H.T No: | | | | | | | | | | | R18 | Course Code: A30216

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Computer Methods in Power Systems

(Electrical & Electronics Engineering)

Date: 10.01.2025 AN **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 are the advantages of matrix representation of power system operation? 2 M
2. Name the diagonal elements and non-diagonal elements of Z_{bus} 2 M
3. What are the data required for a load flow study? 2 M
4. What is the necessary for a slack bus? 2 M
5. How do short circuits occur on a power system? 2 M
6. What are the different types of faults which occur in a power system? 2 M
7. What are the symmetrical components? 2 M
8. Write down the equation for fault current in case of double line to ground fault? 2 M
9. List three factors which affect transient stability limit? 2 M
10. If two machines with inertias M_1 and M_2 are swinging together. What will be the inertia of the equivalent machine? 2 M

PART-B

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

11.A). Explain the formation of Y_{bus} by singular transformation? 10M

OR

11. B). The bus impedance matrix of a network is 10M

	(1)	(2)	(3)	(4)
(1)	j0.105	j0.105	j0.045	j0.105
(2)	j0.105	j0.105	j0.045	j0.105
(3)	j0.045	j0.045	j0.105	j0.405
(4)	j0.105	j0.105	j0.405	j0.325

To this an element 2-3 with an impedance of j0.25 is added. Obtain the modified bus impedance matrix?

12. A). Derive Newton-Raphson power flow analysis algorithm and give steps for implementation of the algorithm? 10M

OR

12. B). Discuss the various types of buses and their significance in detail. Derive the static load flow equation of a power system? 10M

(P.T.O..)

13. A). A three phase transmission line operating at 33 KV and having a resistance and reactance of 5 ohm and 20 ohm respectively is connected to a generating station bus bar through a 15 MVA step up transformer which has a reactance of 0.06 pu. Two generators, one 10 MVA having 0.1 pu reactance and other 5 MVA having 0.075 pu, reactance are connected to the bus bars. Calculate the short circuit MVA and the fault current when a three phase short circuit occurs at i) the high voltage terminals of the transformer ii) at the load end of the transmission line. 10M

OR

13. B). Explain the different types of reactors with a diagram and mention their advantages and disadvantages. 10M

14. A). Find the fault current when an LG fault occurs at the terminals of an unloaded generator? 10M

OR

14. B). A three phase, 6.9 KV, 10 MVA alternator has $X_1 = X_2 = 15\%$ and $X_0 = 5\%$. The neutral is grounded through a reactor of 0.381 ohm. Find the sub transient current in the faulted phase, when a single line to ground fault takes place? 10M

15. A). State and explain swing equation by point-by-point method. 10M

OR

15. B). A system turbine generator unit is rated 100MW at 0.8 pf. Rated voltage is 13.2 KV, Number of poles= 4, Rated frequency is 50 HZ. Moment of inertia 36000 kg m^2. Calculate i) the kinetic energy in Mega Joule at rated speed ii) Inertia Constant iii) Inertia Constant M in MJ-Sec per electrical degree iv) M in per unit on 100 MVA base. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30217**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Power Semiconductor Drives

(Electrical & Electronics Engineering)

Date: 16.01.2025 AN **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.	State the advantages of Thyristor controlled drives.	2 M
2.	Write the applications of three phase fully controlled converters.	2 M
3.	Define plugging.	2 M
4.	What is the purpose of dual converter?	2 M
5.	List the types of choppers.	2 M
6.	In which quadrants the type A and C choppers operable?	2 M
7.	How AC Voltage Controllers are useful in operating an induction motor?	2 M
8.	How the Scherbius drive is different from the Kramer drive?	2 M
9.	Name different methods that are used for control of synchronous motor.	2 M
10.	List applications of VSI, CSI, and Cycloconverter fed synchronous motor.	2 M

PART-B

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

11.A).	Draw speed-torque characteristics of single phase full converter fed dc separately excited motor drive. Explain its operation for continuous conduction.	10M
	OR	
11. B).	Explain the operation of three phase full converter fed DC series motor. Describe its speed control characteristics with respect to change in firing angle.	10M
12. A).	With the help of schematic diagram and waveforms, explain briefly the working of single phase dual converter fed dc motor for its multi-quadrant operation.	10M
	OR	
12. B).	Draw the block diagram of closed loop operation of DC drive and briefly explain the modules present in it.	10M
13. A).	Explain four quadrant chopper fed separately excited DC motor with schematic diagram and waveforms.	10M
	OR	
13. B).	Derive expressions for the average torque for the dynamic braking of a chopper controlled separately excited motor.	10M
14. A).	Draw and explain the working of Static Kramer drive for speed control of a three phase induction motor.	10M

(P.T.O..)

OR

14. B). A 440V, 3 phase, 50Hz 6 pole 945 RPM delta connected induction motor parameters referred to the stator are R_1=2 Ω, R_2 = 2 Ω, X_1= 3 Ω, X_2= 4 Ω. When driving a fan load at rated voltage, it runs at rated speed. The motor speed is controlled by stator voltage. Determine motor terminal voltage, current and torque at 600 RPM. 10M

15. A). Explain variable frequency control of synchronous motor with pulse width modulation. 10M

OR

15. B). Compare self and separate control of synchronous motor drives. Explain closed loop speed control of synchronous motor drive fed from VSI. 10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30235**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Non Conventional Energy Sources

(Electrical & Electronics Engineering)

Date: 18.01.2025 AN **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.	Write a note on total solar energy received in India.	2 M
2.	What are the advantages and limitations of renewable energy sources?	2 M
3.	What are the disadvantages of wind power?	2 M
4.	What are the advantages of vertical axis wind turbine?	2 M
5.	Mention some organic materials used in bio-mass plant.	2 M
6.	Explain the classification of biogas plants.	2 M
7.	What are the main types of OTEC power plants?	2 M
8.	What are the advantages and limitations of tidal power generation?	2 M
9.	What are the limitations of Carnot cycle?	2 M
10.	What are the features of Carnot cycle?	2 M

PART-B

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

11.A).	i) Explain in detail the different types of solar energy measuring instruments. ii) Explain solar pond in brief.	5M 5M
	OR	
11. B).	i) Give an over view of conventional and non-conventional sources of energy sources with reference to India. ii) Explain following angles used in solar radiation analysis: a) Latitude of location b) Hour angle c) Solar azimuth angle d) Zenith angle e) Declination angle.	5M 5M
12. A).	Explain Horizontal axis wind mills with neat sketch.	10M
	OR	
12. B).	i) What is meant by pitch control and Yaw control? ii) What is the principle used in the measurement of speed of the wind?	5M 5M
13. A).	i) What is the difference between Bio mass and biogas? ii) Explain about dry and wet fermentation process.	5M 5M
	OR	
13. B).	Explain the principles of Bio-Conversion and types of biogas digesters with neat diagram.	10M

(P.T.O..)

14. A). With the help of neat diagram, explain the working of geo thermal-preheat hybrid. 10M

OR

14. B). i) Describe various energy extraction technologies used with hydrothermal resources. 5M

ii) Describe the working of open cycle OTEC plant. What are the advantages and disadvantages of OTEC plant? 5M

15. A). Explain Carnot cycle? And write what is the need of DEC. 10M

OR

15. B). Explain the Principles of DEC with neat sketch and limitations. 10M

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