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**R22**



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
**(UGC AUTONOMOUS)**

**Examination** : B.Tech VI Semester Supplementary Examinations Nov/Dec-2025  
**Course Name** : CMOS VLSI Design  
**Course Code** : A402314  
**Branch** : Electrical & Electronics Engineering  
**Date & Session** : 09-12-2025 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. State about fabrication process. 1 M
2. Sketch the transfer characteristics of CMOS Inverter. 1 M
3. Draw the stick diagram of NMOS Inverter. 1 M
4. Explain the difference between stick and layout diagram. 1 M
5. Define parasitic capacitance. 1 M
6. Define the following a) fan-in b) fan out. 1 M
7. Explain the difference between EPROM and EEPROM. 1 M
8. List the various serial access memories. 1 M
9. Define standard cells. 1 M
10. Demonstrate the difference between PAL and PLA. 1 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss the following: i)  $g_m$  ii)  $g_{ds}$  iii) Fan-in iv) Fan-out. 10M
- OR**
11. B). Derive the relationship between  $I_{ds}$  vs  $V_{ds}$ . 10M
12. A). Discuss VLSI Design flow with neat diagram and sketch the circuit diagram, stick diagram of 2-input CMOS NAND gate. 10M
- OR**
12. B). Demonstrate the stick diagram of NMOS and CMOS Inverters. 10M
13. A). Describe the method for driving large capacitive loads. 10M
- OR**
13. B). Demonstrate CMOS Inverter pair delays and evaluate the OR gate using NMOS and CMOS Inverter and state the differences. 10M
14. A). Demonstrate synchronous and asynchronous counter. 10M
- OR**
14. B). Design a 6T SRAM with its read and write operations. 10M
15. A). Sketch the basic structure of parallel scan and explain how it reduces the long scan chains. 10M
- OR**
15. B). Implement the following function using PAL 10M  
 $F_1(x,y,z)=\Sigma(1,2,4,5,7)$   
 $F_2(x,y,z)=\Sigma(0,1,3,5,7).$

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

**Examination** : B.Tech VI Semester Supplementary Examinations Nov/Dec-2025  
**Course Name** : Power Semiconductor Drives  
**Course Code** : A402310  
**Branch** : Electrical & Electronics Engineering  
**Date & Session** : 10-12-2025 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. Draw the Speed – Torque Characteristics of DC series motor controlled by single phase semi converter. 1 M
2. What are the advantages and disadvantages of 3-phase fully controlled converters over single phase fully converters? 1 M
3. What are the advantages in operating choppers at high frequency? 1 M
4. What do you mean by four quadrant operation? 1 M
5. How do you control the speed of an induction motor? 1 M
6. What are the advantages of six pulse converter? 1 M
7. List out the applications of static Kramer's drive. 1 M
8. What are the limitations of slip power recovery schemes? 1 M
9. What is PWM based Voltage Source Inverter 1 M
10. Write the principle of self-control of synchronous motor 1 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Discuss the working of three phase fully-controlled converters connected to DC series motor and obtain voltage, current wave forms. 10M

**OR**

11. B). A 200V, 875 rpm, 150A separately excited dc motor has an armature resistance of 0.06 ohm. It is fed from a single phase fully controlled rectifier with an a.c source voltage of 220V, 50Hz. Assuming continuous conduction mode. Calculate firing angle for rated motor torque and 750 rpm. 10M

12. A). What is electric braking? Explain various types of braking. Draw and explain the block diagram of closed loop operation of DC Motor drive. 10M

**OR**

12. B). Explain the operation of Two quadrant chopper feeding to a DC separately excited motor and draw the wave forms for continuous current operation 10M

13. A). Explain the operation and control of Induction motor by AC voltage controller with relevant waveforms. 10M

**OR**

13. B). With neat diagrams, explain the operation of a Cyclo-converter fed 3-phase induction motor. 10M

**(P.T.O.)**

14. A). Explain the static Kramer Drive operation for an induction motor with a circuit diagram. 10M

**OR**

14. B). A 3-phase, 400V, 50Hz, 4 pole, 1400rpm, star connected wound rotor induction motor has the following parameters referred to the stator  $R_1 = 2\Omega$ ,  $R_2' = 3\Omega$ ,  $X_1 = X_2' = 3.5\Omega$ . The stator to rotor turns ratio is 2. The motor speed is controlled by static Scherbius drive. The inverter is directly connected to the source. Determine.

(i) The speed range of the drive when  $\alpha_{\max} = 165^\circ$ .

(ii) The firing angle for 0.4 times the rated motor torque and speed of 1200 rpm.

15. A). With a block diagram, explain Load commutated CSI fed synchronous Motor and explain Speed-Torque characteristics. 10M

**OR**

15. B). Describe VSI fed synchronous motor drive in detail with a suitable block diagram. 10M

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<b>Examination</b>	: B.Tech VI Semester Supplementary Examinations Nov/Dec-2025	
<b>Course Name</b>	: Non-Conventional Energy Sources	
<b>Course Code</b>	: A402404	
<b>Branch</b>	: Electrical & Electronics Engineering	
<b>Date &amp; Session</b>	: 13-12-2025 AN	<b>Duration: 3 hours</b> <span style="float:right"><b>Max. Marks: 60</b></span>

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

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|--|-----|
| 1. Define extra-terrestrial solar radiation.   | 1 M |
| 2. What is solar pond?   | 1 M |
| 3. Recall the total wind energy potential in Telangana & Andhra Pradesh respectively, in Giga Watts. | 1 M |
| 4. List out any 4 types of wind turbines.  | 1 M |
| 5. Name two of the anaerobic digestors of India.   | 1 M |
| 6. State I.C engine's principle.   | 1 M |
| 7. Recall geo-thermal resources in India.  | 1 M |
| 8. Find wave energy potential in the world.  | 1 M |
| 9. Write the principle of direct energy conversion.  | 1 M |
| 10. What is the need for direct energy conversion?   | 1 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

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|--|-----|
| 11.A). Classify the solar collectors and elaborate.  | 10M |
| <b>OR</b>  |     |
| 11. B). Interpret the principle of photovoltaic power generation   | 10M |
| 12. A). Show performance characteristics of a typical wind-turbine and explain.  | 10M |
| <b>OR</b>  |     |
| 12. B). A wind turbine operates in an airflow with a velocity of 12 m/s. If the downstream wind velocity is 8 m/s, calculate:<br>i) The power extracted by the turbine.<br>ii) The efficiency of the turbine and compare it with the Betz limit.<br>(Assume air density, $\rho = 1.225 \text{ kg/m}^3$ , and swept area, $A = 50 \text{ m}^2$ .) | 10M |
| 13. A). Compare anaerobic and aerobic digestion in detail.   | 10M |
| <b>OR</b>  |     |
| 13. B). Apply the bio-gas energy in different applications, in detail.   | 10M |
| 14. A). Demonstrate the working of open loop OTEC system with the help of an example plant ever existed.   | 10M |
| <b>OR</b>  |     |
| 14. B). List the types of geo-thermal wells and explain any one method of harnessing geo-thermal energy.   | 10M |
| 15. A). Model Carnot cycle and explain the characteristics.  | 10M |
| <b>OR</b>  |     |
| 15. B). Illustrate the applications of direct energy conversion.   | 10M |

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