



ਆਈ.ਕੇ. ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
(ਅਕਾਦਮਿਕ ਵਿਭਾਗ)



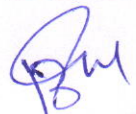
Ref. No.: IKG-PTU/DA/ 2126

Date : 06/11/2019

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

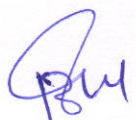
ਵਿਸ਼ਾ :- ਬੀ.ਟੈਕ (ਇਲੈਕਟ੍ਰੀਕਲ ਇੰਜੀ.) ਬੈਚ 2018 ਤੀਜੇ ਸਮੇਸਟਰ ਦੇ ਨਮੂਨਾ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਭੇਜਣ ਸਬੰਧੀ।

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਦੇ ਸਬੰਧ ਵਿੱਚ ਆਪ ਜੀ ਨੂੰ ਬੀ.ਟੈਕ. (ਇਲੈਕਟ੍ਰੀਕਲ ਇੰਜੀ.) ਬੈਚ 2018 ਸਮੇਸਟਰ 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 ਜੋ ਵਿਦਿਆਰਥੀ ਇਮਤਿਹਾਨਾ ਦੀ ਸੂਚਨੇ ਢੰਗ ਨਾਲ ਤਿਆਰੀ ਕਰ ਸਕਣ। ਆਮ ਜਾਣਕਾਰੀ ਹਿੱਤ ਇਸ ਪੱਤਰ ਨੂੰ ਸੰਸਥਾ ਦੇ ਨੋਟਿਸ ਬੋਰਡ ਉਪਰ ਚਿਸਪਾਨ ਕਰਵਾਇਆ ਜਾਵੇ ਜੀ। ਇਸ ਸਬੰਧੀ ਕੋਈ ਵੀ ਸੁਝਾਅ ਨਿਮਨ ਹਸਤਾਖਰ ਦੇ ਦਫਤਰ 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: B.Tech (Electrical Engineering)

Name of the subject: Analog Electronics

Semester: 3rd

Subject code: BTEE-311-18

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) 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 diode.
- i) Give the symbol of Op-Amp. Write its general specifications.
- j) What is the function of Emitter terminal in a transistor?

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 high frequency model of a MOSFET using suitable circuit diagram (s).

Q8) How an Op-Amp can be used as an Integrator, explain with help of a diagram?

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.

Roll No:
[Total No. of Questions: 09]

[Total No. of Page :04]

Course: B.Tech (EE)
Semester : 3rd
Name of the subject: Electrical Circuit Analysis
Subject code: BTEE-301-18

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

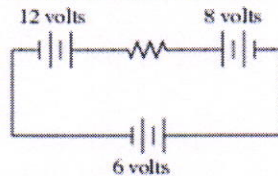
- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section -A

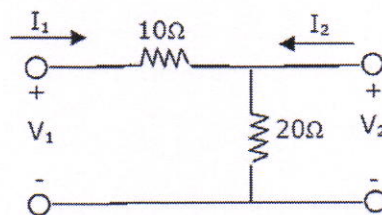
(10 x 2 =20)

Q1

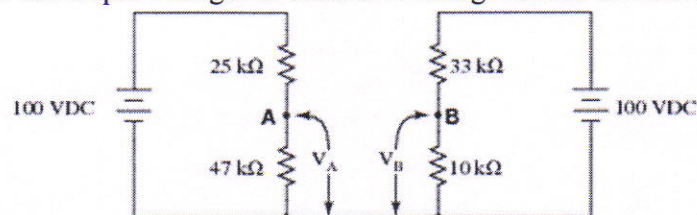
- a) Determine both the polarity of voltage across the resistor in this circuit, and how much voltage will be dropped across the resistor.



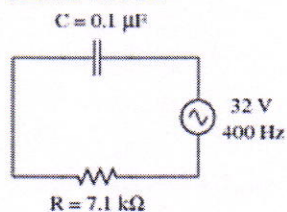
- b) Find the value of Z-parameters using circuit given below.



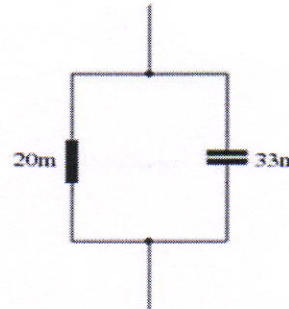
- c) What are the basic criteria for maximum power transfer in any Electrical Circuit?
- d) Calculate the output voltages of these two voltage divider circuits (V_A and V_B)



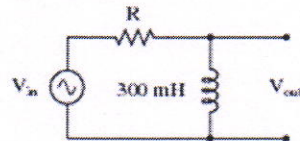
- e) Calculate the power factor of this circuit



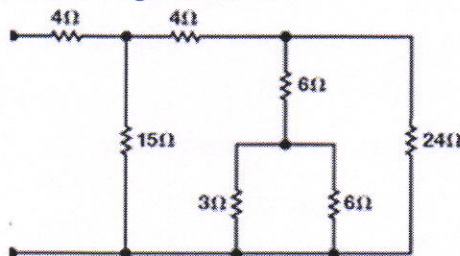
- f) Calculate the resonant frequency of this parallel LC circuit, and qualitatively describe its total impedance (Z_{total}) when operating at resonance.



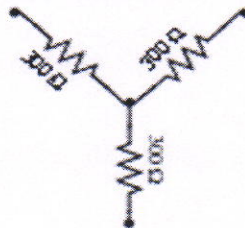
- g) Identify what type of filter this circuit is, and calculate the size of resistor necessary to give it a cutoff frequency of 3 kHz.



- h) Explain why series capacitance is not considered a practical solution for power factor correction in most applications?
- i) Find the Equivalent Resistance of given circuit.



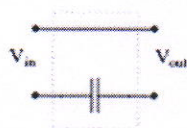
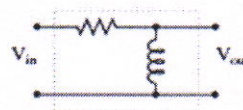
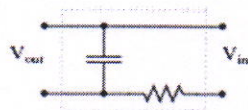
- j) What resistor values would we have to choose in a Delta configuration to behave exactly the same as this Y-connected resistor network?



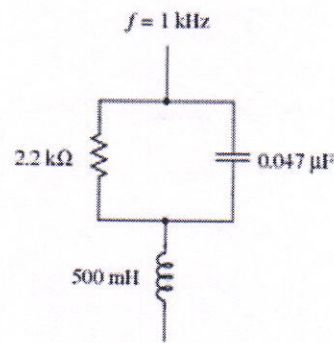
Section – B

(4 x 5 =20)

- Q2 Identify these filters as either being “low-pass” or “high-pass” and how you justify your answer?

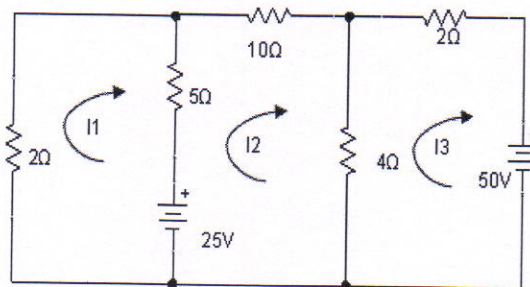


Q3 Determine the total impedance of this series-parallel network and find out whether the circuit is leading or lagging in nature (Consider voltage to be reference to determine the nature)



Q4 Describe the procedure for Norton's theorem with suitable example.

Q5 Find the value of power absorbed by the 40Ω resistor.



Q6 Explain in detail:

1. Initial Value Theorem
2. Final Value Theorem
3. Time-Displacement Theorem
4. Convolution Theorem

Section – C

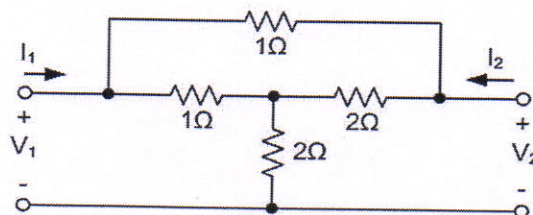
(2 x 10 = 20)

Q7) For the given network function, design both Cauer form of passive network realization.

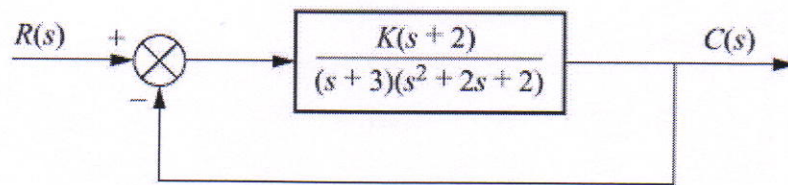
$$Z(S) = \frac{2S^5 + 12S^3 + 16S}{S^4 + 4S^2 + 3}$$

Q8) After finding the values of Z-Parameters from the given circuit, find:

- a) ABCD-Parameters
- b) H-Parameters
- c) Y-Parameters



Q9) Check whether the given system is stable or not using Routh-Hurwitz Criteria



Roll No: _____

[Total no. of Pages: 02]

[Total No of Questions: 09]

COURSE: B. TECH (EE)

Sem.: 3rd

Name of Subject: Electrical Machines-I

Subject code: BTEE-303-18

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) | Draw the magnetisation curve for (i) DC excitation (ii) AC excitation. | 2 |
| b) | Draw the phasor diagram of transformer under (i) Inductive load (ii) Non-inductive load. | 2 |
| c) | How do the field windings in DC series and Shunt motor differ? | 2 |
| d) | Write a brief note on the OCC of a separately excited DC generator. | 2 |
| e) | Using a diagram show how is the flux distributed in a DC generator when only the main field is excited? | 2 |
| f) | What is the condition of maximum efficiency for a transformer? | 2 |
| g) | A 2200/220V, 20kVA single-phase transformer takes a no load current of 1.3 A when high voltage winding is kept open. The iron loss component of no-load current is 0.5A. Calculate no-load power input. | 2 |
| h) | Why is a tap changer needed in transformers? | 2 |
| i) | Write down the (i) essential conditions (ii) desirable conditions, to be satisfied for parallel operation of 3- Φ transformer. | 2 |
| j) | Why is the rating of a transformer in kVA? | 2 |

Section: B

20

- | | | |
|---|---|-------|
| 2 | Compare the Lap Winding and Wave Winding in DC Machines | 5 |
| 3 | Derive the expression for the torque equation of a DC Machine. | 5 |
| 4 | The turn ratio of a single-phase transformer is 4. The resistance and leakage reactance of HV winding is 1.4Ω and 6Ω respectively. The resistance and leakage reactance of LV winding is 0.06Ω and 0.04Ω respectively. If 200V, 50Hz is applied to HV winding and LV winding is short circuited, find the following:
(i) Current in LV winding | 2,2,1 |

- (ii) Copper losses in transformer
(iii) Short Circuit power factor.
- 5 An 6 pole DC shunt generator supplies full-load current at a terminal voltage of 250 V. The armature and field resistance are $0.04\ \Omega$ and $100\ \Omega$ respectively. It runs at a speed of 1000rpm. And has 700 lap connected conductors. The voltage across the armature resistance is 7.2V. Neglect the voltage drop at the brushes. Find the following: 2,2,1
- (i) Load current
(ii) Emf generated
(iii) Flux per pole
- 6 Explain the open circuit test and short circuit test of a transformer. 5
- Section: C** 20
- 7 For an Auto-transformer discuss the following (i) Advantages (ii) Disadvantages (iii) Applications (iv) Copper Saving 2.5 each
- 8 Discuss Armature reaction. Derive the expression for the computing the Demagnetising and Cross Magnetising ampere-turns 6,4
- 9 (a) Discuss the methods of speed control of DC Shunt Motor. 5,5
- (b) A 250v, DC Shunt motor has shunt field resistance of $250\ \Omega$ and armature resistance of $0.25\ \Omega$. For a given load torque and no additional resistance included in shunt field circuit, the motor runs at 1500rpm drawing an armature current of 20A. If a resistance of $250\ \Omega$ is inserted in series with the field, the load torque remains the same, find the new speed and armature current. Assume the magnetization to be linear.

Programme/Course: B. Tech. (2018 Onwards) (Sem.3)
Name of the subject: Electromagnetic Fields
Subject Code: BTEE-304-18
PaperID: [.....]

[Time allowed: 03 hours]

[Max. marks: 60]

INSTRUCTION TO THE 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 × 2=20]

1. Write briefly:

- (a) Give the physical significance of divergence and curl of a vector field.
- (b) Determine the divergence of vector field: $\vec{A} = r \sin \phi \hat{a}_r + 2r \cos \phi \hat{a}_\phi + 2z^2 \hat{a}_z$.
- (c) Find the curl of a vector $\vec{A} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$.
- (d) State Faraday's law of electromagnetic induction.
- (e) Write the Laplace's equation in cylindrical coordinates.
- (f) State normal boundary conditions.
- (g) Give the expression for energy stored in static electric and magnetic field.
- (h) What is difference between scalar magnetic and vector magnetic potential.
- (i) Define Poynting vector.
- (j) What is meant by homogeneous and isotropic medium?

Section-B

[5 × 4=20]

2. State and prove the Gauss's theorem. Explain why it is called the divergence theorem.
3. The concentrated charges of $0.25\mu C$ are placed at the vertices of an equilateral triangle whose side is 2cm. Determine the magnitude and direction of the resultant force on one charge due to others.
4. Explain the concept of 'Displacement Current'. How is this current different from conduction current?
5. Derive the expression for force between the differential current elements.
6. Write Maxwell's equation in free space for the time varying fields both in differential and integral form. Why these equations are not completely symmetrical?

Section-C

[10×2 =20]

7. a) Justify that the net Electric field within a conductor is always zero.
 (b) Derive the equation of continuity for time varying fields.
8. a) Explain the Ampere Law. Discuss the need to modify it.
 b) State and explain the magnetostatic boundary conditions existing at the boundary between two materials.
9. Derive the electro-magnetic wave equation in the free space and show that they travel with velocity of light in free space.

Roll No:

[Total No. of Questions: 09]

[Total No. of Page :02]

Course: B.Tech. (EE)

Semester: 3rd

Name of the subject: Engineering Mechanics

Subject code: BTXX-XXX-18

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 do you understand from indicial notation?
- b) How you can define the three dimensional rotation of object?
- c) Define angular acceleration of rigid body?
- d) Differentiate between vector and tensor?
- e) Define free body diagram (FBD).
- f) Define general plane motion.
- g) Explain with diagram the simply supported beam
- h) Define torsional rigidity of shaft.
- i) Why friction is considered as necessary evil.
- j) Define free precession.

Section – B

(4 x 5 = 20)

Q2 Define symmetric and anti symmetric tensor and vector.

Q3 Explain Euler theorem with proof?

Q4 Derive the relation for five term acceleration formula.

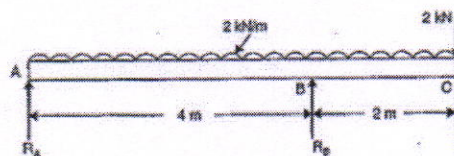
Q5 Explain with diagram theorem of parallel and perpendicular axis?

Q6 Define Gyroscopes couple?

Section – C

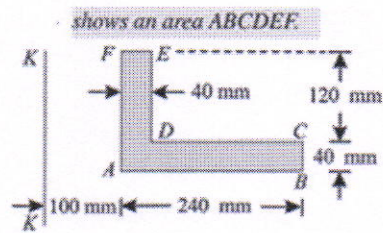
(2 x 10 = 20)

Q7) Draw SF and BM diagram for the overhanging beam carrying UDL of 2 kN/m over the entire length and a point load of 2 kN as shown in Figure below.



Q8) Draw the shear stress distribution in a solid and hollow shaft with same weight and inner diameter of hollow shaft is half of its outer diameter.

Q9) Find the Moment of inertia of the following area.



Compute the moment of inertia of the above area about axis K-K.

Roll No: _____

[Total no. of Pages: 02]

[Total No of Questions: 09]

COURSE: **B.Tech (Electrical Engineering)**

Sem.: 3rd

Name of Subject: Indian Constitution

Subject code: BTMC-101-18

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

- | | | |
|------|--|-----------|
| 1 a) | Who made Indian Constitution? | 20 |
| b) | In how many days Indian Constitution was drafted? | 2 |
| c) | What do you know about Article 31 of Indian Constitution? | 2 |
| d) | What is Habeas Corpus? | 2 |
| e) | Are Fundamental Duties Justiciable? | 2 |
| f) | What are Gandhian Directive Principles of Indian Constitution? | 2 |
| g) | What do you mean by "Failure of Constitutional Machinery"? | 2 |
| h) | What is the composition of Election Commission of India? | 2 |
| i) | Who was the president of Drafting Committee of Constitutional Assembly of India? | 2 |
| j) | India has a Bi-Cameral legislative, explain? | 2 |
| | | 20 |

Section: B

- | | | |
|---|--|-----------|
| 2 | How the powers among Center and States are divided in Indian Constitution? | 5 |
| 3 | It is said the India has a Quasi Federal System, explain. | 5 |
| 4 | Explain Constitutional Remedies in Indian constitution? | 5 |
| 5 | What are the foreign sources of our Constitution? | 5 |
| 6 | What do you know about Secularism in Indian Context? | 5 |
| | | 20 |

Section: C

- | | | |
|---|--|----|
| 7 | Write down a detailed note on Fundamental Rights in India? | 10 |
| 8 | Explain the Fundamental Duties given in our constitution? | 10 |
| 9 | Write a note on the emergency powers of Indian President? | 10 |