ਆਈ.ਕੇ. ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ

(ਅਕਾਦਮਿਕ ਵਿਭਾਗ)

Ref. No.: IKG-PTU/DA/21000

Date : 29/10/2019

ਪ੍ਰਿੰਸੀਪਲ / ਡਾਇਰੈਕਟਰ / ਫੈਕਲਟੀ ਇੰਚਾਰਜ
ਐਫੀਲੇਟਿਡ ਕਾਲਜ / ਸੰਸਥਾਵਾਂ ਅਤੇ ਖੇਤਰੀ ਕੈਂਪਸ
ਆਈ.ਕੇ.ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ।

ਵਿਸ਼ਾ :- **ਬੀ.ਟੈਕ (ਇਲੈਕਟ੍ਰਾਨਿਕਸ ਐਂਡ ਕਮਿਊਨੀਕੇਸਨਜ਼) ਬੈਚ 2018 ਤੀਜੇ ਸਮੈਸਟਰ ਦੇ ਨਮੂਨਾ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਭੇਜਣ ਸਬੰਧੀ।**

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਦੇ ਸਬੰਧ ਵਿੱਚ ਆਪ ਜੀ ਨੂੰ ਬੀ.ਟੈਕ. (ਇਲੈਕਟ੍ਰਾਨਿਕਸ ਐਂਡ ਕਮਿਊਨੀਕੇਸਨਜ਼) ਬੈਚ 2018 ਸਮੈਸਟਰ ਤੀਜਾ ਦੇ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਨਮੂਨਾ ਇਸ ਪੱਤਰ ਨਾਲ ਨੱਥੀ ਕਰਕੇ ਭੇਜਿਆ ਜਾਂਦਾ ਹੈ। ਆਪ ਜੀ ਨੂੰ ਲਿਖਿਆ ਜਾਂਦਾ ਹੈ ਕਿ ਇਹ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਨਮੂਨਾ ਸਬੰਧਤ ਵਿਦਿਆਰਥੀਆਂ ਅਤੇ ਅਧਿਆਪਕ ਸਾਹਿਬਾਨ ਨੂੰ ਪੁੱਜਦਾ ਕੀਤਾ ਜਾਵੇ ਤਾਂ ਜ਼ੋ ਵਿਦਿਆਰਥੀ ਇਮਤਿਹਾਨਾ ਦੀ ਸੁਚੱਜੇ ਢੰਗ ਨਾਲ ਤਿਆਰੀ ਕਰ ਸਕਣ। ਆਮ ਜਾਣਕਾਰੀ ਹਿੱਤ ਇਸ ਪੱਤਰ ਨੂੰ ਸੰਸਥਾਂ ਦੇ ਨੋਟਿਸ ਬੋਰਡ ਉਪਰ ਚਿਸਪਾਨ ਕਰਵਾਇਆ ਜਾਵੇ ਜੀ। ਇਸ ਸਬੰਧੀ ਕੋਈ ਵੀ ਸੁਝਾਅ ਨਿਮਨ ਹਸਤਾਖ਼ਰ ਦੇ ਦਫ਼ਤਰ ਨੂੰ ਭੇਜਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਆਪ ਜੀ ਵੱਲੋਂ ਭੇਜੇ ਗਏ ਸੁਝਾਅ ਸਾਡੇ ਲਈ ਮਹੱਤਵਪੂਰਨ ਹਨ।

(ਡਾ. ਬਲਕਾਰ ਸਿੰਘ)
ਡੀਨ ਅਕਾਦਮਿਕ

ਇਸ ਦਾ ਇੱਕ ਉਤਾਰਾ :

1. ਇੰਚਾਰਜ ਸਕੱਤਰੇਤ : ਮਾਨਯੋਗ ਉਪ ਕੁਲਪਤੀ ਜੀ ਦੀ ਜਾਣਕਾਰੀ ਹਿੱਤ।
2. ਡਾਇਰੈਕਟਰ (ਮੇਨ ਕੈਂਪਸ) ਜੀ ਨੂੰ ਸੂਚਨਾ ਹਿੱਤ।
3. ਕੰਟਰੋਲਰ ਪ੍ਰੀਖਿਆਵਾਂ ਜੀ ਨੂੰ ਸੂਚਨਾ ਹਿੱਤ।
4. ਇੰਚਾਰਜ, ਆਈ.ਟੀ.ਐਸ. ਵਿਭਾਗ ਨੂੰ ਯੂਨੀਵਰਸਿਟੀ ਵੈਬਸਾਈਟ ਤੇ ਅਪਲੋਡ ਕਰਨ ਹਿੱਤ।

(ਡਾ. ਬਲਕਾਰ ਸਿੰਘ)
ਡੀਨ ਅਕਾਦਮਿਕ

Roll No: ....

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

Programme/Course: 3rd Sem B.Tech ECE

Name of the subject: Analog Electronics

Subject code: BTEE-311-18

Paper ID:……

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

Instruction to Candidates:

1)Section - A consists of ten questions of two marks each. All are **Compulsory.**

2)Attempt any **Four** questions from Section - B carrying five marks each.

3) Attempt any **Two** questions from Section - C carrying ten marks each.

Section –A (10 x 2 =20)

Q1

a) Define P-N junction diode.

b) What do you mean by Drift current and Diffusion Current?

c) What is a rectifier?

d) List some applications of MOSFETs.

e) What are the types of Transistors?

f) Give some technical examples where Rectifiers are used?

g) What is a Zener diode?

h) Write applications of a Tunnel diode.

i) Define Sheet Resistance

j) What is the significance of Etching process in fabrication of Electronic devices?

Section – B (4 x 5 =20)

Q2 Draw the V-I characteristics of a diode giving the Universal Diode equation.

Q3 Explain a Full-wave rectifier with the help of a neat diagram.

Q4 Discuss how a Transistor acts as an amplifier with help of a neat circuit diagram.

Q5 An A.C..voltage of peak value 20V is connected in series with a Silicon diode and a load resistance of 500Ω. If the forward resistance of diode is 10Ω, find : i) peak current through diode ii) peak output voltage.

Q6 An A.C. supply of 230V is applied to a half-wave rectifier circuit through a transformer of turns ratio 10:1, determine: I_m, I_{dc}, I_{rms}, d.c. power output, a.c. power input and efficiency.

Section – C (2 x 10 = 20)

Q7) Discuss the construction and working of a MOSFET using suitable diagram(s).

Q8) Explain the basic fabrication processes that are involved in the design and fabrication of Electronic devices?

Q9) A full-wave rectifier uses two diodes, the internal resistance of each diode is 20Ω. The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50V and load resistance is 980Ω. Find i) d.c. load current and ii) rms value of load current iii) dc output power iv) ac input power iv) rectification efficiency.

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Roll No: ....

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

Programme/Course: B.Tech

Name of the subject: Digital System Design

Subject code: BTEC-302-18

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) Draw the Logic draw using two input NAND gate only for the expression (AB + A'B').(CD' +C'D)

b) How Race around Condition can be eliminated?

c) Convert J K Flip-Flop to D Flip Flop.

d) Can two half adders act as a full adder circuit? If yes justify your answer.

e) Calculate the analog output voltage of DAC whose output voltage range 0 to 10V for their following digital inputs:

(i). 10 (2 –bit DAC)

(ii).1010 (4-bit DAC)

f) How can IF and CASE statements be used to control the flow of execution within model?

g) How do signed and unsigned data types in VHDL differ from each other?

h) Define "Figure of Merit" and "Propagation Delay Time".

i) List the limitations of Finite State machines.

j) Differentiate between Moore and Mealy Machines.

Section – B (4 x 5 =20)

Q2 Design a counter which can generate the sequence 0, 2, 4, 7, 0….. and also eliminate the hang out condition.

Q3 Differentiate between Counter type and Dual slope type A/D Converter. Why Dual slope is preferred over SAR type ADC.

Q4 Implement the full Subtractor circuit using Demultiplexer

Q5 Draw the circuit of ECL and explain its principle and operation. Also compare it with

TTL NAND gates.

Q6 Design a Sequence generator to generate the sequence .....1101011.....

Section – C **(2 x 10 = 20)**

Q7) (a) Reduce the following expression by using K-Map and implement the expression using NOR gate:

$$F = \Sigma m\,(0, 2, 4, 6, 8, 12, 15) + d(3,7,11)$$

(b) What is the difference between PLA and PAL? Also Explain PAL based design in detail.

Q8) (a) What are the different ways to represent data in VHDL? Discuss in brief.

(b) Design a BCD to Gray Code Converter using VHDL language.

Q9) **(a)** Design the following expression using 8:1 Multiplexer

$$F = \Sigma m\,(0, 2, 4, 7, 8, 12, 14). \quad (5)$$

(b) Write the Short note on the following:

(i). Algorithmic State Machine Charts (3)

(ii).Behavioural Modelling (2)

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

Uni. Roll No. ....

Program/Exam: B.Tech. EIE 4th Sem December 2019
Name of Subject: Electromagnetic Field Theory
Subject Code: EC-208
Paper ID: 4112804

Time allowed: 03 Hours

NOTE: **Max. Marks:60**

1) **Section A** is **compulsory.**
2) Attempt any **four** questions from **Section-B** and any **two** questions from **Section-C.**
3) Any missing data may be assumed appropriately.

SECTION-A [Marks: 02 each]

Q1. a. What is meant by Surface Impedance? Give its mathematical formula.
b. Give the formula for Transmission Co-efficient for a perfect insulator.
c. What is the significance of Skin depth in EM waves?
d. Write the formula for velocity of propagation in TE waves.
e. What do you mean by Poynting Vector?
f. Write the condition for a distortion less transmission line.
g. What do you mean by Skin Depth?
h. Define Voltage Standing Wave ratio.
i. What is Characteristics Impedance of a waveguide?
j. Define TEM Waves

SECTION-B [Marks: 05 each]

Q2: Drive the general expression of a Plane wave in a perfect insulator.
Q3: Find the cut-off frequency for TE1 mode propagating between two parallel conduction plates separated by 3cm?
Q4: Give the Transmission Line analogy for Waveguides. Explain.
Q5:Give various important propagation characteristics of TE waves. Also give their significance.
Q6: A low loss transmission line of 100 ohms characteristics impedance is connected to a load of 300 ohms. Calculate the reflection co-efficient and VSWR?

SECTION-C [Marks: 10 each]

Q7: Drive the integral form of Maxwell's equations. Are all the four Maxwell's equations independent? Explain.
Q8: Find the Reflection co-efficient and Transmission co-efficient of an electric-field wave travelling in air and incident normally on a boundary between air and dielectric having permeability of $\mu_r = 1$ and $\varepsilon_r = 4$.
Q9: Write short note on: Rectangular Waveguides

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Roll No: ....

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

Programme/Course: B.Tech (ECE)
Name of the subject: Mathematics-III
(Transform, Calculus, Probability and Statistics)
Subject code: BTEC-303-18
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 Existence theorem of Laplace transform.

b) Evaluate $L\left(\frac{sin^2 t}{t}\right)$.

c) Obtain fourier series for $f(x) = e^{-x}$ in $0 < x < 2\pi$

d) State Dirichlet's conditions for fourier series.

e) Find z-transform of $\left(\frac{3}{4}\right)^n - \left(-\frac{1}{3}\right)^n$

f) Find $z^{-1}\left(\frac{1}{z-2}\right)$

g) State any three properties of normal distribution.

h) Define Conditional probability with example.

i) Write the normal equations to fit a second degree papabola.

j) Define Chi square test.

Section – B (4 x 5 =20)

Q2 State and prove Parsevel's identity for fourier transform.

Q3 Find $L^{-1}\left(\frac{S(S+2)}{(S+4)(S^2+6S+18)}\right)$

Q4 In a normal distribution 7% of the items are under 35 and 89% are under 63. What is the mean and standard deviation.

Q5 Solve $x(k+2) - 3x(k-1) + 2x(k) = 3k + 5; x(0) = 0, x(1) = 1$

Q6 Define Correlation coefficient and Regression coefficient, Prove that correlation coefficient is the geometric mean between the regression coefficients.

Section – C **(2 x 10 = 20)**

Q7) State and prove convolution theorem and use it to evaluate $L^{-1}\left(\frac{s^2}{(s^2+4)(s^2+9)}\right)$

Q8) . Calculate the coefficient of correlation and obtain the least square regression line of y on x for the following data,

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

Q9) .(a) Fit a poisson distribution to the following data,

X	0	1	2	3	4
f	109	65	22	3	1

($e^{-0.61} = 0.5434$). Value of chi square at 5% level = 5.991

(b) Out of 800 families with 4 children each, how many families would be expected to have (i) 2 boys and 2 girls

(ii) at least one boy

(iii) at most two girls.

Assume equal probability for boy and girl.

Roll No: ....

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

Programme/Course: B.Tech

Name of the subject: Network Theory

Subject code: BTEC-304-18

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) What are the necessary conditions for transfer functions?

b) State Tallegen's theorem.

c) State Superposition Theorem with circuit diagram

d) What is the relation between unit step, unit ramp and unit impulse input?

e) What is a unit doublet function?

f) Verify initial value theorem for $f(t)=5e^{-4t}$

g) Synthesize $F(s)=\frac{s^2+9s+6}{s+2}$ as Foster second form.

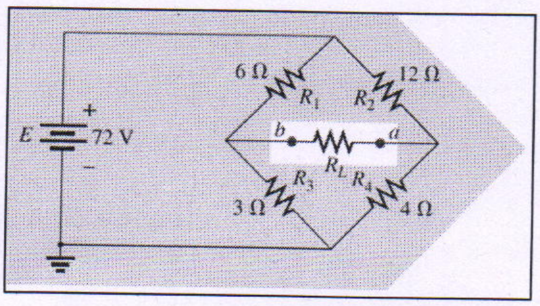
h) Discuss the properties of RL driving point impedance function.

i) If $H(s)=\frac{S(S+2)}{(S+4)(SS^2+6S+18)}$ find h(t) using pole-zero plot of the function.

j) A resistance of 10 ohm is connected across a supply of 200V. if a resistance R is now connected in to parallel with a 10 ohm resistance, the current drawn from the supply gets doubled. Find the value of unknown resistance.

Section – B (4 x 5 =20)

Q2 Find the Thévenin equivalent circuit for the network in the shaded area of the bridge network in the below figure.



Q3 Explain how time domain function can be obtained from pole zero plot of a function

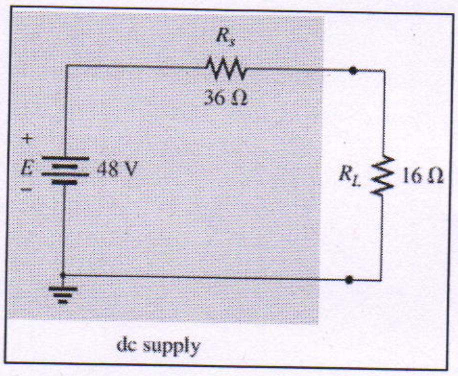
Q4 Classify filters and analyze any one type of filter in detail.

Q5 A series LCR type band pass filter has L=50mH, C=130nF and Rf = 80ohm. Determine: a) the frequency of resonance b) the bandwidth c) the cut-off frequencies d) also find the output voltage for an input ac voltage of 20V(rms) at resonance. Assume load resistance to be 600 ohm.

Q6 A fixed load of 16 Ω is applied to a 48 V-supply with an internal resistance of 36 Ω

i. For the conditions given in Figure, what is the power delivered to the load and lost to the internal resistance of the supply?

ii. If the designer has some control over the internal resistance level of the supply, what value should he or she make it for maximum power to the load? What is the maximum power to the load? How does it compare to the level obtained in part (a)?



Section – C **(2 x 10 = 20)**

Q7) An impedance function is given by:

$$Z(s) = (s+1)(s+4)/s(s+2)(s+5)$$

Find the Foster-I, II forms and Cauer I and II forms.

Q8) Write notes on following: **(4+3+3)**

i. Interconnection of two port networks
ii. Reciprocity theorem
iii. Nodal Analysis

Q9) If an m-derived high pass filter has design impedance of 500(ohm) and cut off frequency of 3.5 KHz and infinite attenuation at 2.6 KHz, design the filter.