B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Eighth Semester

Branch : Electrical and Electronics Engineering

EE 010 802—SWITCH GEAR AND PROTECTION (EE)

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 marks.

1. List out the important components common to most of the circuit breaker ?

2. Why is back-up protection needed ?

3. What is static relay ?

4. Discuss the importance of bucholz relay.

5. List out the cause of over voltages.

                                                    (5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 marks.

6. List and explain the main parts of a circuit breaker.

7. Discuss the characteristics of thermal relay.

8. Write short note on static earth fault relay.

9. Explain the concept of reverse phase protection.

10. Comment on insulation coordination.

                                                    (5 × 5 = 25 marks)

Part C

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

11. Discuss the following phenomenon of CB :

    (i) . Resistance switching.

    (ii) Restriking voltage.

    (iii) Capacitive current breaking.

Or

12. The constructional details and operation of a SF6 Circuit breaker. Mention its advantages and disadvantages.

13. Explain the different zones of protection and essential qualities of protection.

Or

14. Explain with diagram the Operating principle of an induction type over-current relay and hence derive its torque equation

15. Explain the working principle of static differential relay and list out the merits and demerits of static relay

Or

16. With a neat block diagram and flow- chart explain the operation of impedance relay using microprocessor.

17. (i) Explain with neat diagram about the protection of Stator against inter turn faults of an alternator.

    (8 marks)

    (ii) Describe the following : (a) Protection against Pole slipping and (b) Back up protection.

    (4 marks)

Or

18. Explain the different types of faults and the protective schemes used against each type in an transformer.

19. Comment on the following terms : (i) Power frequency over voltages and (ii) Switching over voltages.

Or

20. Explain in detail about the wave propagation in transmission line and cables.

[5 × 12 = 60 marks]

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Name..................................

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Eighth Semester

Branch : Electrical and Electronics Engineering

EE 010 803—ELECTRICAL SYSTEM DESIGN (EE)

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. State carters coefficient.

2. What is the specific magnetic loading on the design of transformers ?

3. What will be the effect on increasing the field excitation of an alternator ?

4. What is the role of NEC and NBC (National Building Code) in building design ?

5. What is the importance of earthing of electrical installations ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Derive the output equation of a d.c. machine.

7. Derive an expression for the magnetising current of a single-phase transformer.

8. Derive the output equation of a synchronous machine.

9. Explain how will you calculate the connected load of a residential building.

10. Draw a sketch of plate earthing.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each full question carries 12 marks.

11. Explain the design specifications of d.c. machines.

Or

12. A 500 KW, 460 V, 8 pole, 375 r.p.m. compound generator has an armature diameter of 1.1m and a core length of 0.33m. Design a symmetrical armature winding, giving the details of equalizers. The ampere conductors per metre are 34,000. The internal voltage drop is 4 per cent of terminal voltage and the field current is 1 per cent of the output current. The ratio of pole arc to pole pitch is 0.7. The voltage between adjacent segments at on load should not exceed 15 V and the slot loading should not exceed 1500 A. The diameter of commutator is 0.65 of armature diameter and the minimum allowable pitch of segments is 4mm. Make other suitable assumptions.

13. Derive the output equation of a single phase core type transformer. Indicate the usual values of specific loadings used for different types of transformers.

Or

14. Calculate the main dimensions and winding detail of a 100 KVA, 2000/400 V, 50 Hz, single-phase shell type, oil immersed, self cooled transformer. Voltage per turn = 10 V, flux density in core = 1.1 Wb/m^2, current density = 2A/mm^2, window space factor = 0.33. Assume :

$$\frac{\text{window height}}{\text{window width}} = 3, \frac{\text{core depth}}{\text{width of centrallimb}} = 2.5.$$

15. Derive the output equation of a three phase induction motor. Explain the choice of specific loadings and also the separation of D and L from D^{2}L while designing a three phase induction motor.

Or

16. Determine the main dimensions, turns per phase, number of slots, conductor cross section and slot area of a 250 h.p., 3 phase, 50 Hz, 400 V, 1410 r.p.m., slip ring induction motor. Assume B$_{av}$ = 0.5 Wb/m^2, ac = 30,000 A/m, efficiency = 0.9, power factor = 0.9, winding factor = 0.955, current density = 3.5 A/mm^2. The slot space factor is 0.4 and the ratio of core length to pole pitch is 1.2. The machine is delta connected.

17. In what ways the electrical installations of a high-rise apartment building differs from that of an ordinary residential building ? Explain.

Or

18. Explain the design and layout of a cinema theatre.

19. Explain various earthing systems.

Or

20. Describe the important features of selection of transformer substation for High Tension consumers.

(5 × 12 = 60 marks)

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Eighth Semester

EE 010 804 L06—OPTO ELECTRONICS

Elective III (EE)

Branch : Electrical and Electronics Engineering

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. What is meant by step index and graded index fibres.

2. Explain 'v' number cut off wave length.

3. What are the advantages of APD ?

4. Compare stimulated emission and spentaneous emission.

5. What is meant by wave length Division multiplexing.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Write briefly about signal degradation in optical fibres.

7. Explain the characteristics of LED.

8. Explain the principle of operation of PIN photodiode.

9. Explain speckle noise and reflection noise in optical fibre receivers.

10. Explain the Concept behind optical computing.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. Explain in detail the superiority of wave theory of light over the ray theory in respect of light wave propagation.

Or

12. With necessary equations explain the different losses in optical fibre communication.

13. Write short notes on :

    (a) Heterojunction LEDs.
    (4 marks)

    (b) Electrical and optical Band width.
    (4 marks)

    (c) Laser diodes.
    (4 marks)

Or

14. Give the structures of surface emitting and edge emitting LED and compare their Performances.

15. Write short notes on :

    (a) APD.
    (4 marks)

    (b) Photo transistors.
    (4 marks)

    (c) Fibre optic link system.
    (4 marks)

Or

16. With the help of neat diagram explain the process of link design for optical fibre communication.

17. Explain in detail about eye diagram. How can it be used for link design.

Or

18. Explain about reflection noise and speckle noise. Also discuss the problems associated with them and the methods to reduce them.

19. Explain in detail about WDM, with the help of block diagram.

Or

20. Write short notes on :

    (a) Raman amplifier.
    (4 marks)

    (b) Erbium doped optical amplifer.
    (4 marks)

    (c) Fibre optic sensors.
    (4 marks)

    [5 × 12 = 60 marks]

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Eighth Semester

Branch : Electrical and Electronics Engineering

EE 010 805 G 06—DISTRIBUTED POWER SYSTEMS (Elective IV) (EE)

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain the terms : (a) Insolation ; (b) Solar constant.

2. What are the factors to be taken into consideration while selecting a site for a wind farm ?

3. Give an account of the fuel saving in Wind-diesel power generation.

4. Obtain an expression for power potential of a micro-hydel scheme ?

5. What is the difference between voltage sag, swell and sustained interruption ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. How are fuel cells classified ? Explain.

7. Derive an expression for energy in the wind.

8. Explain the turbine models.

9. How are bio-fuels classified ?

10. Explain the phenomenon of Ferro resonance.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. What is photovoltaic effect ? Explain briefly. Draw and explain the V-l characteristics of a solar cell.

Or

12. (a) What is a fuel cell and how does it work ?

     (b) Explain the different types of solar cells based on the material used for their fabrication.

13. The following data pertain to a propeller turbine :—

     Velocity of wind at 20°C   = 20 m/s (at atmospheric pressure)

     Turbine diameter   = 12 m

     Operating speed of turbine   = 45 r.p.m at maximum efficiency of 35 %

     Calculate :

        (i)   Total power density in wind stream.
        (ii) Maximum obtainable power density
        (iii) Total power generated.
        (iv) Maximum torque and maximum axial thrust.

Or

14. Give a typical electrical design for a wind farm.

15. (a) Explain the principle and application of wind electric system. State the basic components and their working in wind electric system.

     (b) Explain in detail about integrated wind - solar systems.

Or

16. (a) Explain with a neat diagram the working of various types of wind generators.

     (b) Explain any 4 types of rotors used for wind power generation with neat diagram.

17. How are geothermal sources classified ? Explain with the help of a schematic the flashed steam open system used for power generation.

Or

18. (a) Explain with a schematic diagram the anaerobic digestion system.
     (b) Describe the major components of a micro-hydro power project

19. What are low voltage distribution networks ? Explain the operation of DG interconnected with these networks.

Or

20. (a) Describe the harmonic sources present in the Electrical power system.

     (b) What are the power quality issues in power systems ?

                                                                          (5 × 12 = 60 marks)