Roll No: .....

[Total No. of Questions: 09] [Total No. of Page :01]

Programme/Course:……

Name of the subject: Digital Electronics

Subject code: BTEE-401-18

Paper ID:…….

Time: 03 Hours **Maximum Marks: 60**

Instruction to Candidates:

1)Section - A is **Compulsory.**

2)Attempt any **Four** questions from Section - B.

3) Attempt any **Two** questions from Section - C.

Section –A (10 x 2 =20)

Q1

a) State De-Morgan's theorem and mention its use.?

b) Define 'Minterm' and ' Maxterm'?

c) Show how to connect NAND gates to get an AND gate and OR gate?

d) Explain the operation of basic sample and hold circuit?

e) Find the 2's compliment of$(10100011)_2$

f) State advantage Of CMOS Logic?

g) Draw truth table of RS flip flop.

h) Distinguish between combinational logic circuit and sequential logic circuit.

i) What is difference between latch and flip flop?

j) Show that ABC + ABC' + AB'C + A'BC = AB + AC + BC

Section – B (4 x 5 =20)

Q2 Simplify the following

(a)A'B'C'D+A'BC'D+A'BCD+A'BCD'+ABC'D'+ABC'D+ ABCD+AB'CD

(b)Reduce f(A,B,C,D)=Σm(0,1,4,8,9,10)

Q3 Explain the working of Multiplexer(1:8) and Demultiplexer (4:1)?

Q4 What are various types of A/D converter? Explain any one with logic circuit.?

Q5 How J- K-T and D- types flip flops works .Discuss with logic circuit and truth table ?

Q6 Explain half adder and full adder logic circuit with logic circuit?

Section – C (2 x 10 = 20)

Q7) What are counters? Discuss ring counter, Ripple counter and synchronous counter?

Q8) How digital to analog converter works? Discuss weighted register and R-2R Ladder D/A converter?

Q9) (a)Design a parity generator to generate an odd parity bit for 4 bit word (use minimum gates)

(b) Define a register? Construct a shift register from RS Flipflops and explain their operation.

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[Total No of Questions: 09]

COURSE: B. TECH (EE)

Sem.: 4th

Name of Subject: Electrical Machines-II

Subject code: BTEE-402-18

Time: 3 Hours Maximum Marks: 60

Instructions to candidates:

1) Section A is compulsory, each question carries 2 marks.
2) From Section B attempt any four, each question carries 5 marks.
3) From Section C attempt any two, each question carries 10 marks.

Section: A **20**

1	a)	Calculate the fundamental, third harmonic and fifth harmonic breadth factor for a stator with 36 slots wound for 3-phase, 4poles.	2
	b)	Derive the expression of voltage generated in winding of AC machine.	2
	c)	What is standstill rotor emf and what is its frequency? How does the emf magnitude and frequency vary with speed?	2
	d)	Draw: (i) the complete speed torque characteristic of an induction machine (ii) speed torque characteristic of an induction motor with increasing values of rotor resistance.	2
	e)	Using diagrams show the difference between a full-pitched and short-pitched coil. Also indicate the coil side and the overhangs on it.	2
	f)	Why is a 1-Φ induction motor not self-starting?	2
	g)	What role do damper windings play in a synchronous machine? Where are they placed?	2
	h)	Define (i) Plugging (ii) Hunting.	2
	i)	Under what condition is a synchronous generator said to be floating on the busbar.	2
	j)	In case of 3-Φ IM, what is (i) the speed of rotor field (ii) the speed of stator speed (iii) the relative speed between the stator field and rotor field (iv) relative speed between the rotor field and the rotor	2

Section: B **20**

2	Distinguish between cylindrical rotor synchronous machine and salient pole synchronous machine	5
3	A three-phase induction motor has a 4 pole, star connected stator winding and runs on a 220V, 50 Hz supply. The rotor resistance per phase is 0.1ohm and reactance is 0.9 ohm. The ratio of stator to rotor turns is 1.75. The full load slip	5

is 5%. At this load calculate: (i) the load torque, (ii) speed at maximum torque, (iii) rotor emf per phase at maximum torque.

4		Draw the power flow diagram of an induction motor. The power input to a 500V, 50 Hz, 6-pole three phase IM running at 975rpm is 40kW. The stator losses are 1kW and friction and windage losses are 2kW. Calculate: (i) slip, (ii) rotor copper loss (iii) shaft power (iv) efficiency	5
5		Derive the expression for (a) Breath factor (b) Pitch factor and hence winding factor for a distributed winding	5
6		Prove that: (i) the magnitude of the flux at any instant of time is $1.5\Phi_m$ (ii) the field produce is rotating.	5

Section: C **20**

7		Discuss the V-curves in detail-effect of change of excitation on the armature current of a synchronous motor at various shaft loads.	10
8	(i)	An 8-pole, 50 Hz, three phase slip ring induction motor has effective rotor resistance of 0.08ohm/phase. Its stalling speed is 650rpm. Ignore the magnetizing current and stator leakage impedance. How much resistance must be inserted in the rotor resistance per phase to obtain maximum torque at starting.	5,5
	(ii)	Derive the expression for the condition of maximum torque in 3-Φ induction motor.	
9	(i)	Explain the concept of rotating magnetic field when three phase supply is given to a three-phase stator winding of and induction motor	5,5
	(ii)	Two alternators A and B operate in parallel and supply a load of 8MW at 0.8pf lagging. The power output of A is adjusted to 5000kw by changing its steam supply and its pf is adjusted to 0.9 lagging by changing its excitation. Find the pf of alternator B.	

Roll No: .....

[Total No. of Questions: 09] [Total No. of Page :02]

Programme/Course: ……

Name of the subject: Power Electronics

Subject code: BTEE-403-18

Paper ID: …….

Time: 03 Hours **Maximum Marks: 60**

Instruction to Candidates:

1) Section - A is **Compulsory.**
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section –A **(10 x 2 =20)**

Q1

a) Why IGBT is very popular nowadays?

b) What are the different methods to turn on the thyristor?

c) What is the difference between power diode and signal diode?

d) Power BJT is a current controlled device. Why?

e) How can a we turned-off thyristor?

f) Define latching current & holding current.

g) What are the advantages of freewheeling diodes in a controlled in a controlled rectifier?

h) Why diodes should be connected in antiparallel with the thyristors in inverter circuits?

i) What is meant by PWM control in dc chopper?

j) Write down the expression for average output voltage for step-up chopper.

Section – B **(4 x 5 =20)**

Q2. Discuss some of the applications of controlled rectifier.

Q3. Explain the structure and operation of turn on and turn of characteristics of SCR**.**

Q4. Draw and explain the forward characteristics of SCR using two transistor model of SCR.

Q5. Draw the circuit diagram of buck regulator and explain its working principle with necessary waveforms.

Q6. Explain the working of single phase full-bridge Controlled Rectifier with circuit diagram and waveforms.

Section – C **(2 x 10 = 20)**

Q7) Explain the principle of operation of 3 phase voltage source inverter with 180°conduction mode with necessary waveforms and circuits. Also obtain the expression for line to line voltage.

Q8) With necessary circuit and waveforms, explain the principle of operation of three-phase controlled bridge rectifier feeding R-L load and derive the expression for the average output dc voltage.

Q9) A dc chopper has an input voltage of 200V and a load of 15ohm resistance. When the chopper is on, its voltage drop is 1.5V and the chopping frequency is 10KHz. If the duty cycle is 80%. Find:

i.) average and rms output voltage

ii.) chopper on time.

Roll No: .....

[Total No. of Questions: 09] [Total No. of Page :02]

Programme/Course: ……

Name of the subject: Signal & System

Subject code: BTEE-404-18

Paper ID: …….

Time: 03 Hours **Maximum Marks: 60**

Instruction to Candidates:

1) Section - A is **Compulsory.**
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

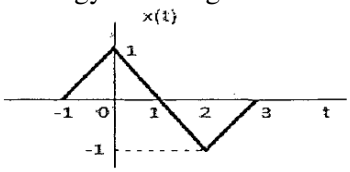
Section –A (10 x 2 =20)

Q1

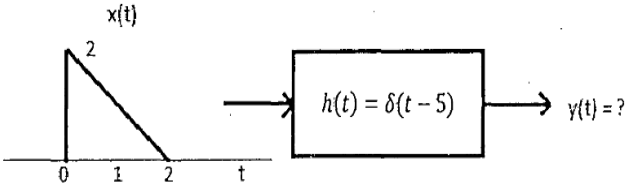
a) Determine the fundamental time period of the signal:

$x(t) = \frac{3}{5}\left(\cos(4t + \pi/3) + \frac{8}{3}\sin(8t + \pi/2)\right)$

b) For the x(t) shown below find the energy of the signal



c) For the system shown below with the input x(t) and the impulse response h(t), Sketch the output y(t).



d) What is the classification of the systems?

e) State convolution property of Fourier transform.

f) What is an anti–aliasing filter?

g) Define Fourier Transform.

h) Find the Fourier transform of function x(t)=δ(t)

i) Explain even and odd signals with help of examples.

j) Evaluate the energy and power of a unit step signal.

Section – B (4 x 5 =20)

Q2 Sketch the following signals.

a) x(t) = 2t for all t
b) x(n) = 2n – 3, for all n.

Q3 Check whether the following are periodic:

a) $x(n) = \sin(\frac{6\pi}{7}\, n + 1)$
b) $x(n) = e^{j3\pi(n+1/2)/5}$

Q4 Determine the FT of the x(t) = $e^{-a\,|t|}$

Q5 Discuss the Properties of Fourier Transform

Q6 What is Sampling? Discuss about the aliasing and construct the filter to eliminate aliasing.

Section – C **(2 x 10 = 20)**

Q7) A continuous time signal x(t) is shown in fig. sketch and label carefully each of the following signal:

a) x(t-1)
b) x(2-t)
c) x(t)*[δ (t+3/2) - δ (t-3/2)]
d) x(2t+1)

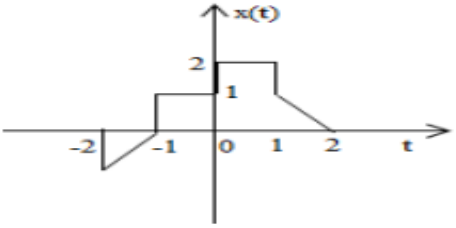


Fig: x(t)

Q8) Discuss the Proof of Sampling function by discussing it's both parts.

Q9) Determine the z-transform and sketch the pole zero plot with the ROC for each of the following signals

a) $x[n] = (0.5)^n u[n] - (1/3)^n u[n]$
b) $x[n] = (1/2)^n\, u[n] + (1/3)^n u[n-1]$

Roll No. **Total No. of Pages : 03**

Total No. of Questions : 9

B.Tech. (EE) (2018 Batch) (Sem.–4)

MATHEMATICS-III Subject Code : BTAM-302-18

M.Code : 77610

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A IS COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any four questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any two questions.**

SECTION-A

1. **Write briefly :**
   - **a)** Define Random variable.
   - **b)** State Law of Total Probability.
   - **c)** If a sample space S=AUB , P(A)=1/2 , P(B)=3/4 Find P(A∩ B).
   - **d)** Define Alternative Hypothesis.
   - **e)** Find the expectation of following probability distribution

X	8	12	16	20	24
P(X)	1/8	1/6	3/8	¼	1/12

   - **f)** State Z-distribution.
   - **g)** Define correlation.
   - **h)** Define Skewness and Karl Pearson's coefficient of skewness.
   - **i)** What is meant by Weighted Arithmetic Mean?
   - **j)** Distinguish between Regression and Correlation.

SECTION-B

2. A coin is tossed until a head appear .What is the expectation of number of tosses required?

3. Six students were given a test in Statistics.They were given a month's further tution and a second test of equal difficulty was held at the end of it. Do the marks give evidance that students have benefitted by extra coaching

   Test 1 : 20 16 21 12 24 19

   Test 2 : 21 15 25 15 20 17

4. Marks obtained by a number of students are assumed to be normally distributed with mean 50 and variance 36. If four students are taken at random, what is the probability that exactly two of them will have marks over 62? Given that $_0^2\int \Phi$ (z) dz=0.4772 z where Z is N (0, 1).
5. If the two lines of regression are 4x – 5y + 30 = 0 & 20x – 9y – 107 = 0. Which of these is the line of regression of x on y, and y on x. Find correlation coefficients and variance of Y when variance of X is 3.
6. A continuous random variable X has a probability density function f (x) = k (1 + x), $2 \leq x \leq 5$. Find P(X ≤ 4).

SECTION-C

7. Fit a second degree parabola to the following data :

   X : 1 2 3 4 5

   Y : 1090 1220 1390 1625 1915

8. **a**) Two fair dice are thrown independently. Three events A, B and C is defined as follows : A : Even face with first dice B : Even face with second dice C : Sum of the points on the two dice is odd. Discuss the independence of events A, B and C.

   b) b) A coin was tossed 400 times and the head turned up 216 times.Test the hypothesis that the coin is unbiased at 5% level of significance?

9. **a**) Find the Karl Pearson's co-efficient of skewness from the following data:

Size :	1	2	3	4	5	6	7
Frequency :	10	18	30	25	12	3	2

b) From the following table, calculate the coefficient of correlation by Karl Pearson's method

X:	6	2	10	4	8
Y :	9	11	6	8	7