Six** Questions   6 x 5

   a.   A shunt generator deliver 450amp at 230 volt .The resistance of the shunt field and armature are 50 ohm and 0.03 ohm respectively. Calculate the generated emf.

   b.   With circuit diagram explain the open circuit test of a single phase transformer.

   c.   Establish the relationship between torque, rotor current and power factor of induction motor.

   d.   With diagram explain the armature control method of speed control of dc motor.

   e.   A no load test of a single phase transformer the following test data were obtained.

Primary voltage =220volt,
Secondary voltage=110volt,
Primary current=0.5 ampere,
Power input=30watt. Find

    (i) Turns ratio.
    (ii)Magnetising component of a no load current.
    (iii)Iron loss component of no load current.
    (iv)iron loss if the resistance of primary winding= 0.6ohm

f. Explain the starting of an induction motor by star delta starter.

g A 220 volts shunt motor running at 1000 rpm has an armature resistance of 0.3 ohm and armature current of 15A at certain load. What resistance should be placed in series with the armature to reduce the speed of the motor to 700 rpm?

3   In a 25 KVA transformer the iron and full load copper losses are 350W and 400W respectively. Calculate the efficiency at: 10

    a) Full load unity power factor
    b) Half full load,0.8 power factor lagging
    Also determine the load for maximum efficiency.

4   A 20KVA,200/400 volt,50Hz single phase transformer give the following test result   10

    OC TEST= 200V,1.3A.120Watt on Low voltage side
    SC TEST =22V,30A,200watt on High voltage side.

Calculate (a) magnetising current and component corresponding to core loss at normal frequency and voltage (b) magnetizing branch impedance.

5   Explain the principle of development of rotating field in stator.   10

6   Explain with neat diagram, the operation of a four-point starter.   10

7   A 230 V, 50 Hz ac supply is applied to a coil of 0.06 H inductance and 2.5 Ω resistance connected in series with a 6.8 μF capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) power factor (v) Active Power, Reactive Power, Apparent Power   10

4TH SEM./APP.ELEC & INSTRU ENGG/ CSE/ECE/ETE/ IT/ MECHATRONICS/2022(S)
Th2 DATA COMMUNICATION AND COMPUTER NETWORK

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer All questions   2 x 10
   a. What do you mean by subnet mask?
   b. Differentiate between physical address and logical address of a node in a network.
   c. Compare between star and ring topology.
   d. What is the role of protocol in networking?
   e. Write the functional difference between STP and UTP cable.

   f. What do you mean by line and block coding?
   g. Explain Nyquist theorm for channel capacity.

   h. Write the need of multiplexing in a communication channel.

   i. Distinguish between bit rate and baud rate.
   j. Give two examples of half duplex and full duplex mode of communications.

2. Answer Any Six Questions   6 x 5
   a. Illustrate different services provided by application layer in OSI model.
   b. Describe the TCP/IP layering model.
   c. List the difference between FDMA, TDMA and CDMA channelization techniques.

   d. What are the transmission impairments in communication medium?

   e. Classify synchronous and asynchronous mode of communication?

   f. List the functions of switch, bridge and gateway.
   g Explain the working principle of CSMA/CD.

3 Discuss different types of physical topologies in the network with   10
   diagram.

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4	Describe different protocols work in each layer of OSI model	10
5	Explain different transmission medium used in data communication.	10
6	Illustrate NRZ and RZ coding techniques with examples.	10
7	Write Short notes on (ANY TWO) a) Bluetooth b)WLAN c) Parity bit d) Frame Relay	2X5

4th Sem./ AE&I/ CSE/ ECE/ETC /IT / 2022(S)

Th3   MICROPROCESSOR AND MICROCONTROLLER

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer All questions   2 x 10

   a.   Differentiate between microprocessor and microcontroller.

   b.   Determine the total memory accessed by 8085 microprocessor.

   c.   Name different machine cycles of 8085 microprocessor and mention the number of T – states present in each machine cycle.

   d.   Define Stack Pointer (SP) and Program Counter (PC) of 8085 μP?

   e.   Give 2 examples each of 2 – byte and 3 – byte instructions for 8085 μP.

   f.   Name the non-maskable and non – vectored hardware interrupts of 8085 μP.

   g.   Consider the following 8085 program.
     MVI A, 25H
     RRC
     RRC
     Find the content of accumulator, A after execution of this program.

   h.   What do @ and # signs indicate in 8051 μC and where are they used?

   i.   Draw the internal RAM structure of 8051 μC.

   j.   Show different bit positions of flag register in 8086 μP.

2.   Answer Any Six Questions.   6 x 5

   a.   Explain different addressing modes of 8085 μP with examples.

   b.   Give 2 examples each for the following groups of instruction of 8085 μP and explain their meaning.
     i)   Data Transfer ii) Arithmatic iii) Logic iv) Branching v) Machine Control

   c.   Draw the timing diagram for the instruction **MVI A, 67H**.

   d.   Explain the different bit positions of flag register in 8085 μP. Given [A]=58 H, what will be content of flag register after execution of the following instruction?
     ADI A, BCH

   e.   Explain the bit positions of control word of 8255 PPI for I/O and BSR Mode.

   f.   Differentiate between memory mapped I/O and I/O mapped I/O

   g   Write an 8051 – assembly level language program to find the multiplication of 8-bit data present in two consecutive memory locations and store the result in next memory location.

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3   Draw the pin diagram of 8085 µP and explain each pin briefly.   10

4   Explain the architecture of 8255 PPI with the help of its block diagram.   10

5   Write an 8085 – assembly language program to find the largest number in a given   10
     array of 10 numbers.

6   Draw the internal architecture of 8086 µP and explain the function of each block   10
     briefly.

7   Write short notes (**Any TWO**).
     I.   Timer Mode (T_{MOD}) and Timer Control (T_{CON}) registers of 8051 µC.   10
     II.   Direct Memory Access (DMA).
     III. Software and Hardware Interrupts of 8085 µP.

4TH SEM./ECE/ETC/2022(S)

Th-4 Analog Electronics and Linear IC

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1 & 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Define Ripple factor. Mention ripple factor of half wave rectifier and full wave rectifier.

   b.   Define α and β of a transistor.

   c.   List different types of power amplifiers.

   d.   Write the full form of CMOS and draw it's symbol indicating each terminal.

   e.   Define Barkhausen criterion.

   f.   Name any two audio frequency oscillators and RF oscillators.

   g.   Mention the name of components used to design (i) clipper circuit (ii) clamper circuit

   h.   Define Monostable multivibrator.

   i.   Define CMRR and Slew rate of an Op-amp.

   j.   Draw the pin diagram of 555 timer and mention each pin name.

2.   Answer **Any Six** Questions   6 x 5

   a.   Explain the current flow mechanism in a p-n junction under:

         (i) No bias
         (ii) Forward bias
         (iii) Reverse bias condition

   b.   Differentiate between voltage and power amplifier.

   c.   Classify FETs. Draw the symbols showing current direction and name each terminal.

   d.   (i) Draw block diagram of voltage series feedback amplifier. [2]

      (ii) Determine the voltage gain, input, and output impedance with feedback for voltage series feedback having open loop gain (A) = 100, input resistance (R_{in}) = 10 kΩ, output resistance (R_o) = 20 kΩ for feedback fraction of $\beta = 0.1$. [3]

   e.   Draw the circuit diagram of inverting and non inverting amplifier using Op-amp. Also, Compute gain of both the circuits if input resistance (R_{in}) = 1kΩ and feedback resistance (R_f) = 10kΩ.

   f.   Explain the working of a voltage to current convertor using Op-amp.

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g   A sinusoidal signal having maximum voltage $V_m = 5V$ is applied to the clipper circuit having bias voltage $V_r = 1V$ as given below. Draw the output waveform.

Input Waveform
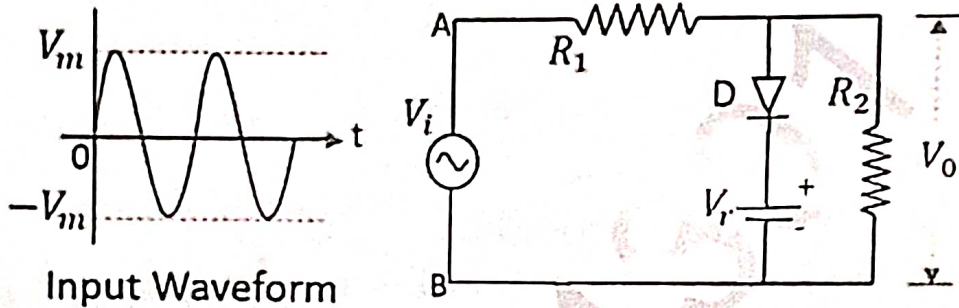
3   With neat diagram describe the working principle of RC coupled amplifier with its frequency response curve.   **10**

4   With neat sketch, explain the working of Class – B push pull amplifier.   **10**

5   Explain the working of wine-bridge oscillator with circuit diagram. Write the expression for frequency of oscillation.   **10**

6   Explain the operation of integrator and differentiator using OP-AMP with neat diagrams.   **10**

7   Explain the operation of Astable multi-vibrator using IC-555 with a neat circuit diagram.   **10**

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