No. of Printed Pages : 3

BIEEE-003

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00335

Term-End Examination

December, 2014

BIEEE-003 : SPECIAL ELECTRICAL MACHINES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions in all. Use of scientific calculators is permitted.*

1. Explain the construction and performance of the following : *2×5=10*

(a) Deep bar rotor three-phase induction motor

(b) Double cage rotor three-phase induction motor

2. (a) Describe the construction and working of a shaded pole motor. *5*

(b) Draw and explain torque – speed characteristic of two-phase AC servo-motors. *5*

3. (a) Describe the constructional features and operating principle of variable reluctance motor. *5*

(b) Explain the construction and principle of operation of switched reluctance motor. *5*

4. For a single-phase induction motor, give qualitative explanation for the following : *2×5=10*

(a) Behaviour of the motor with its rotor at standstill and with only main winding excited.

(b) The forward flux is several times greater than backward flux wave at normal rotor speed, but they are equal at standstill.

5. (a) What are linear electric machines ? Give the construction and operation of linear induction machine. *5*

(b) Discuss the construction and operating principle for a PCB motor. What are the advantages of a PCB motor over conventional motors ? *5*

6. (a) Draw the torque – speed characteristics of single-phase and three-phase induction motors and explain the reason for which there are significant differences in their performance. *5*

(b) Explain whether a single-phase induction motor is self-starting in nature. *5*

7. Explain the following with valid reasons : $4 \times 2\frac{1}{2} = 10$

(a) As compared to a three-phase induction motor, a single-phase induction motor has higher slip, less efficiency and more noise.

(b) Maximum electromagnetic torque in a poly-phase induction motor is independent of rotor circuit resistance.

(c) A DC series motor can be operated with AC supply.

(d) Servo-motors can produce high torque at zero speed.

8. Describe the features and applications of a brushless DC motor in detail (BLDC). *10*

9. Explain the operation of a hybrid stepping motor with proper illustration and also discuss the advantage of using hybrid stepper motor over Permanent Magnet Stepper Motor (PMSM). *10*

No. of Printed Pages : 3

BIEEE-004

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00635 **Term-End Examination**

December, 2014

BIEEE-004 : MECHATRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data if any.*

1. (a) A 6-bit D/A converter gives an output voltage of 8·775 volts for an input of 011011. What is the step size, the full range voltage and the percentage resolution ? *5*

(b) Show the binary addition and subtraction of 195 (decimal) and 235 (decimal). *5*

2. (a) What is a temperature transducer ? How are these classified ? Briefly explain all of them. *5*

(b) Describe the methods for range sensing. *5*

3. (a) What are the advantages of hydraulic system over mechanical system ? *5*

(b) With the help of a neat sketch describe how the hydraulic system can be used to amplify force. *5*

4. (a) What do you mean by Inverse Kinematics ? Briefly explain the importance of path planning. 5

(b) How can a transistor be used as a switch ? Explain. 5

5. (a) What are the two types of data transfer techniques used in computer interfacing ? List out the main differences between them. 5

(b) Describe and compare the characteristics of proportional plus integral plus derivative (PID) control. 5

6. (a) Explain in brief the hysteresis in a device. 5

(b) Identify the various elements that might be present in a control system involving a thermostatically controlled electric heater. 5

7. (a) Describe the functioning of a relay with schematic diagram. 5

(b) Explain the principle of a stepping motor along with a diagram. 5

8. (a) Explain the functioning of a servo motor with the help of a diagram. 5

(b) Describe armature voltage speed control of a DC motor. 5

9. Describe Programmable Logic Controller with a block diagram. Give examples of popular PLCs in use. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) VCR

(b) Industrial Robot

(c) Timers

No. of Printed Pages : 4

BIEEE-005

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

00255

Term-End Examination

December, 2014

BIEEE-005 : UTILIZATION OF ELECTRICAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Question no.* ***1*** *is* ***compulsory****. Answer any* ***four*** *questions from questions no.* ***2*** *to* ***7****. Use of scientific calculator is allowed.*

1. Choose the correct answer from the given alternatives. *7×2=14*

(a) The luminous intensity of a lamp is expressed in

(i) Watts

(ii) Lumens

(iii) Lux

(iv) Candela

(b) The illumination of a surface at any point is proportional to the _____ of the angle between the normal at that point and the direction of the luminous flux.

(i) sine

(ii) cosine

(iii) tangent

(iv) cotangent

(c) A traction motor must be capable of developing _____ starting torque.

(i) high

(ii) low

(iii) very low

(iv) medium

(d) Which of the following motors provides the highest starting torque :

(i) DC series motor

(ii) DC shunt motor

(iii) DC compound motor

(iv) Universal motor

(e) Welding electrodes are made of material having _____ electrical conductivity.

(i) high or low

(ii) low

(iii) high

(iv) None of the above

(f) Projection welding is advantageous for which of the following reasons :

(i) Projection makes the welding process simple.

(ii) It is possible to join several welding points in projection welding.

(iii) More output is obtained since more than one weld is done at a time.

(iv) All of the above

(g) For high performance, the efficiency of a desert cooler should be

(i) greater than 80%

(ii) not less than 70%

(iii) 50%

(iv) None of the above

2. (a) What is meant by stroboscopic effect ? How is this effect eliminated in fluorescent tube lighting ?

(b) Enumerate the various factors to be considered while designing flood and street lighting. *2×7=14*

3. (a) The power required for dielectric heating of a slab of resin 150 cm^2 in area and 2 cm thick is 200 W, frequency of 30 MHz. The material has a relative permittivity of 5 and pf of 0·05. Determine the necessary voltage and current flowing through the material. If the voltage is limited to 600 V, what will be the value of the frequency to obtain the same heating ?

(b) With a neat sketch, describe the construction and principle of operation of Ajax Wyatt furnace. *2×7=14*

4. (a) What are the fundamental differences between electric arc welding and resistance welding ?

(b) What are the advantages of using coated electrodes ? Mention different types of coatings used. *2×7=14*

5. What are the advantages of regenerative braking ? Explain how regenerative braking can be obtained in DC locomotives. *14*

6. Discuss the construction and operation of a domestic air-conditioner and draw its wiring diagram. *14*

7. Write short notes on any ***two*** of the following : *2×7=14*

   (i) Group and individual drives

   (ii) Electric supply for Arc welding

   (iii) Halogen lamp

   (iv) Speed-time curve of a train