H.T No: | | | | | | | | | | | **R18** **Course Code: A30211**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech V Semester Supplementary Examinations June/July-2025

Course Name: Power Systems-II

(Electrical & Electronics Engineering)

Date: 30.06.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. What is the effect of earth on the capacitance of transmission line and write the corresponding expression for capacitance — 2 M
2. Explain the difference between composite conductors and bundled conductors — 2 M
3. Define surge impedance loading of a transmission line. With formulae — 2 M
4. The surge impedance of a 50 miles long cable is 50Ω.For a 25 miles length cables what will be the surge impedance? — 2 M
5. Write advantage of corona phenomena &what are the factors affecting corona phenomena? — 2 M
6. In a Three phase overhead line the conductors have each a radius of 1.2 cm & are spaced equilaterally 3 meters apart. if the dielectric strength of air is 30 KV/cm (peak). find the critical disruptive voltage? — 2 M
7. Discus briefly the factors which affect sag? What is the effect of tower configuration on tower height & Right of way? — 2 M
8. Why voltage distribution is non uniform across the string of suspension type insulators? — 2 M
9. Discuss the advantages and disadvantages of underground cables — 2 M
10. Discuss the type of insulation used for under cables & Properties of the insulating material also? — 2 M

PART-B

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

11.A). Derive an expression for Capacitance of three phase double circuit lines with unsymmetrical spacing but transposed. — 10M

OR

11. B). Calculate the loop inductance of a single-phase line with two parallel conductors spaced 3.5m apart. The diameter of each conductor is 1.5cm, also calculate the reactance of the transmission line if frequency is 50Hz. — 10M

12. A). Derive expressions for Sending end voltage and current of a medium transmission line using Nominal π method and draw the equivalent circuit and phasor diagram. — 10M

OR

12. B). i) Explain the concept of surge impedance and wave velocity with respect to transmission lines. — 5M

ii) Explain Ferranti effect with necessary circuit & Phasor diagram? — 5M

(P.T.O.)

13. A). i) Explain Bewely's lattice diagram with one example 5M

ii) A surge of 110 kV travels on a line of surge impedance 500Ω and reaches a T junction. The surge impedances of the branch lines are 450 and 50. Determine the reflected and refracted values of currents and voltages 5M

OR

13. B). Define Critical disruptive voltage? explain the factors effecting corona loss. 10M

14. A). i) Explain different methods to improve the string efficiency across suspension type insulators. 5M

ii) In a string of four suspension insulators, if the voltage across second and third units is 13.2 kV and 20kV respectively find the total working voltage of the string 5M

OR

14. B). Explain sag & Tension calculations in an overhead line when the supports are at different levels. 10M

15. A). Explain the classification of Underground cables. 10M

OR

15. B). An 85 KV ,single core metal sheathed cable is to be graded by means of a metallic inters heath such that over all diameter of the cable is a minimum .the insulating material can be worked at 55 KV per cm. find the diameter of the inter sheath and the voltage at which it must be maintained? 10M

*****

H.T No: | | | | | | | | | | | **R18** **Course Code: A30209**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech V Semester Supplementary Examinations June/July-2025

Course Name: Control Systems

(Electrical & Electronics Engineering)

Date: 02.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

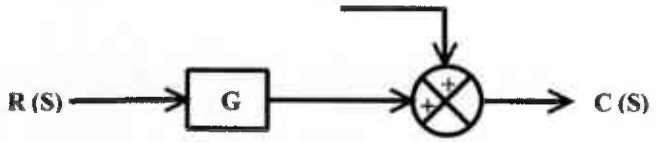
(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Compare open loop and closed control system. 2 M
2. Move the summing point before the block. 2 M



3. List the time domain specifications. 2 M
4. What is steady state error? 2 M
5. Give any two limitations of Routh-stability criterion. 2 M
6. State the effect of addition of poles in a root locus. 2 M
7. What do you understand frequency response plot? 2 M
8. What should be the values of gain margin and phase margin of a stable system? 2 M
9. Write any two properties of state transition matrix. 2 M
10. What are state variables? 2 M

PART-B

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

11.A). Reduce the block diagram shown in the Fig. 11(A) into its simple form and hence find the transfer function $\frac{C(s)}{R(s)}$. 10M

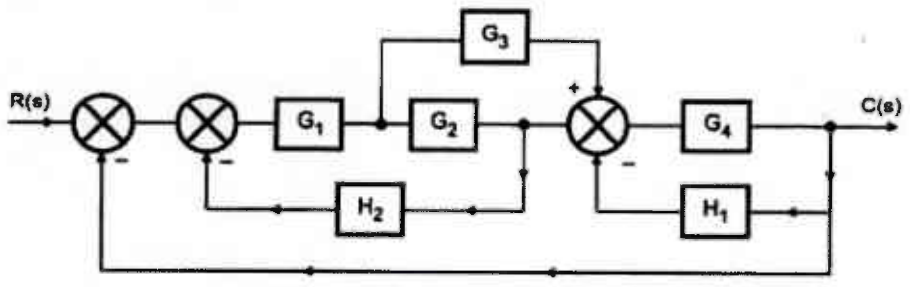
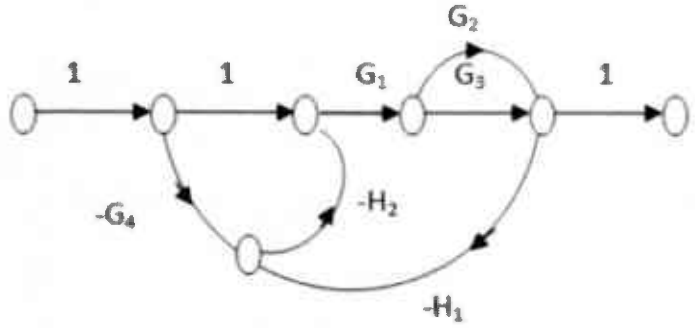


Fig. 11(A)

(P.T.O.)

OR

11. B). Find C(s)/R(s) using Mason's gain formula for signal flow graph shown below. 10M



12. A). Explain time domain response of second order under damped system with unit step input. 10M

OR

12. B). A unity feedback control system has an open loop transfer function $G(s)=\frac{10}{s(s+2)}$. Find the rise time, percentage overshoot, peak time and settling time for unit step input. 10M

13. A). Construct a Routh array and determine the stability of the system represented by the characteristics equation $s^5+s^4+2s^3+2s^2+3s+5=0$. Comment on the location of the roots of characteristic equation. 10M

OR

13. B). Sketch the Bode plot and for the transfer function $G(s)=\frac{Ks^2}{(1+0.2s)(1+0.02s)}$. Determine the value of K for the gain cross-over frequency to be 5 rad/sec. 10M

14. A). The open loop transfer function of a unity feedback control system is given by $G(s)=\frac{1}{s(1+s)(1+2s)}$. Sketch the polar plot and determine the gain margin and phase margin. 10M

OR

14. B). The open loop transfer function of a unity feedback system is given by $G(S)H(S)=\frac{4}{S(1+0.1S)(1+0.2S)}$ 10M

Draw the Nyquist plot and hence find out whether the system is stable or not.

15. A). Explain in detail the Concepts of Controllability and Observability. 10M

OR

15. B). Find the state transition matrix for the following system: 10M

$$\dot{x}=\begin{bmatrix}0 & 0 & -2\\ 0 & 1 & 0\\ 1 & 0 & 3\end{bmatrix}x \;;\; x(0)=\begin{bmatrix}0\\1\\0\end{bmatrix}$$

*****

H.T No: | | | | | | | | | | | **R18** **Course Code: A30210**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech V Semester Supplementary Examinations June/July-2025

Course Name: Power Electronics

(Electrical & Electronics Engineering)

Date: 07.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. List the power electronic applications. 2 M
2. What are the advantages of forced commutation for AC-DC converters? 2 M
3. What is meant by overlapping period in phase controlled converters? 2 M
4. Find the average output dc voltage of a single-phase semi-converter with Vs=230 V and firing angle of 30°. The converter is operating under continuous conduction. 2 M
5. Draw the output voltage and output current waveforms of buck converter. 2 M
6. Define Duty cycle. 2 M
7. What are the methods used for control the output voltage of inverter? 2 M
8. What do you mean by Harmonics? 2 M
9. List the advantages and disadvantages of cyclo-converter. 2 M
10. Differentiate between single phase ac voltage controller and single phase cyclo-converter. 2 M

PART-B

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

11.A). Explain the steady state and switching characteristics of MOSFET with the aid of diagrams 10M

OR

11. B). Analyze and draw the I-V and Switching characteristics of SCR. 10M

12. A). A 1-Φ fully controlled bridge converter is supplied from a 230V,50Hz. The load consist of R =10 ohm and a large inductance so as to render the load current constant. For a firing angle delay of 30^0 draw the related waveforms for firing angle and 10M
Determine
   (i) Average output voltage
   (ii) Average output current
   (iii) Average and rms values of thyristor currents
   (iv) Input power factor

OR

12. B). Explain the operation of 3-Φ fully controlled converter for RL load with necessary waveforms and circuit diagram. Also derive the expression for output voltage and current. 10M

13. A). Discuss the operation of a Boost converter with neat circuit diagrams and waveforms and derive the relation between input and output voltage. 10M

(P.T.O..)

OR

13. B). i) Explain the operation of buck-boost converter and derive the expression for output voltage. 5M

ii) The Buck converter has a resistive load, R = 20 Ω and input voltage, V_S = 220 V. When the chopper remains on, its voltage drop, V_{ch} = 1.5 V and chopping frequency, f = 10 kHz. If the duty cycle is 80 %, Estimate the: (i) average output voltage (ii) rms output voltage, and (iii) Chopper efficiency. 5M

14. A). Explain with neat sketches, the principle of operation of 3-Φ bridge inverter for 180 degree mode of operation. 10M

OR

14. B). Discuss the following in detail : 10M

i) Single pulse Modulation

ii) Sinusoidal PWM technique.

15. A). Draw the circuit of single phase voltage controller with antiparallel connection of two thyristors and an R load. Explain its working. Sketch load voltage and load current waveforms. Derive an expression for output voltage. 10M

OR

15. B). Explain the operation of a single phase bridge type step down cyclo-converter with the help of circuit diagram and waveforms. 10M

*****

H.T No: | | | | | | | | | | | **R18** **Course Code: A30213**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech V Semester Supplementary Examinations June/July-2025

Course Name: Electrical Measurements

(Electrical & Electronics Engineering)

Date: 09.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. List out the applications of AC potentiometers. 2 M
2. State the limitations of DC potentiometers. 2 M
3. List out the disadvantages of kelvin double bridge. 2 M
4. What are the limitations of loss of charge method? 2 M
5. List out the advantages of anderson's bridge. 2 M
6. What are the drawbacks of owen's bridge? 2 M
7. What is a B-H loop? 2 M
8. List out the applications of ballistic galvanometers. 2 M
9. What are the limitations of digital multimeters? 2 M
10. Write the applications of digital storage oscilloscopes. 2 M

PART-B

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

11.A). With the help of a neat circuit diagram explain Crompton's potentiometer and it's working. 10M

OR

11. B). A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50cm. 10M

12. A). Explain how to measure Low resistances using Kelvin's double bridge. Derive the necessary equations. 10M

OR

12. B). Derive the expression for the sensitivity of Wheatstone bridge. 10M

13. A). Explain the principle of Owen's bridge and derive the expression for unknown parameters. 10M

OR

13. B). Draw Maxwell's AC bridge and give the balance equation of resistance. 10M

14. A). Explain how core loss is determined by bridges and potentiometer. 10M

OR

14. B). Explain the operation of Ballistic Galvanometer with a neat diagram. 10M

15. A). Explain about the operation of successive approximation type digital voltmeter. 10M

OR

15. B). Explain the working of true RMS meter with neat diagram. 10M

*****