CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech III Semester Regular & Supplementary Examinations Nov/Dec-2025
Course Name	:	Electrical Circuit Analysis-II
Course Code	:	A402203
Branch	:	Electrical & Electronics Engineering
Date & Session	:	26-11-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1. Define time constant of RL circuit.   1 M
2. What is the behavior of capacitor in Initial and Steady state conditions?   1 M
3. Why Laplace transform method is superior to classical method?   1 M
4. Write the Laplace transform of following functions.   1 M
   i) Sinwt   ii) e^{at}
5. What is the condition for half wave symmetry and odd symmetry of function?   1 M
6. Define line spectra and phase angle spectra.   1 M
7. What is the condition for reciprocity in Z & Y parameters?   1 M
8. List the properties of RL impedance function.   1 M
9. Sketch the frequency response of high pass filters.   1 M
10. What is a high pass filter? In what respects it is different from a low pass filter?   1 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). i) Derive the Transient Response of Series RL with DC excitation.   5M
       ii) A series RC circuit consists of a resistor of 10Ω and capacitor of 0.1 F with a constant   5M
       voltage of 20v, is applied to the circuit at t=0.Obtain the current equation. Determine the
       voltage across the resistor and the capacitor.

OR

11. B). Derive the expression for the voltage across the inductor and capacitor in a series RLC   10M
        circuit (R = 5Ω, L = 5mH, C = 5µF) excited by a sinusoidal voltage of 100V, 50 Hz if the
        supply is connected at t= 0. Assume zero initial conditions.

12. A). Obtain the expression for i(t) for a series RC circuit for a sinusoidal excitation using   10M
        Laplace transform.

OR

12. B). In the initially relaxed RL circuit shown, the sinusoidal source of e = 100 sin (500 t) V is   10M
        applied at time t = 0. Determine the resulting transient current for time t > 0 using Laplace
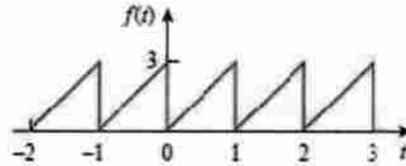   transform.
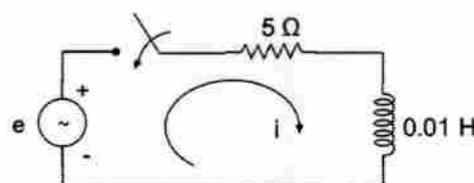
<div align="right">(P.T.O..)</div>

13. A). The Z-parameters of a two- port network are $Z11=15\Omega$, $Z12=Z21=6\Omega$ and $Z22=24\Omega$. 10M
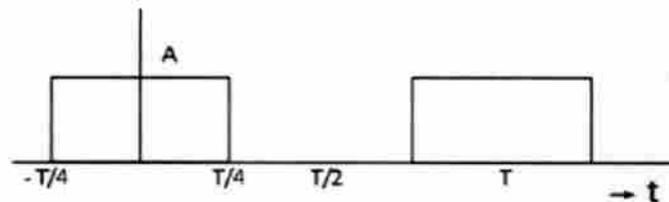Determine Y and ABCD parameters.

OR

13. B). Explain series parallel connection of two port networks. 10M

14. A). Determine the Fourier series of the sawtooth waveform shown in Figure. 10M

OR

14. B). Find the exponential Fourier series for the waveform shown below. Draw the Fourier 10M
spectrum.

15. A). Design a K type low filter with a design impedance of 300Ω and the cut off frequency at 10M
2 KHz.

OR

15. B). Derive the equations to find the inductances and capacitances of a constant K type high 10M
pass filter

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech III Semester Regular & Supplementary Examinations Nov/Dec-2025
Course Name : Electro Magnetic Fields
Course Code : A402302
Branch : Electrical & Electronics Engineering
Date & Session : 28-11-2025 FN   Duration: 3 hours   Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Define Curl of a vector.	1 M
2.	State Divergence Theorem.	1 M
3.	What is Gaussian surface?	1 M
4.	What is the expression for Maxwell first law?	1 M
5.	Define Current density.	1 M
6.	Write the expression for energy stored in an inductor.	1 M
7.	What is magnetic dipole?	1 M
8.	Write maxwell's third equation.	1 M
9.	What is displacement current?	1 M
10.	State faraday's law.	1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) State and prove strokes theorem. 6M
ii) Prove that $\nabla(F.G) = F \times (\nabla \times G) + G \times (\nabla \times F) + (F.\nabla)G = (G.\nabla)F$ 4M

OR

11. B). i) Write a short note on surface and volume integral. 5M
ii) Find the divergence and curl of the vector $\vec{A} = xyz\hat{a}_x + 5x^2y\hat{a}_y + (x^2z - yz^2)\hat{a}_z$ 5M

12. A). i) Using Gauss law, derive the expression for electric field intensity due to an infinite length of line charge. 6M
ii) Two 6nC point charges are located at (1,0,0) and (-1,0,0) in free space. 4M
a) Find V at P(0,0,z)   b) Find V_{max} c) Find Potential gradient

OR

12. B). i) Derive the expressions for Electric field intensity and potential due to an electric dipole. 6M
ii) An electric dipole located at the origin in free space has a moment 4M
$p = 3\,a_x - 2\,a_y + a_z$n C-m. Find V at: i) P(2,3,4) ii) r=2.5, $\theta=30^0$, $\varphi=40^0$

13. A). Derive Poisson's and Laplace's equations from fundamentals. 10M

OR

13. B). i) Derive the expression for the energy stored in the capacitor. 6M
ii) The capacitance of a parallel plate capacitor is 0.2µF. Potential difference between the plates is 2V. Calculate the energy stored by the capacitor. 4M

(P.T.O..)

14. A). i) Apply Biot-Savart's law to derive the expression for Magnetic Field Intensity due to circular loop placed on xy plane with radius 'r'. 6M

ii) Derive the expression for the force between two finite current carrying loops. 4M

OR

14. B). i) Find the Magnetic Field Intensity due to a infinite straight current carrying conductor. 6M

ii) Find the magnetic field intensity at the centre O of a square loop of sides equal to L and carrying 10A of current. 4M

15. A). i) State and explain faraday's laws of electromagnetic induction. 6M

ii) A parallel-plate capacitor with plate area of 5 cm^2 and plate separation of 3 mm has a voltage $50\sin10^3tV$ applied to its plates. Calculate the displacement current assuming $\varepsilon= 2\varepsilon_0$ 4M

OR

15. B). Write Maxwell's equation for static fields in differential and integral form. Explain how they are modified for time varying electric and magnetic fields. 10M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech III Semester Regular & Supplementary Examinations Nov/Dec-2025
Course Name	:	Electrical Machines-I
Course Code	:	A402301
Branch	:	Electrical & Electronics Engineering
Date & Session	:	01-12-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1.	Define the function of Commutator.	1 M
2.	Compare lap and wave windings.	1 M
3.	Write the condition for maximum efficiency.	1 M
4.	List out the applications of DC series motor.	1 M
5.	Define stray losses in a DC motor?	1 M
6.	List out the advantage of Hopkinson's test over Swinburne's test.	1 M
7.	State the principle of operation of a transformer.	1 M
8.	Define all-day efficiency.	1 M
9.	Define voltage regulation of a transformer.	1 M
10.	Compare of an auto-transformer over a two-winding transformer.	1 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). A 6-pole lap-wound dc generator has 240 coils of 2 turns each. Resistance of one turn is 0.03 ohm. The armature is 50 cm long and 40 cm diameter. Air-gap flux density of 0.6 T is uniform over pole shoe. Each pole subtends an angle of 40° mechanical. For armature speed of 1200 rpm, find (i) generated emf at no load and (ii) the terminal voltage at full load armature current of 40 A.   10M

OR

11. B). Explain the method of excitation of separately excited and self-excited DC Generator with neat circuit diagram.   10M

12. A). With neat circuit diagram explain the operation of speed control of Armature voltage control method.   10M

OR

12. B). With neat circuit explain the operation of 3-point starter.   10M

13. A). With neat sketch explain the operation of regenerative testing method of DC machines and its advantages.   10M

OR

13. B). With neat sketch explain the operation of Hopkinson's Test on a DC machines.   10M

(P.T.O..)

14. A). Draw and explain the equivalent circuit of a single-phase transformer. 10M

OR

14. B). Describe the operation of a transformer on no-load and on-load conditions. 10M

15. A). Describe the Sumpner's test on identical transformers. 10M

OR

15. B). Explain the efficiency and regulation of a transformer are predetermined from OC and SC tests. 10M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech III Semester Regular & Supplementary Examinations Nov/Dec-2025
Course Name	:	Power Systems-I
Course Code	:	A402303
Branch	:	Electrical & Electronics Engineering
Date & Session	:	03-12-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	What is the use of condenser in thermal power station?	1 M
2.	List out various important parts of a gas turbine plant.	1 M
3.	Define the Proximity effect.	1 M
4.	List the advantages of suspension type insulators.	1 M
5.	How does AC distribution differ from DC distribution?	1 M
6.	Distinguish between a feeder and a distributor.	1 M
7.	What are the limitations of Indoor substation?	1 M
8.	List of different types of AC distribution systems.	1 M
9.	Define Demand factor.	1 M
10.	Define tariff.	1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Explain the structure of power system with simple diagrams.   10M

OR

11. B). With neat sketch, explain the principle of operation of thermal power plant.   10M

12. A). Derive an expression for inductance and loop inductance of a single-phase transmission system.   10M

OR

12. B). An insulator string for 66kV line has 4 discs. The shunt capacitance between each joint and metal work is 10% of the capacitance of each disc. Find the voltage across the different discs and string efficiency.   10M

13. A). Derive the voltage expressions for a DC distributor fed at (i) one end   (ii) both the ends with concentrated loads.   10M

OR

13. B). Determine the cross sectional area of the d.c distribution shown. Take $\rho=1.78\times10^{-8}$ Ωm. The maximum voltage drop V_{FB} is not to exceed 10V. The conductor is fed at A.   10M
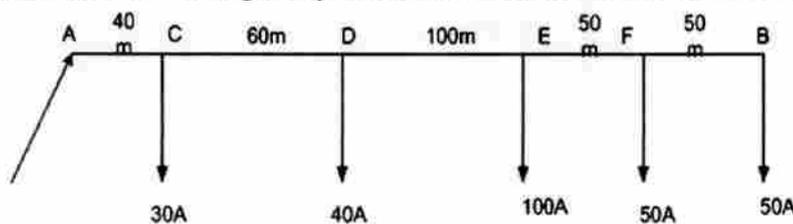
(P.T.O..)

14. A). Elaborate the following with neat diagrams: 10M
   (i) AC 3-phase, 3 wire distribution system.
   (ii) AC 3-phase, 4 wire system.

OR

14. B). Sketch neatly the various bus bar arrangements that are used in Substation.   10M

15. A). (i) What is load factor and diversity factor in the cost of the supply of electrical energy?   5M
   (ii) A consumer has the following connected loads: 10 lamps of 60 W each and two   5M
   heaters of 1000 W each. His maximum demand is 1500 W. On the average he uses 8
   lamps 5 hours a day and each heater for 3 hours a day. Find his average load, monthly
   energy consumption and load factor.

OR

15. B). (i) Describe the desirable characteristics of tariff.   5M
   (ii) The tariff in force is Rs. 150 per kVA of maximum demand and 8 paise per unit   5M
   consumed. If the load factor is 30%, find the overall cost per unit at (a) unity p.f. and
   (b) 0.7 p.f.

*****