G 2003 (Pages : 2) Reg. No.....

Name.....

B.TECH DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL MACHINES III (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Compare squirrel cage induction motor with slipring induction motor.
2. Discuss the effect of changing the value of the rotor resistance on the performance characteristics of 3-phase induction motor.
3. Describe an autotransformer starter for a 3-phase induction motor.
4. Write short notes on single-phase operation of three-phase induction motors.
5. Explain the principle of working of induction generator.
6. Describe shaded pole single-phase induction motor.
7. Discuss the methods of improving the starting torque of three-phase cage induction motor.
8. Write notes on Universal motor.
9. Explain how speed control can be achieved from stator side of an induction motor.
10. Explain the working principle repulsion motor.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain how a rotating magnetic field can be produced by a 3-phase widing fed with 3-phase supply with diagrams. Also discuss the operation of 3-phase induction motor.

Or

12. Derive the torque equation of 3-phase induction motor and deduce the torque slip characteristics. Draw the torque slip characteristics for various values of rotor resistance.

Turn over

13. A 415 V 29.84 kW 50 Hz delta connected induction motor gave the following test results :

No load test	:	415 V	21 A	1250 w
Blocked Rotor test	:	100 V	45 A	2730 w.

Construct the circle diagram and determine (a) Line current and power factor for rated output ; (b) Maximum torque. Assume stator and rotor Cu losses equal at standstill.

Or

14. A 7.5 kW 230 V 3-phase star connected 50 Hz 4-pole squirrel cage induction motor has its full load internal torque at a slip if 0.04. The parameters of the motor are R_1 = 0.36 Ω/phase R_2 = 0.222 Ω/phase $X_1 = X_2$ = 0.47 Ω/Phase X_m = 155 Ω. The shunt branch is connected across the supply terminals. Find the (a) Maximum internal torque at rated voltage and frequency ; (b) Slip at maximum torque ; (c) Starting torque.

15. Explain why single-phase induction motor is not self starting.

Explain the different methods of starting single-phase induction motor.

Or

16. Explain with neat diagrams the construction working and application of Synchronous induction motor.

17. Explain the operation of Reluctance motors with neat diagram. Discuss its applications.

Or

18. Explain the construction, working and application of Hysteren's motor.

19. The impedances at standstill of the inner and outer cages of a double cage rotor are (0.01 + j 0.5) Ω and (0.05 + j 0.1) Ω respectively. The Stator impedance may be assumed to be negligible. Calculate the ratio of the torques due to the two cages (i) at starting and (ii) when running with a slip of 5%.

Or

20. Write short notes on :
    (a) Scherbius phase advancer.
    (b) Linear induction motor.

[5 × 12 = 60 marks]

G 2012 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRIVES AND CONTROL (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What are the various types of electrical drives? Mention advantages of electric drives.
2. What are the various methods of controlling the speed of DC motors?
3. Explain what is meant by free wheeling with regeneration in converter fed DC drives.
4. Briefly explain four quadrant choppers.
5. Explain the principle of stator voltage control of Induction motors.
6. Mention *two* types of schemes under slip power recovery.
7. What is a PWM inverter? Give its advantages.
8. How frequency is controlled in three phase induction motor? Explain.
9. Discuss the principle of vector control.
10. What are the various means of starting of synchronous motors?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. With a neat circuit diagram and relevant waveforms, explain the operation of a single phase fully controlled bridge rectifier d.c. drive (separately excited). Draw the speed-torque characteristics of various firing angles.

Or

12. (a) Explain the importance of D.C. drives.

    (b) A single phase full converter drives a 110 V, 3.73 kW, 1200 r.p.m. d.c. shunt (separately excited) motor. A.C. supply is 120 V, 50 Hz. The delay angle $\alpha = 45°$. The motor current is 15 A and is assumed to be ripple free. Armature resistance is neglected. Find the power drawn by the dc motor and supply Power factor.

Turn over

13. Explain the operation and advantages of four quadrant chopped controlled drives.

Or

14. Discuss the circulating current free mode of operation of a dual converter fed DC drives, bringing out the salient points regarding speed control and regenerative braking.

15. (a) Discuss the applications and advantages of induction motor drives.

(b) Explain the principle and operation of a static Kramer's drive.

Or

16. (a) What is flux weakening schemes of speed control?

(b) Discuss the V/f control schemes.

17. Explain a current source Inverter and its application to induction motor drives.

Or

18. (a) Explain the significance of PWM inverters.

(b) Discuss the PWM inverter fed induction motor drive.

19. Discuss with neat diagram self controlled synchronous motor with electronic commutation.

Or

20. (a) Explain the steadystate torque-load angle characteristics of synchronous machines.

(b) Discuss the voltage source inverter drive with open loop control.

(5 × 12 = 60 marks)

G 2030 (Pages : 2) Reg. No.....

Name.....

B.TECH DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

CONTROL SYSTEMS – II (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is compensation? Why is it needed?
2. Derive the transfer function of a lead network.
3. Draw and explain a sample and hold circuit.
4. Explain the method of solving difference equation using Z-transform. Compare it with other methods.
5. Define describing function. What is its significances?
6. What are limit cycles?
7. Define state and state variables. Illustrate the terms with an example.
8. Define state transition matrix. What are its properties?
9. Define controllability and deservability.
10. What is pole-placement compensation?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) The open loop transfer function of a unity feedback system is G (s) H (s) = $\frac{4k}{s(s+2)}$.

Design a compensator such that the static velocity error coefficient is 20 s^{-1}, phase margin is atleast 50° and gain margin is at least 10 dB.

Or

(b) The open-loop transfer function of a unity feedback system is
$G(s)\,H(s) = 1.06/[s\,(s+1)\,(s+2)]$.
Design a compensator such that KV is about $5s^{-1}$ without appreciably changing the location of the dominant closed-loop poles.

Turn over

12. (a) Find F (k) for the following systems :

(i) $F(z) = 1/[z + a]$.

(ii) $F(z) = (z - 4) / [z - 1)(z - 2)^2]$.

Or

(b) Explain with an example the Jury's method of testing stability of discrete systems.

13. (a) Derive the describing function of a saturation non-linearity with dead-zone.

Or

(b) Explain with an example the phase-plane method of analysing non-linear systems.

14. (a) Obtain a state model of the system with transfer function $\frac{C(s)}{R(s)} = \frac{s+3}{(s+1)(s+5)(s+10)}$.

Or

(b) Find $x_1(t)$ and $x_2(t)$ of the system with initial conditions :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -2 \end{bmatrix}$$

$$\begin{bmatrix} x_1(0) \\ x_2(0) \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

15. (a) Determine the state controllability and observability of the system described by $\dot{x}_1 = AX + BU$ and $Y = Cx$; where $A = [0\ 1\ 0\ ;\ 0\ 0\ 1\ ;\ -6, -11, -6]$ $B = [0\ 0\ 1]^T$ and $C = [4\ 5\ 1]$.

Or

(b) A discrete-time system is described by the difference equation :

$x(k + 2) + 5x(k + 1) + 6x(k) = u(k)$

$x(0) = x(1) = 0$; $T = 1s$.

Determine the state model and state transition matrix.

[5 × 12 = 60 marks]

G 2041 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

SYSTEM DESIGN WITH MICROCONTROLLERS (E)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Explain the logical division of internal RAM in 8051 microcontroller.
2. Discuss the various modes of timers in 8051.
3. List any *five* bit manipulation instructions in 8051.
4. Detail the addressing modes in 8051.
5. What are the various SFRs needed while programming a serial port ? Explain.
6. Explain the I/O ports of 8051.
7. Draw the interfacing of a DAC to 8051.
8. Write a program to read 200 bytes of data from PI and save the data in external RAM starting at RAM location 5000 H.
9. Discuss briefly on Data acquisition system.
10. Discuss any microcontroller based system design.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Discuss the various SFRs and the Register Banks in 8051.

    (b) Explain the division of internal RAM in 8051.

Or

12. Explain the architecture of 8051 with a neat block diagram and its salient features.
13. (a) Write a programme to add two unsigned 8 bit numbers.

    (b) What are the SFRs associated with interrupt programming ? explain.

Or

Turn over

14. (a) Show how a time delay can be designed using timers ?

    (b) Write a programme to generate a squarewave with T_{on} = 1 ms and T_{off} = 1ms on $P_{0.0}$.

15. With suitable circuits, explain the function of the ports of 8051 microcontroller.

Or

16. Write a program to configure the 8051 in mode O for serial communication. Send the data values stored in locations 700 H to 70B H through the serial port to an external serial device.

17. Illustrate how a matrix keypad can be interfaced to 8051 microcontroller. How the pressed key can be identified ?

Or

18. Illustrate with neat diagram, how an LCD module can be interfaced to 8051.

19. Discuss a typical temperature control system using 8051 microcontroller.

Or

20. Explain the Basic configuration of PLCs.

(5 × 12 = 60 marks)

G 2065 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch: Electrical and Electronics Engineering

NEURAL NETWORKS (Elective I) (E)

(Supplementary)

Time : Three Hours Maximum : 100 marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Compare biological neuron and artificial neuron.
2. What is a perceptron ?
3. Differentiate between Supervised learning and unsupervised learning.
4. What are the activation functions used in back propagation networks ?
5. Define stability and plasticity.
6. What are the strengths of competitive learning ?
7. What is the basic principle behind simulated annealing network ?
8. Discuss the applications of Boltzmann machine.
9. What are the activation functions used in continuous BAM ?
10. Discuss the different types of Hopfield nets.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain with necessary diagram the activation functions used in NNW.

Or

12. Explain the architecture and training of multilayer perceptron.
13. Explain the BP training algorithm.

Or

14. Discuss the applications of BPNs.

Turn over

15. State Kohonen and Grossberg training rules.

Or

16. Draw and explain the architecture of a full CPN.

17. Explain Boltzmann's training and Cauchy's training.

Or

18. Explain the statistical methods of non-linear optimization problems.

19. Discuss the architecture and training of discrete Hopfield network.

Or

20. What are the applications of ART networks ?

[5 × 12 = 60 marks]

G 2067 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch—Electrical and Electronics Engineering

BIOMEDICAL INSTRUMENTATION (Elective I) (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *the questions.*
Each question carries 4 *marks.*

1. Explain the generation of bioelectric potentials.
2. Explain with figure the conducting system of heart.
3. Differentiate between ESR and GSR.
4. Explain any *one* method of measurement of temperature of human body parts.
5. What is respiration ? What chemical action takes place in the human body during respiration ?
6. Explain the principle of operation of an inhalator with its uses.
7. Explain briefly the neuronal communication.
8. Briefly explain the organisation of brain.
9. Explain the principle of ultrasonic imaging system.
10. What is meant by electrotherapy ? Describe the principle of operation of Transcutaneous Electrical Nerve Stimulator (TENS).

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. (a) Explain the 12-lead system of measurement of ECG with diagrams. (8 marks)

    (b) Draw the typical ECG waveform and explain. (4 marks)

Or

12. (a) Briefly explain the physiology of respiratory system. (4 marks)

    (b) Draw the action potential waveform and explain how the action potentials are generated and propagated. (8 marks)

Turn over

13. Explain with diagram the external pacemaker. What are its applications ? (12 marks)

Or

14. (a) Differentiate between synchronous and asynchronous operation of defibrillators. (6 marks)

(b) Explain any *two* indirect methods of pressure measurement. (6 marks)

15. (a) Draw the functional diagram of positive pressure ventilator and explain. Why negative pressure ventilators become unpopular. (6 marks)

(b) What are respirators ? Explain with figure with different types of respirators. (6 marks)

Or

16. Explain in detail the different methods of respiration rate measurement. (12 marks)

17. Describe the 10–20 electrode system of EEG measurement with diagrams. (12 marks)

Or

18. Describe in detail the anatomy of central nervous system. (12 marks)

19. What are dialysers ? Explain in detail the different types of dialysers. (12 marks)

Or

20. (a) Draw the block diagram of a surgical diathermy machine and explain. (6 marks)

(b) Compare computer tomography and magnetic resonance imaging system. (6 marks)

[5 × 12 = 60 marks]

G 2083 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRAWING (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **two** *questions from Part A and* **two** *questions from Part B.*

All questions carry equal marks.

Assume any missing data suitably.

Part A

1. Draw the developed winding diagram for a simplex lap wound 24 slots, 4-pole double layer armature. Show the equalizer connection so that 50 % equalization is done.

2. Draw to quarter scale a half sectional end elevation looking from the shaft end of a 100 kW D.C. generator with the main dimensions as given below :

No. of poles	= 4
External dia. of armature stamping	= 41.5 cm.
Internal dia. of armature stamping	= 21 cm.
No. of slots	= 39
Size of slot	= 3.5 cm × 1.2 cm.
Main pole height	= 16 cm., width = 12 cm.
Pole arc / pole pitch	= 62 %
Inter pole	= 44 cm × 15 cm.
Air gap at main pole	= 0.5 cm.
Thickness of yoke	= 6 cm.
Shaft dia. at coupling end	= 8 cm.

The machine has end shield bearing. The armature stampings are mounted on a cast iron spider keyed to the shaft and clamped between end plates. Other missing data may be assumed.

3. Draw the sectional elevation of a single-phase 100 kVA 2000/400 V shell type Transformer.

Core width	= 13 cm.
Depth	= 36 cm.
Window width	= 14 cm. height = 24 cm.
Overall height of Transformer	= 37 cm.
Overall length	= 54 cm.
Overall depth	= 36 cm.
HT coil Total no. of coils	= 4 nos.
No. of Turns/coil	= 48
Cross-section of conductor	= 24 mm^2.
LT coil Total No. of coils	= 4 nos.
No. of turns/coil	= 10
Area of section	= 112 mm^2.

(2 × 25 = 50 marks)

Part B

All questions carry equal marks.

4. Give the layout of a lap winding for the stator of 3-phase a.c. machine having 4 poles and 24 slots. There are 2 coil sides/slot.

Or

5. Draw the half-sectional elevation and end view of a 3-phase slipring induction motor with the following dimensions :

Inside dia. of stator	= 55 cm.
Stator length	= 20 cm.
Stator overhang on each side	=10 cm.
Stator frame length	= 38 cm.
Dia. of Rotor	= 54.6 cm.
Total length of motor at foot step	= 73 cm.
Height of base upto eye bolt	= 93.04 cm.
Width at footstep	= 92.76 cm.
Foot thickness	= 5 cm.
Length	= 14 cm.

6. Draw half-sectional elevation of 440 × 275 kVA 10 kVA 3-phase alternator having the following main dimensions in cm.

Stator out side dia.	= 105
Inside dia.	= 80
Core length	= 24 with 3 vent ducts of 1 cm. each

Coil overhang 12 cm. is each side 105 slots

Semi enclosed size 0.8 × 4.5

Rotor air gap length	= 0.3
Pole axial length	= 24 width = 11.5 height 19
Pole arc	= 16.5 shoe height 2.

Shaft dia. 10 at centre and 7.5 at bearings. Any other missing data may be assumed.

(2 × 25 = 50 marks)

G 2020 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

UTILIZATION OF ELECTRICAL POWER (E)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. List the factors affecting the choice of a motor for a particular drive.
2. What are the essential features of satisfactory braking? Compare the performance of mechanical and electric braking.
3. Explain the requirements of ideal traction and suggest the types of drives.
4. Define coefficient of adhesion and explain the factors on which it depends.
5. Discuss the various methods of controlling temperature in resistance ovens.
6. Compare Carbon arc and Metallic arc welding.
7. What is an Integrating sphere? Explain its use in illumination Engineering.
8. Explain a Refrigeration cycle. What are the properties of refrigerants?
9. Write short notes on energy auditing.
10. Discuss the advantages and limitations of harnessing geothermal power.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the characteristics of motors for applications in steel mills and paper mills.

Or

12. Explain the various methods of braking as applied to d.c. series motors and 3ϕ Induction motors.

13. Obtain the expression for specific energy output using simplified speed time curve.

Or

Turn over

14. An electric train is to have acceleration and braking, retardation of 0.8 km/h/s and 3.2 km/h/s respectively. If the ratio of maximum to average speed is 1.3 and time for stops is 26 seconds, find the schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed time curve.

15. Explain the construction, working and advantages of core type and coreless Induction furnaces.

Or

16. Explain and compare different types of Resistance welding.

17. Write short notes on interior lighting system design. Explain the factors to be considered in designing factory lighting.

Or

18. What are the different types of Air-conditioning? Explain central Air-conditioning system for large buildings.

19. Discuss the energy management techniques applied to Industries/Organisations.

Or

20. Write short notes on the following :

    (a) Energy Auditing.

    (b) Wind power.

    (c) Energy efficient lamps.

(5 × 12 = 60 marks)

G 2066 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

OBJECT ORIENTED PROGRAMMING (Elective I) (E)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Explain with an example the concept of encapsulation.
2. What is meant by fundamental data types ? Give their classification and uses.
3. Discuss the significances of Arrays.
4. How is dynamic initialization of object achieved ?
5. What are the merits and demerits of function overloading ?
6. Differentiate between Constructor overloading and function overloading.
7. What are the characteristics of derived class ?
8. When do text files are preferred over Binary files ?
9. What is meant by dynamic memory allocation ?
10. What are the uses of Virtual functions ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the basic concept of OOP with examples.

Or

12. Explain with an example the process of nesting of member functions. What are its advantages ?
13. Explain with an example how a function returns an object.

Or

14. Illustrate the construction and use of a copy constructor.

Turn over

15. Explain with examples how Binary operators are overloaded.

Or

16. Illustrate the use of 'this' pointer.

17. Explain the different forms of Inheritance.

Or

18. What are file Pointers ? How are they manipulated ?

19. Explain the use of pointers in dynamic memory allocation in C++.

Or

20. What is Dynamic binding ? How is it implemented ?

(5 × 12 = 60 marks)