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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **CMOS VLSI Design**
Course Code : **A402314**
Branch : **Electrical & Electronics Engineering**
Date & Session : **19-06-2025 AN** **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 the different types of MOSFET. 1 M
2. Sketch the Pass transistor. 1 M
3. Draw the schematic of NAND and NOR gate 1 M
4. Sketch and explain the switch logic. 1 M
5. Define parasitic capacitance. 1 M
6. Describe rise time and fall time. 1 M
7. Define 2-bit parity generator. 1 M
8. Sketch 1 bit SRAM cell. 1 M
9. Define CMOS testing. 1 M
10. Define observability with respect to testing. 1 M

PART-B

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

11.A). Explain with neat diagrams the various NMOS fabrication technology. 10M

OR

11. B). Describe basic electrical properties of MOSFET i.e Ids-Vds relationships. 10M

12. A). Explain in detail about the scaling concept in VLSI circuit design and Explain about Lambda based design rules. 10M

OR

12. B). Sketch the static CMOS circuit for the expression. i) Y= (AB+CE+BD) ii) X= (AB+C(A+B))′ 10M

13. A). Explain Dynamic CMOS logic and the time delays in MOS Transistor. 10M

OR

13. B). Sketch the static CMOS circuit and stick and layout diagram for the expression i) Y= (ABCD)′ ii) Y= [D(A+BC)]′. 10M

14. A). i) Sketch and explain the operation of four transistor DRAM cell. 5M
ii) Explain the working principle of Ripple Carry Adder 5M

OR

14. B). Explain with neat diagram the operation of barrel shifter. 10M

15. A). Explain the architecture of CPLD with neat diagram. 10M

OR

15. B). Discuss the drawbacks of PLA? How PLA used to implement combinational and sequential logic circuits. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Power Semiconductor Drives**
Course Code : **A402310**
Branch : **Electrical & Electronics Engineering**
Date & Session : **21-06-2025 AN** **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 electrical drives?	1 M
2.	Write the basic performance equations of a separately excited D.C motor	1 M
3.	What are the advantages of electrical braking over mechanical braking?	1 M
4.	Explain dynamic braking.	1 M
5.	State separately the speed control methods of induction motor from stator side and rotor side.	1 M
6.	List the difference between CSI and VSI?	1 M
7.	Explain the principle of slip power recovery used in control of induction motor.	1 M
8.	What are the limitations of slip power recovery schemes?	1 M
9.	When operating in true synchronous mode, why the frequency must be changed in small steps?	1 M
10.	List out the advantages of self-control of synchronous motor?	1 M

PART-B

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

11.A).	Explain the operation of single phase semi-controlled converter connected to DC separately excited motor and obtain voltage current wave forms for continuous current operation.	10M
	OR	
11. B).	100 kW, 440V, 960 rpm DC motor is operated at 750 rpm and developing 75% rated torque is controlled by 3-phase, six-pulse thyristor converter feeding from a 3-phase, 415V, 50Hz a.c supply. If the back emf at rated speed is 405V, determine the triggering angle of the converter.	10M
12. A).	What is electric braking? Explain various types of braking. Discuss about four Quadrant Operation of DC Drives by single phase dual converter.	10M
	OR	
12. B).	A 220 V, 20 A, 1000 rpm separately excited dc motor having an armature resistance of 2 Ω is controlled by a chopper. The chopping frequency is 500 Hz and the input voltage is 230 V. Calculate the duty ratio for a motor torque of 1.25 times rated torque at 600 rpm.	10M
13. A).	Explain the operation of variable frequency control of induction motor by voltage Source Inverter. Compare Voltage Source Inverter and Current Source Inverter.	10M

(P.T.O..)

OR

13. B). A 440V, 3 phase, 50 Hz 6 pole 945 RPM delta connected Induction Motor has the following parameters referred to the stator. $R_S = 2.0\ \Omega$, $R_r = 2.0\ \Omega$, $X_S = 3\ \Omega$, $X_r = 4\ \Omega$. When driving a fan load at rated voltage, it runs at rated speed. The motor speed is controlled by stator voltage control. Determine motor terminal voltage, current and torque at 800 RPM. 10M

14. A). Explain with neat diagram and equations about the static Scherbius system of slip power recovery scheme with sub synchronous and super synchronous modes of control. 10M

OR

14. B). Explain static rotor resistance technique to control the speed of wound rotor induction motor and plot the speed and torque characteristics. 10M

15. A). With a neat block diagram, explain the separate control of synchronous motor drive. Also mention its applications. 10M

OR

15. B). Explain the closed loop operation of synchronous motor drives with neat block diagram. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Non-Conventional Energy Sources**
Course Code : **A402404**
Branch : **Electrical & Electronics Engineering**
Date & Session : **28-06-2025 AN** **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 conventional and non-conventional energy sources. 1 M
2. What are limitations of solar energy? 1 M
3. What are the origins of winds? 1 M
4. Classify the wind turbines. 1 M
5. Define the process of photosynthesis. 1 M
6. What is the origin of biomass energy? 1 M
7. How many types of wells in Geothermal sources? 1 M
8. Mention difference between wave and tidal energies. 1 M
9. What is Joule Thomson Effect? 1 M
10. What is the need for direct energy conversions? 1 M

PART-B

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

11.A). What is the status of non-conventional energy sources in India and their future prospect? 10M

OR

11. B). Explain the construction and working of flat plate collector with neat sketch. 10M

12. A). Explain the construction and principle operation of VAWT system. 10M

OR

12. B). Explain the horizontal axis wind turbine with neat sketch. 10M

13. A). Discuss the combustion characteristics of bio-gas. 10M

OR

13. B). Discuss the types of bio gas digestion and explain anaerobic digestion with neat diagrams. 10M

14. A). Describe the closed cycle OTEC system mention its advantages and limitations. 10M

OR

14. B). Discuss the principle operation of tidal energy with neat diagrams and their limitations. 10M

15. A). Explain any one type of fuel cell with its working principle. 10M

OR

15. B). Explain the principle working of MHD generators. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations July-2025**
Course Name : **Electrical Distribution Systems**
Course Code : **A402416**
Branch : **Electrical & Electronics Engineering**
Date & Session : **01-07-2025 AN** **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. Name the four major classifications of electrical loads. 1 M
2. Differentiate between loss factor and load factor. 1 M
3. What is the perpendicular bisector rule in substation placement? 1 M
4. State the drawbacks of improper substation location. 1 M
5. Define symmetrical and unsymmetrical faults. 1 M
6. List the advantages of coordination of protective devices. 1 M
7. What is the power factor correction? Why is it required? 1 M
8. Mention two effects of installing shunt capacitors on a distribution system. 1 M
9. What is the main objective of voltage control in a power system? 1 M
10. What is the role of an Automatic Voltage Regulator (AVR)? 1 M

PART-B

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

11.A). List and explain the key factors affecting the selection of feeder voltage level. 10M

OR

11. B). A feeder has a peak load of 500 kW, and the average load over a 24-hour period is 300 kW. The total energy loss over the same period is 720 kWh. Calculate: 10M
(a) Load Factor
(b) Loss Factor
(c) Determine the relationship between the two and discuss the result.

12. A). Describe the concept of the service area of a substation with multiple feeders. How is load divided among 'n' primary feeders? 10M

OR

12. B). A 1- Φ, feeder circuit has total impedance of (0.5 + j 0.2) Ω, $V_R = 230$ V & $I_R = 5\angle -30^0$ A, Determine, 10M
(a) Power factor of the load
(b) Load power factor for which the voltage drop is maximum
Load power factor for which the impedance angle is maximum. Derive the formula used.

13. A). What is coordination of protective devices? Explain the objectives and general procedure for achieving protection coordination. 10M

(P.T.O..)

OR

13. B). Describe following types of faults in distribution systems with neat diagrams and necessary equations. 10M

(a) line-to-line (LL)

(b) line-to-line-to-ground (LLG)

14. A). Explain how capacitor banks are economically justified in distribution systems. Mention cost-benefit considerations. 10M

OR

14. B). A 3- phase substation transformer has a name plate rating of 7250 KVA and a thermal capability of 120% of the name plate rating. If the connected load is 8816 KVA with a 0.85 of lagging power factor, determine the following: 10M

(i) The KVAR rating of the shunt capacitor bank required to decrease the KVA load of the transformer to its capability level.

(ii) The power factor of the corrected level.

The KVAR rating of the shunt capacitor bank required to correct the load p.f. to unity.

15. A). Describe the role and effect of shunt capacitors and series capacitors in voltage control with phasor diagrams. 10M

OR

15. B). Explain the role and operation of a Line Drop Compensator (LDC) in voltage control, with the help of a neat circuit diagram and phasor diagram. 10M

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