G 5090 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL MACHINES—III (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Draw and explain the phasor or diagram of three phase induction motor.
2. Discuss crawling and the methods for eliminating it.
3. Explain how torque slip characteristic is varied by varying rotor resistance.
4. Explain single phasing of three-phase induction motor.
5. Discuss the advantages and disadvantages of Induction generator.
6. Explain the types of induction generators.
7. List the applications of Universal motor.
8. Discuss the modification on required for satisfactory operation of AC series motor.
9. Explain the principle of commutator motor.
10. Draw equivalent circuit of double cage induction motor.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. A three-phase star connected, 220V (line to line) 50 Hz, 4 pole induction motor has stator impedance/phase of (0.3 + j 0.5) Ω and equivalent rotor impedance/phase of 0.15 + j 0.2) Ω. The magnetising reactance is 14 Ω and total constant losses is 420W. Find (a) stator current and power factor ; (b) Torque developed and (c) efficiency for a ship of 2%.

Or

12. A three-phase 6 pole, 50 Hz star connected induction motor give the following test results :

Test		*Line voltage*	*Line current*	*Total input*
No load	...	400 V	9 A	1250 W
Blocked rotor	...	200 V	50 A	6930 W

Turn over

Stator loss at standshll = 0.55 times total copper loss. Draw the circle diagram and find the following :—

(a) Maximum torque and corresponding slip ;

(b) Starting torque

(c) Maximum power input

(d) Efficeincy for a load current of 32 A.

13. Explain the various methods of speed control in ship ring induction motor.

Or

14. A 15 kW, 400 V, 950 r.p.m., three-phase, 50 Hz, 6 pole cage induction motor with 400 V applied takes 6 times full load current at standstill and develops 1.8 times the full load torque. The full load current is 32 A. Find the voltage to be applied to produce full load torque at starting. Also find: (a) What will be the line current y the voltage is supplied by an autotransformer ; (b) If starting current is limited to full load current by an autotransformer, what will be starting torque as a percentage of full load torque.

The magnetising current and stator impedance drops may be neglected.

15. Explain why single-phase induction motor is not self starting and discuss the starting methods.

Or

16. Draw and explain the torque-slip characteristics of the single-phase induction motor.

17. Explain the principle of Repulsion type motor. Discuss the different types of repulsion motors.

Or

18 Explain the construction and working of :

(a) Shaded pole motor.

(b) Hysterisis motor.

19. Explain with neat diagram the principle of operation of linear induction motor.

Or

20. Write short notes on the following :—

(a) Schrage motor.

(b) Phase advancers.

(5 × 12 = 60 marks)

G 5100

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRIVES AND CONTROL (E)

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List out the advantages of electric device.
2. What is the principle of closed loop control of electric drive ?
3. What is the principle of operation of step down chopper ?
4. What is meant by continuous and discontinuous operation ?
5. List out the various speed control of induction motor by variation of slip frequency.
6. What is meant by slip power ?
7. List out the drawbacks of stepped wave inverter fed drive.
8. Enumerate the general features of an induction motor on a current source inverter.
9. Draw and explain briefly the torque-speed characteristics of a synchronous reluctance motor at constant voltage and frequency.
10. What is the principle of vector control ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. With a neat sketch explain the operation of half controlled bridge rectifier drives along with the free wheeling diode.

(12 marks)

Or

12. (a) Describe the various parts of electrical drive. (4 marks)

    (b) With the suitable waveform, explain the discontinuous mode of operation of a single-phase fully controlled converter fed d.c. drive.

(8 marks)

Turn over

13. With necessary waveforms explain the operation of Dual converter fed D.C. separately excited motor. (12 marks)

Or

14. (a) Explain the motoring and regenerative braking of a separately excited D.C. motor using chopper control. (7 marks)

(b) Briefly explain about the speed reversal of DC motor fed with Dual converter. (5 marks)

15. Explain the operation of static kramer derive. (12 marks)

Or

16. (a) Mention the merits and demerits if stator voltage control. (4 marks)

(b) Briefly explain about the constant torque and constant power control. (8 marks)

17. Briefly explain about the flux weakening control scheme. (12 marks)

Or

18. (a) Explain the operation of a induction motor under fixed frequency and under variable frequency. (8 marks)

(b) Compare VSI and CSI fed drive. (4 marks)

19. Briefly explain the operation of self controlled synchronous motor with electronic commutation. (12 marks)

Or

20. Explain the self controlled synchronous motor drive employing load commutated thyristor. (12 marks)

[5 × 12 = 60 marks]

G 5109 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

UTILIZATION OF ELECTRICAL POWER (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Classify various types of drives and discuss their merits and demerits.
2. Discuss the steady state characteristics of DC motors.
3. Define the term coefficient of Adhesion and discuss the factors on which it depends.
4. Discuss the requirements of an ideal traction system.
5. Discus the properties of good heating materials.
6. Explain pinch effect in induction furnaces.
7. Explain the following terms solid angle, luminous intensity, MHCP and glare.
8. Explain comfort Air conditioning.
9. Write short note on Energy Auditing.
10. Discuss the various factors to be taken for energy saving in domestic sector.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the characteristics and properties of motors for applications in paper mills and coal mines.

Or

12. Explain the operation of Induction motor when subjected to (a) dynamic braking ; (b) Regenerative braking.

13. Explain specific energy consumption and the factors affecting specific energy consumption.

Or

Turn over

14. An electric train weighing 400 tonnes runs along an upgradient of 1% with following speed time curve ; (i) uniform acceleration of 1.5 kmphps for 30 sec ; (ii) free running for 36 sec ; (iii) coasting for 25 secs ; (iv) Braking at 2.6 kmphps to rest. If tractive resistance is 45 N/tonne, rotational inertia effect overall efficiency of transmission and motor 75%, determine specific energy consumption.

15. Explain the various types of Resistance welding.

Or

16. A piece of insulating material of size 10 × 10 × 3 cm is heated by dielectric heating. A frequency of 20 megacycles is used and the power absorbed is 400 W. Calculate the voltage necessary for heating if power factor is 0.05 and the relative permittivity of material is 5.

17. Discuss the factors to be considered in street lighting. Explain the design of an exterior lighting system.

Or

18. Explain different types of Refrigeration systems. List the refrigerators used in practice.

19. Explain the various methods of generating energy from non conventional sources.

Or

20. What is the necessity for energy management ? Discuss the energy management techniques applied to Industries.

(5 × 12 = 60 marks)

G 5120 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

CONTROL SYSTEMS – II (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Where do we use lag compensator and lead compensator?
2. When do we use (i) Bode plot method ; and (ii) Root locus method of compensator design?
3. State and explain sampling theorem.
4. Define pulse transfer function.
5. Describe the non-linearities found in physical systems.
6. What is Limit Cycle? What are its characteristics?
7. Define (a) State, (b) State variable, (c) State space.
8. What are the properties of state transition matrix?
9. Derive the relationship between transfer function and state space representations of systems.
10. Define Controllability and Observability.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. A unity feedback system has the open loop transfer function $G(s) = K/[(1 + s)(1 + 10s)]$. Design a compensator such that the phase margin is 45° and steady state position error is less than 1%.

Or

12. Explain with an example the steps involved in the design of compensator using root locus method.

Turn over

13. Solve the difference equation $x(n+2) - 3(n+1) + 2x(n) = 3^k$ with $x(0) = 0$ and $x(1) = 1$.

Or

14. Using Jury's test, determine the stability of the system whose characteristic equation is

$$Z^3 - 1.8Z^2 + 1.05Z - 0.20 = 0.$$

15. Explain with an example, the phase plane method of analysis of non-linear systems.

Or

16. Derive the describing function of a saturation non-linearity with dead-zone.

17. Obtain a state model of the system defined by $\dddot{x} + 6\ddot{y} + 11\dot{y} + 6y = 3\dot{x} + 5x$.

Or

18. Obtain the state transition matrix for the system $\dot{X} = AX + BU$ where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -1 & -5 \end{bmatrix}; B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}.$$

19. The closed loop transfer function of a unity feedback system is

$$\frac{C(s)}{R(s)} = (640 + 160S)/[640 + 192s + 18s^2 + s^3].$$

Obtain a state space model of the system.

Or

20. Consider the system $\dot{X} = AX + BU$; $Y = CX$ where

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 3 & 1 \end{bmatrix}; B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

Determine state controllability and observability.

(5 × 12 = 60 marks)

G 5132

(Pages : 2)

Reg. No.....Copy.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

SYSTEM DESIGN WITH MICROCONTROLLERS (E)

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Compare Microprocessor and microcontroller based on internal structure and applications.
2. Describe the format of timer control register in 8051.
3. Give two examples of logical instructions in 8051.
4. Write 8051 assembly language segment for generating a delay. How is the delay time computed ?
5. What is meant by serial com interrupts ?
6. List the features of data transfer by polling.
7. What are the different types of interrupts in 8051 ?
8. With a diagram show how 8051 is interfaced with a common anode type 7 segment display.
9. Explain the applications of PLC.
10. What is meant by ladder diagram with respect to a PLC ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. With a neat sketch, explain the internal architecture of 8051.

Or

12. Explain the operation of 8051 timer in detail.
13. A 16 bit data word is available in external memory pointed by DPTR. Write the assembly language code for 8051 for counting the number of 1's in the data word.

Or

14. Write 8051 assembly language code for multiplying two bytes. Assume that the input and output data are available in external memory.

Turn over

15. It is desired to glow an LED for 30s in the event of an external interrupt. Explain the 8051 algorithm for such action.

Or

16. Explain serial communication using 8051.

17. With a diagram describe how 8051 microcontroller can be interfaced with LCD display.

Or

18. Explain a technique for generating low frequency sinewave with a microcontroller based system.

19. With a block diagram explain a 8051 based system for temperature control.

Or

20. With a block diagram explain how 8051 based system can be used for measuring the frequency of a periodic signal. Give the algorithm of the software used.

(5 × 12 = 60 marks)

G 5157 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

BIOMEDICAL INSTRUMENTATION (Elective I) (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What are bioelectric potentials? Explain.
2. Explain the electrical activity of heart.
3. Distinguish between a.c. and d.c. defibrillators.
4. Explain any one method of measurement of body temperature.
5. Explain the characteristic of sleep with waveforms.
6. What are neuronal receptors? Explain.
7. Explain the basic principle of a respirator.
8. What is positive pressure ventillation? What are the types of such ventillator?
9. What are the classifications of dialysers? Explain any *one* type in detail.
10. Explain the production of X-rays with the different types of X-ray tubes used.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the 12-lead system of measurement of ECG with waveforms. (12 marks)

Or

12. Describe with diagram the physiology of respiration. (12 marks)

13. (a) What is pH? Explain how pH of blood is measured. What are the uses? (8 marks)

    (b) Explain the principle of operation of a pacemaker with its necessity. (4 marks)

Or

14. Explain in detail different types of pressure measurement. (12 marks)

Turn over

15. (a) Explain the principle of operation of an inhalator. What is the significance in respiratory therapy? (6 marks)

(b) Describe the CO_2 method of respiration rate measurement. What are its advantages? (6 marks)

Or

16. Draw the block diagram of a conventional ventillator and explain. Compare with mechanical ventillators. (12 marks)

17. Describe in detail the organisation of the brain with a neat diagram. (12 marks)

Or

18. Explain in detail with diagram the 10-20 electrode placement system of EEG measurement. (12 marks)

19. Draw the block diagram of an echocardiograph and explain with uses. (12 marks)

Or

20. (a) Explain the basic principle of electrotherapy. (4 marks)

(b) Describe with diagram the surgical diathermy machines with applications. (8 marks)

[5 × 12 = 60 marks]

G 5174 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2013

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRAWING (E)

(Improvement/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 winding diagram for a 4-pole, 13 slots double layer, wave winding with 14 commutator segments. (25 marks)

2. Draw the following view of the armature with commutator of DC machine :—

   Elevation with top half in section :

External diameter of armature	: 45 cm
Length of armature core	: 22.5 cm
Diameter of commutator	: 28 cm
Length of winding overhang	: 15 cm
Length of commutator	: 10 cm
Shaft diameter	: 10 cm.

   (25 marks)

3. Draw the full sectional elevation, sectional plan, sectional side elevation of a 3-phase transformer for the given below dimensions :

   Core, 3-step construction

Core diameter	: 22 cm
Height of core	: 48 cm
Height of yoke	: 25 cm

   Centre to centre distance between the cores = 35 cm.

   (25 marks)

[2 × 25 = 50 marks]

Turn over

Part B

4. Develop 3-phase mush winding for an A.C. machine having 24 slots, 4 pole. (25 marks)

5. Draw the following views of a 5 H.P 400/440 V, 1440 r.p.m. 3 phase squirrel cage induction motor :—

   (a) Half sectional front elevation.

   (b) Half sectional end view.

   Main dimensions :

   (i) Outside diameter of stator stampings : 230 mm

   (ii) Inside diameter of stator stampings : 164 mm

   (iii) Stator core length : 120 mm

   (iv) Thickness of stator frame : 25 mm

   (v) Slots :

   (a) Type : Open

   (b) No : 36

   (c) Size = 15 × 8 mm.

   (vi) Air gap = 2 mm

   (vii) Outside dia. of rotor stamping = 160 mm

   (viii) Inside diameter of rotor stamping = 35 mm.

   (ix) Shaft diameter :

   (a) At centre = 35 mm

   (b) At bearing = 30 mm.

(25 marks)

6. Draw the half sectional front elevation and half sectional end view of 25 kVA, 1500 R.P.M., 3-phase alternator. The rotor of salient pole type :

   Main dimensions :

   (i) Outside diameter of stator stamping : 400 r.p.m.

   (ii) Inside diameter of stator stamping : 290 mm

   (iii) Thickness of stator frame : 36 mm

   (iv) Stator core length : 135 mm

   (v) Slots :

   (a) Type : Open type

   (b) Number : 48

   (c) Size : 32 × 12 mm

   (vi) Pole :

   (a) Pole axial length : 135 mm

   (b) Pole width : 70 mm

   (c) Pole height with shoe : 75 mm

   (d) Shoe height : 18

   (vii) Air gap : 2 mm

   (viii) Shaft diameter :

   (a) At centre : 70 mm

   (b) At bearing : 55 mm

(25 marks)

[2 × 25 = 50 marks]