Roll No. .....

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B. Tech. 6th Semester (EE)

Examination – May, 2023

POWER ELECTRONICS

Paper : PCC-EE-306-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Explain the block diagram of Power Electronics.

(b) Discuss the characteristics features of TRIAC.

(c) Explain dI/dt protection of SCR.

(d) What is the reason for connecting SCRs in series. Write the expression for Series string efficiency.

(e) List the function of freewheeling diodes in controlled rectifier.

(f) Write and explain the expression for duty cycle of DC chopper. $2.5 \times 6 = 15$

SECTION – A

2. (a) Compare MOSFET and Power Transistor. 7.5

(b) Discuss the merits and demerits of MOSFET. List some applications of MOSFET. 7.5

3. Explain the construction and static characteristics of IGBT. 15

SECTION – B

4. Explain the Turn ON and Turn OFF characteristics of SCR. 15

5. Discuss Commutation techniques and explain any two of them in detail. 15

SECTION – C

6. (a) Draw and explain single phase full wave converter in bridge configuration supplying highly inductive load. 7.5

(b) Compare fully controlled and half controlled converters. 7.5

7. Draw and explain the Three phase half controlled converter operation with RL load and derive the expression for DC output voltage. 15

SECTION – D

8. Explain the operation of I80-degree mode three-phase voltage source inverter (VSI). 15

9. With the aid of a basic circuit and waveforms explain basic principal and operation of a step down chopper with resistive load. Obtain the expressions for DC output voltage, output power and chopper efficiency. 15

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B. Tech. 6th Semester (EE) (Elective-IV) Examination – May, 2023

ADVANCE ELECTRIC DRIVES

Paper : PEC-EE-18-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Give classification of PWM technique used in Inverter. $2.5 \times 6 = 15$

   (b) What is meant by Scalar control and Vector control of Induction motor drive ?

   (c) Compare BLDC motor with PMSM motor.

   (d) Draw block diagram of BLDC motor.

(e) Describe the evolution of Switched Reluctance motor drive.

(f) What is use of DSP in motion control of electric drives ?

UNIT – I

2. (a) What is PWM technique ? Explain its principle. 7.5

(b) Explain in detail Space vector PWM technique. 7.5

3. What is the need of PWM rectifiers ? Explain in detail the working of Three-phase diode rectifier with boost chopper for line current wave shaping. 15

UNIT – II

4. Explain in detail Open loop V/f speed control using voltage - fed Inverter 15

5. Draw and explain Block diagram of Direct torque and flux control of Induction motor drive. 15

UNIT – III

6. Explain the concept of speed and torque control in PMSM motor. 15

7. Write short notes on : 15

(a) Modelling of Synchronous machine

(b) Open loop V/f control of Synchronous machine

UNIT – IV

8. Write short notes on : 15

(a) Speed and torque control of SRM

(b) Various topologies for SRM drive

9. Explain various DSP topologies available for motion control of Electric drive. 15

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B. Tech. 6th Semester (EE) (Elective - III) Examination – May, 2023

POWER SYSTEM PROTECTION

Paper : PEC-EE-06-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Explain protection against failure of excitation in brief.

   (b) What is Over-current protection in power system ?

   (c) What do you mean by relay testing ?

(d) Explain df/dt relays in brief.

(e) Explain the function of under frequency relays.

(f) Explain sequence networks in brief. $6 \times 2.5 = 15$

SECTION – A

2. What is relay ? How relays are classified ? Explain in detail. 15

3. Explain generator protection scheme in detail. 15

SECTION – B

4. Discuss over current protection and over current relay co-ordination in detail. 15

5. Explain transformer protection scheme. What is buchholz's relay ? Discuss its operation. 15

SECTION – C

6. Explain bus bar protection and bus bar arrangement schemes in detail. 15

7. Explain simulation of transients using Electro-Magnetic Transients (EMT) programs. 15

SECTION – D

8. What is Wide-Area Measurement Systems (WAMS) ? Explain the Application of WAMS for improving protection systems. 15

9. Explain the effect of power swings on distance relaying. 15

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B. Tech. 6th Semester (EE) Examination – May, 2023

ELECTRONICS DESIGN LABORATORY

Paper : LC-EE-310-G

Time : Three hours] *[Maximum Marks : 50*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting ***one*** question from each Section. Question No. **1** is ***compulsory.*** All questions carry equal marks.

1. (a) Explain the term noise in electronic systems.

(b) List various electronic instruments.

(c) Define sensor conditioning.

(d) Discuss applications of CRO. $2.5 \times 4 = 10$

SECTION – A

2. (a) Distinguish between direct and indirect method of measurement. Support your answer giving an example. 5

(b) Discuss the Signal conditioning circuit in short. 5

3. Explain the elements of Generalized Measurement System. 10

SECTION – B

4. Explain the interfacing of analog and digital systems in detail. 10

5. Write a note on analog system design. 10

SECTION – C

6. Explain interfacing of LCD with 8051 microcontroller. 10

7. Write short notes on :

   (a) FPGAs 5

   (b) CPLDs 5

SECTION – D

8. Explain properties of ideal operational amplifier. 10

9. Describe the specifications of DACs with examples. 10

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B. Tech. 6th Semester (EE) (Elective-V) Examination – May, 2023

CONVENTIONAL AND RENEWABLE ENERGY RESOURCES

Paper : OEC-EE-08-G

Time : Three hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Question No. 1 is *compulsory*. Attempt *four* more question from the sections **A, B, C & D** by selecting at least one question from each Section.

1. (a) Explain the term Energy Sources. $6 \times 2.5 = 15$

(b) What is Inter Connected Generation & what are it applications ?

(c) What are the prospects of solar energy in India ?

(d) What do you mean by Mini hydro generators ?

(e) What do you mean by the term 'Load factor and Plant Factor' ?

(f) What is Energy Audit ?

SECTION – A

2. What are renewable energy sources ? Explain recent trends in power generation and amount of generation of electric power from conventional and non conventional sources of energy in Haryana and India in detail. 15

3. Explain the environmental aspects of Electrical Energy Generation in detail. 15

SECTION – B

4. What is tariff ? Explain the different types of tariff plans in India. 15

5. Explain Base load and Peak load Power Plants. Also explain connected Load, maximum demand and demand factor in detail. 15

SECTION – C

6. Explain Basic Principle of wind energy conversion and Scheme for Electric Generation by Wind Energy Power Plant. 15

7. What is MHD ? Explain its construction and working principle in detail. 15

SECTION – D

8. Explain the construction benefits and application of Energy Efficient Motors in detail. 15

9. Write short note on : 15

(a) Energy management

(b) Co-generation
