H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Semester Supplementary Examinations June/July-2025**
Course Name : **Control Systems**
Course Code : **A402305**
Branch : **Electrical & Electronics Engineering**
Date & Session : **30-06-2025 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 are the advantages of the closed loop control system? 1 M
2. What is a signal flow graph? 1 M
3. Define Steady state error. 1 M
4. What are the type-0 and type-1 system. 1 M
5. Write the necessary and sufficient condition for the stability in Routh Stability criterion. 1 M
6. Define Phase cross over frequency. 1 M
7. What is meant by compensation? 1 M
8. What is a lag lead compensator? 1 M
9. What is state transition matrix? 1 M
10. Define Observability. 1 M

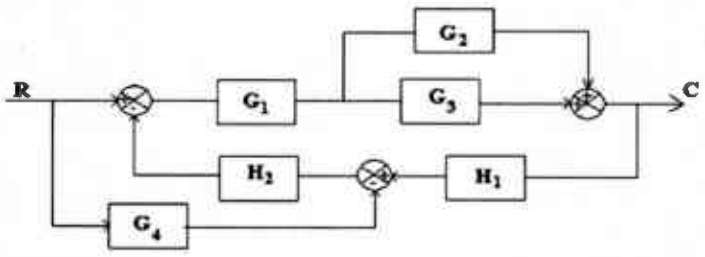
PART-B

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

11.A). i) Differentiate Open loop and Closed loop control systems. 5M
ii) Derive the transfer function of armature controlled DC servo motor. 5M

OR

11. B). Draw a signal flow graph for the block diagram shown below and find its closed loop transfer function. 10M



12. A). Define transient response specifications. i) Delay time ii) Rise time iii) Peak time iii) Peak overshoot iv) Settling time of second order system. 10M

OR

12. B). Find the various static error constants for a unity feedback control system whose open loop transfer function is 10M

$$G(S) = \frac{10(S+2)}{S^2(S+1)}$$

(P.T.O..)

13. A). Construct R-H criterion and determine the stability of a system representing the characteristics equation $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$. Comment on location of the roots of the characteristics equation. 10M

OR

13. B). The open loop transfer function of a unity feedback control system is given by $G(S) = \frac{K(S+9)}{S(S^2+4S+11)}$ sketch the root locus of the system. 10M

14. A). What is a lag compensator, obtain the transfer function of lag compensator and draw pole-zero plot? 10M

OR

14. B). Sketch the polar plot of the following transfer functions and from the plot determine the phase margin and gain margin 10M

$$G(S) = \frac{10(S+1)}{(S+10)^2}$$

15. A). System is characterized by the transfer function 10M

$\frac{Y(S)}{U(S)} = \frac{3}{S^3+5S^2+11S+6}$

state whether the system is controllable and observable.

OR

15. B). The state variable formulation of the system is given by 10M

$$[\dot{X}] = \begin{bmatrix} -3 & 2 \\ -1 & 0 \end{bmatrix}[X] + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \text{ and } Y = [1 \quad 0]X$$

Find (i) Transfer function (ii) State transition matrix

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech V Semester Supplementary Examinations June/July-2025**
Course Name : **Power System Protection**
Course Code : **A402309**
Branch : **Electrical & Electronics Engineering**
Date & Session : **02-07-2025 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 restriking voltage. 1 M
2. What is arc? 1 M
3. What is the classification of electromagnetic relays? 1 M
4. What is the application of over current relays? 1 M
5. What are the general faults occurring in the generators? 1 M
6. Write Function of Buchholz relay in protection. 1 M
7. Define solid neutral grounding. 1 M
8. Define solid reactance grounding. 1 M
9. Write Classification of lighting arresters. 1 M
10. Define impulse ratio. 1 M

PART-B

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

11.A). Explain the construction and operation of vacuum and SF6 circuit breakers. 10M

OR

11. B). Explain the principle of Resistance Switching. What is it necessary in air blast circuit? 10M

12. A). Compare the construction and operation of attracted armature and balanced beam relays. 10M

OR

12. B). Compare the construction and operation of impedance and reactance relay. 10M

13. A). Classify various types of over current relays? Discuss their area of application. 10M

OR

13. B). Describe the principle of differential system of protection applied to prior transformers. State the difficulties, and how they are overcome. 10M

14. A). Relate important difference between grounded and ungrounded neutral systems. 10M

OR

14. B). Compare Neutral grounding and solid grounding. 10M

15. A). Illustrate the process of generation of over voltages in power systems. 10M

OR

15. B). Describe the valve type lighting arrester. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech V Semester Supplementary Examinations June/July-2025**
Course Name	:	**Power Electronics**
Course Code	:	**A402306**
Branch	:	**(Electrical & Electronics Engineering**
Date & Session	:	**04-07-2025 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.	List out the turn off methods of SCR.	1 M
2.	Classify the types of power diodes.	1 M
3.	What is the function of freewheeling diodes in controlled rectifier?	1 M
4.	What is meant by commutation?	1 M
5.	Define Duty cycle.	1 M
6.	Name any two application of DC chopper.	1 M
7.	What are the advantages of PWM control in inverter.	1 M
8.	What is a current source inverter?	1 M
9.	List the merits and demerits of AC voltage controller.	1 M
10.	What are the two types of cyclo-converters?	1 M

PART-B

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

11.A).	Describe with circuit IGBT static I-V, transfer and turn –on characteristics.	10M
	OR	
11. B).	Explain the static V-I and switching characteristics of SCR.	10M
12. A).	Explain the operation of a single phase full converter with RLE load using relevant waveforms. Obtain the expressions for its average output voltage and RMS value of output voltage.	10M
	OR	
12. B).	A 230 V, 50 Hz supply is connected to load resistance of 12 Ω through half wave controlled rectifier. If the firing angle is 60°, Calculate (i) Average output voltage. (ii) RMS output voltage. (iii)Ratio of rectification and (iv)Transformer utilization factor.	10M
13. A).	Explain the working of buck converter with neat waveform and also derive the expression for average output voltage.	10M

(P.T.O..)

OR

13. B). A step-down DC Chopper has input voltage of a 230 V with 10 Ω load resistor connected, voltage drop across chopper is 2 V when it is ON. For duty cycle of 0.5. Calculate: (i) Average and RMS value of output voltage. (ii) Power delivered to load. 10M

14. A). Describe the operation of 3 phase bridge inverter for 120-degree mode of operation with aid of relevant phase and line voltage waveforms. 10M

OR

14. B). Describe in detail the various types of PWM methods available for voltage control employed in an inverter. 10M

15. A). Draw and Describe the circuit diagram of single phase AC voltage controller with RL load. Explain the circuit operation with necessary waveforms. 10M

OR

15. B). A single phase voltage controller has input voltage of 230 V, 50 Hz and a load of R=15 Ω. For 6 cycles ON and 4 cycles OFF. Calculate (i) RMS output voltage. (ii) Input power factor. (iii) Average and rms thyristor currents. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech V Semester Supplementary Examinations June/July-2025**
Course Name : **Microprocessors & Microcontrollers**
Course Code : **A402312**
Branch : **Electrical & Electronics Engineering**
Date & Session : **07-07-2025 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. Draw the flag register of 8086. 1 M
2. What are stack operation instructions? 1 M
3. List the features of 8259. 1 M
4. List the registers in 8255. 1 M
5. What is the difference between synchronous and asynchronous communication. 1 M
6. How does USART work in serial communication? 1 M
7. What is the significance of PSEN signal in 8051? 1 M
8. What is the memory capacity of 8051 micro controller? 1 M
9. How many bytes of bit addressable memory are present in 8051 based microcontrollers? 1 M
10. To get 2 displayed by a 7 segment display, what should be the combination of 8051 pins (P1.7 – P1.0)? 1 M

PART-B

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

11.A). Briefly explain about the signal description of 8086 processor 10M

OR

11. B). Draw the timing diagrams of minimum mode write operation and explain in detail. 10M

12. A). Draw the internal architecture of 8259 PIC and explain the operation of each block in detail. 10M

OR

12. B). Draw the Interfacing diagram of 8257 DMA with 8086 CPU and explain its operation. 10M

13. A). Draw the block diagram of USART and explain about each block. 10M

OR

13. B). Write short notes on (i) IEEE-488 and (ii) Serial communication Methods. 10M

14. A). Explain the following registers (i) IP (ii) IE (iii) PCON (iv) TMOD. 10M

OR

14. B). Discuss the interrupt structure of 8051 Microcontroller. 10M

15. A). Write 8051 program to generate 2khz square wave on pin P1.0 port1 using Timer interrupt. 10M

OR

15. B). Develop the interfacing diagram of stepper motor with 8051 and explain. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech V Semester Supplementary Examinations June/July-2025**
Course Name : **Utilization of Electrical Energy**
Course Code : **A402402**
Branch : **Electrical & Electronics Engineering**
Date & Session : **09-07-2025 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 electrical drive. 1 M
2. List out the advantages of an electrical drive. 1 M
3. List few applications of dielectric heating. 1 M
4. Define resistance arc welding. 1 M
5. Define luminous efficiency. 1 M
6. Why tungsten is selected as the filament material? 1 M
7. What are the advantages of electric traction? 1 M
8. Discuss the use of speed time curve. 1 M
9. What is meant by tractive effort? 1 M
10. What are the special features of traction motors? 1 M

PART-B

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

11.A). What are the factors influencing the choice of electrical drives? 10M

OR

11. B). i) What is the Classification of Electrical Drives? 5M
ii) What are the advantages and disadvantages of Electric drives? 5M

12. A). What is induction heating? What are the characteristics of induction heating? Explain Ajex-wyatt furnace. 10M

OR

12. B). With neat diagram describe the different type of arc welding. 10M

13. A). Determine the average illumination of a room measuring 9.15m by 12.2 m illuminated by halogen 150-watt Lamps. The luminous efficiency of lamps can be taken as 14 lumen/watt and coefficient of utilization is 0.35. 10M

OR

13. B). Explain about the following lamps with neat diagrams. 10M
(i) Incandescent lamp
(ii) Sodium Vapour lamp

(P.T.O..)

14. A). Describe how Plugging, Rheostatic braking and Regenerative braking are employed with DC series motor. 10M

OR

14. B). Draw the speed – Time curve of a traction system. Also explain various periods and the action. 10M

15. A). (i) Discuss the speed-time curves for urban service. 5M

(ii) How the electric traction system is classified? Briefly discuss? 5M

OR

15. B). A train has schedule speed of 50 km/hr over a level track distance between stations being 2 km. Duration of stop is 20 sec. Assuming braking retardation of 5km/hr/sec and maximum speed 35% greater than average speed, calculate acceleration required to run the service? 10M

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