G 1174 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

INSTRUMENTATION (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Define speed of response, fidelity and dynamic error.
2. Derive the response of a zero order system to step input.
3. Discuss the applications and advantages of LVDT.
4. Explain the working principle of a piezo-electric transducer.
5. List the advantages and disadvantages of thermocouples.
6. Explain the characteristics of thermistors with its limitations.
7. Explain the operating principle of an ultrasonic flow meter with applications?
8. Explain the ultrasonic flow detector with diagram.
9. Explain any *one* type of ionisation gauge with uses.
10. Explain the angular measurement by using a special encoder.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain in detail any *three* methods of correction for interferring and modifying inputs with examples.

(12 marks)

Or

12. (a) Draw the circuit of a charge amplifier and explain with applications.

    (b) What are the classification of transducers? Explain with examples.

(6 + 6 = 12 marks

Turn over

13. Explain in detail the temperature effects on strain gauges and its compensation.

(12 marks)

Or

14. (a) What are load cells? Explain any *one* type with applications.

(b) Describe with diagram any *three* types of capacitive transducers with uses.

(4 + 8 = 12 marks)

15. Explain with diagram the radiation and optical pyrometers. Compare them.

(12 marks)

Or

16. Explain the Resistance Temperature Detector with the different techniques used to eliminate the lead wire effect of it in a bridge circuit.

(12 marks)

17. Explain in detail the null type and servo type accelerometers with diagram. Compare them.

(12 marks)

Or

18. (a) Describe electromagnetic flowmeter with applications.

(b) Explain the piezo electric accelerometer with uses.

(6 + 6 = 12 marks)

19. (a) Explain McLeod gauge with diagram. What are its limitations?

(b) Explain with diagram the hygrometer. What are its uses?

(6 + 6 = 12 marks)

Or

20. (a) Draw the block diagram and explain the spectrum analyser.

(b) Explain with block diagram and applications the scintillation counter.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

G 1183 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL SYSTEM DESIGN (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Mention the factors to be considered for the design of shunt field coil of a d.c. machine.
2. What are the factors to be considered in the design of commutator ?
3. In transformers, why the low voltage winding is placed near the core ?
4. How will you fix up the tank dimensions based on overall dimensions of transformer yoke ?
5. What are the advantages of large air-gap in synchronous machine ?
6. Why short chorded windings are employed in induction motor ?
7. List the various types of internal wiring.
8. What are the general requirements of earthing ?
9. What are the conventional methods of laying underground cables ?
10. State the reasons for establishing substations.

(10 × 4 = 40 marks)

Part B

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

11. The commutator of a 50 r.p.m. machine is 0.3 m. in diameter. The brush friction loss is 100 W. If at full-load the commutator loss is twice the brush friction loss, calculate the length of commutator which will give a final temperature rise of 40° C. Assume that a commutator of this diameter and 15 mm. in length running at 700 r.p.m. gives a temperature rise of 40° C. with a commutator loss of 300 W. The cooling coefficient is $C = \frac{K}{1+0.1V_C}$, where V_C is peripheral speed of commutation in M/s and K is a constant.

Or

12. A 4 pole generator supplies a current of 140 A. It has 480 armature conductors (a) wave connected ; (b) lap connected. The brushes are given an actual lead is 10. Calculate the cross and demagnetizing m.m.f. per pole in each cone. The field winding is shunt connected and takes a current of 10 A. Find the number of extra shunt field turns to neutralize the demagnetization.

Turn over

13. Calculate approximate overall dimensions for a 200 kVA, 6600/440 V, 50 Hz, 3-phase core type transformer. The following data may be assumed ; e.m.f. per turn = 10 V ; Maximum flux density = 1.3 Wb/m.^{2}, current density = 2.5 A/mm.^{2} ; Window space factor = 0.3 ; Overall height = Overall width ; Stacking factor = 0.9. Use a 3 stepped core.

Or

14. Explain the procedure of design a windings of a transformer.

15. Determine the main dimensions, turns per phase, no. of slots conductor cross-section and slot area of a 250 H.P., 3-phase, 50 Hz, 400 V, 1410 r.p.m. slip induction motor. Assume B_{av} = 0.5 Wb/m.^{2}, ac = 30000 A/m, efficiency = 0.9 and 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.

Or

16. Estimate the diameter, core length, size and number of conductors, no. of slots of stator of a 15 MVA, 11 kV, 50 Hz, 2 pole, star connected turbo-alternator with 60 phase spread. Assume B_{av} = 0.55 Wb/m.^{2}, ac = 36,000 A/m. ; Current density = 5A/mm.^{2} ; peripheral speed = 160 m/s. The winding should be arranged to eliminate 5th harmonic.

17. Draw a neat diagram showing the position of the switch boards, distribution board accessories with necessary connections in looping in system for a hall of 15 m. × 6 m. × 4.5 m. height. The hall is to be fitted with fan and light points. Make your own assumptions for the number of light and fan points and other missing data.

Or

18. One hall is to be provided with wooden casing-capping wiring for the following provisions ;size of hall is 60 m. × 30 m. ;

    (a) Power points, 10 numbers, 1000 W each.

    (b) Light points, 30 numbers, 60 W each.

    (c) Fan points, 15 numbers, 60 W each.

    (d) Plug points, 30 numbers, 100 W each.

    Supply is three-phase, 400 V, 4-wire, 50 Hz a.c. Draw the circuit layout upto the distribution board and prepare the list of materials required with specification.

19. Write short notes on :

    (a) Earth mat.

    (b) Plate earthing.

Or

20. An 11 kV overhead line is to be run through a distance of 3 km. from an existing 11 kV overhead line. An indoor substation 11 kV/415 V is to be erected at the terminal point of its overhead line. The 11 kV/415 V transformer is to feed the following loads :

    (i) Production shop having a load of 400 kW of three-phase and single-phase motors.

    (ii) Foundary shop having a load of 150 kW.

    (iii) Administration block having light and fan loads of 100 kW.

    Estimate the quantity of material required for the installation of the overhead line and the indoor substation. (Assume the p.f. to be 0.8 and load factor to be 0.6).

(5 × 12 = 60 marks)

G 1206 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

ADVANCED MICROPROCESSORS (Elective II) (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are the various operating modes of 8086 microprocessor ? Explain briefly.
2. How address latching is done in 8086 based system ?
3. What is meant by memory banking ? Explain with reference to 8086 processor.
4. Classify the Instruction set of 8086. Give examples in each class.
5. What are the features of 8087 ?
6. What are the additional factors 80186 is having compared to 8086 ?
7. What is meant by memory management ? Explain.
8. What are Descriptors ?
9. Compare the RISC and CISC architectures.
10. Explain, what is meant by Superscalar Architecture.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. With a neat block diagram, explain the internal architecture of 8086 microprocessor.

Or

12. What are the various registers in 8086 ? Explain the function of each of them.
13. What are the various addressing modes of 8086 ? Explain with examples.

Or

14. (a) Using string instructions write a program (using 8086 instruction set) to move a block of 100 (8 bit numbers) data from one memory location to another location in the same data segment.

    (b) Show how a memory can be interfaced with 8086.

Turn over

15. Explain the internal block diagram of 8087 Numeric Data Processor.

Or

16. (a) Discuss the advanced features of 80286 compared to 80186 processor.

(b) Give the additional instructions in 80286.

17. Explain the real mode and protected mode of operations of 80386 processor.

Or

18. With neat block diagram, explain the internal architecture of 80486 processor.

19. (a) Explain the special pentium registers and their functioning.

(b) Give a brief note on Pentium Memory Management.

Or

20. Write short notes on :

(a) Branch prediction logic.

(b) Hyper pipelined technology.

(c) Memory paging mechanism.

(5 × 12 = 60 marks)

G 1238 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

DIGITAL PROTECTION OF POWER SYSTEMS (Elective III) (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions from Part A and* **five** *questions from Part B.*

Part A

Each question carries 4 *marks.*

1. Explain sample and hold circuit.
2. What is the function of A/D converter?
3. Describe the status flag of Intel 8085 micro processor.
4. Explain in brief about a programme counter.
5. Discuss the essential qualities of a protective relay.
6. What is a single chip micro computer?
7. What are the different registers of Intel 8085?
8. Explain zero cross detector.
9. What do you mean by RHT?
10. How can R and X of line can be calculated using an algorithm based Discrete Fourier transform?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain CT burden. How is it specified?

Or

12. What do you understand by a Zone of protection? Discuss various zones of protection for modern power system.
13. Discuss the application of computer in protective relaying.

Or

Turn over

14. How the simulation of distance relays are done during transcient condition?

15. Explain relay co-ordination programme.

Or

16. What are the offline applications of computer in protective relaying?

17. What is a micro processor? Describe a typical micro computer with the help of a block diagram.

Or

18. Explain multistage frequency relay.

19. Describe the realization of Mho an offset Mho by using a generalized mathematical model and a microprocessor.

Or

20. What do you mean by FWHT? How can R and X offline can be calculated by an algorithm based on FWHT?

(5 × 12 = 60 marks)

G 1239 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

INSULATION TECHNOLOGY (Elective III) (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. What are poly chlorobiphenyls?
2. Write short note on purification of transformer oil.
3. Explain complex permittivity.
4. What are the factors that affect the dielectric strength of insulating of material?
5. Define dipole moment and polarisation.
6. What are absorption currents?
7. Discuss Penning effect.
8. What are the limitations of Toansend's theory?
9. Discuss the factors influencing conduction in pure liquids.
10. What is treeing and tracking?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain the preparation and properties of paper insulation.

    (b) What are the special features of Epoxy resin insulation?

Or

12. Explain the properties and applications of following insulating materials :

    (a) Mica ; (b) SF_6 ; (c) Teflon.

Turn over

13. Explain the frequency dependence of dielectric constant and loss tangent.

Or

14. Explain a method for measurement of partial discharges.

15. What is internal field? Derive Clausius-Mosotti relation.

Or

16. Explain surge phenomenon and design of insulation system in HV Transformers.

17. Explain Streamer theory of breakdown in gases.

Or

18. Explain the following :

    (a) Ionisation by collision.

    (b) Breakdown in electronegative gases.

19. Explain various mechanisms of breakdown in vacuum.

Or

20. Write short notes on the following :

    (a) Breaddown in composite dielectrics.

    (b) Breakdown due to internal discharges.

(5 × 12 = 60 marks)

G 1242

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

VLSI TECHNOLOGY (Elective III) (E)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Explain Frenkel defect.
2. Write a note on metallisation.
3. Write a note on junction isolation.
4. Write a note on Schottky diodes.
5. Explain the need for design rules.
6. Write a note on Latch up in CMOS transistors.
7. Explain the steps to be taken to reduce power dissipation in subsystem designs.
8. Discuss the steps involved in a subsystem design.
9. Write a note on the features of Ga As technology.
10. Write a note on the need for device modelling.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain the operation of a crystal grower with the help of a neat sketch.

Or

(b) Explain the different diffusion profiles and their significances.

12. (a) Discuss the fabrication of monolithic n-p-n bipolar transistors.

Or

(b) Explain how the threshold voltage of a CMOS transistor can be controlled.

Turn over

13. (a) Explain scaling in CMOS transistors.

Or

(b) Explain twin well process for the fabrication of a CMOS transistor.

14. (a) Draw the schematic of an array shifter using transmission gates. Also draw its layout.

Or

(b) Explain the design steps of a BiCMOS NOR gate.

15. (a) Explain the significance and effects of sub micron CMOS technology.

Or

(b) Explain the doping process in GaAs technology.

(5 × 12 = 60 marks)

G 1163 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Branch : Electrical and Electronics Engineering

SWITCHGEAR PROTECTION (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. What are the processes that lead to initiation of arc in circuit breakers?
2. Explain the terms, Breaking current and Making current.
3. What are the advantages and disadvantages of static relays over electromagnetic relays?
4. Discuss the following terms : Zone of protection, primary and back up protection.
5. List the various faults that can occur in alternators.
6. What is the working principle of Buchholtz Relay?
7. Discuss the advantages of distance protection over other types of protection for feeders.
8. Explain Translay protection scheme for a single-phase feeder.
9. Discuss the causes of switching overvoltages in power systems.
10. What are volt time curves and BIL?

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Derive an expression for RRRV.

    (b) In a 220 kV system, the inductance and capacitance upto the location of circuit breaker is 25 mH and 0.025 μF respectively. A resistance of 600 Ω is connected across the contacts of the circuit breaker. Determine

    (i) Natural frequency of oscillation.

    (ii) Damped frequency of oscillation.

    (iii) Critical value of resistance which will give no transient oscillation.

Or

12. Explain the construction, operation and types of Air Blast circuit breaker.

13. Write short notes on the following :

    (a) Negative sequence relay.

    (b) Time curved characteristics for overcurrent protection.

    (c) Operating principle of Impedance relay.

Or

14. With block diagram, explain the operation of static differential relay.

15. (a) Explain the protection of alternator against loss of excitation.

    (b) A 50 MVA, 33 kV, 3-phase alternator is protected by circulating current scheme using 2000/5 A current transformer. The neutral is grounded through a resistance of 7.5 Ω. If the pick up current for the relay is just above 0.5 A, determine the percentage of the winding of each phase that remains unprotected.

Or

16. (a) Describe with neat sketch, Merz Price protection of Star delta transformer.

    (b) Discuss the need of Harmonic Restraint Relay.

17. Explain the following methods for protection of feeders :

    (a) Differential protection.

    (b) Distance protection.

Or

18. Write short notes on the following :

    (a) Carrier current protection for long lines.

    (b) Time graded protection for radial and parallel feeders.

19. Starting from fundamentals, derive the expressions for voltage and current waves propagated on long transmission lines.

Or

20. Discuss the various methods of protection of transmission lines against lightning overvoltages.

(5 × 12 = 60 marks)

19. (a) Derive the swing equation of a synchronous machine.

(b) A 2 pole, 50 Hz, 11kV turboalternator has rated power of 1,000 MW at 0.85 pf lagging. The rotor has moment of inertia of 10,000 kg–m^2. Calculate H and M in pu.

Or

20. Explain Equal area Criterion for analysing sudden change in mechanical inpt on a single machine infinite bus bar system.

(5 × 12 = 60 marks)

G 1156 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2012

Eighth Semester

Electrical and Electronics Engineering

POWER SYSTEM ANALYSIS (E)

(Regular / Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Draw the single line diagram of a typical power system having generators, Transformers and Transmission lines. Draw its impedance diagram.
2. Draw the zero sequence networks of :
   (a) Star - delta with neutral of star grounded.
   (b) Delta delta transformers.
3. What is accelerating factor ? Discuss its effect on load flow solution algorithm.
4. Compare Gauss Seidel and Newton Raphson methods of load flow solution.
5. Discuss cost function and incremental fuel cost.
6. Explain B coefficients and penalty factor for optimal power dispatch.
7. Draw and explain the oscillogram of short circuit current when an unloaded alternator is subjected to 3-phase fault.
8. Discuss the need for reactors in power system operation.
9. Differentiate between voltage stablity and rotor angle stability.
10. What is synchronising Coefficient ? How does it affect stability of the system ?

(10 × 4 = 40 marks)

Part B

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

11. Determine the bus admittance matrix for the system given in Fig. 1. (on page 2)

Line (bus to bus)	1—2	1—4	2—3	3—4
R (Per unit)	0.02	0.05	0.04	0.025
X (per unit)	0.1	0.2	0.2	0.1

Which elements of Y bus are affected, if the line shown dotted is added from bus 2 to bus 4. if the pu. impedance of this line is 0.1 + j 0.4, find new Y bus.

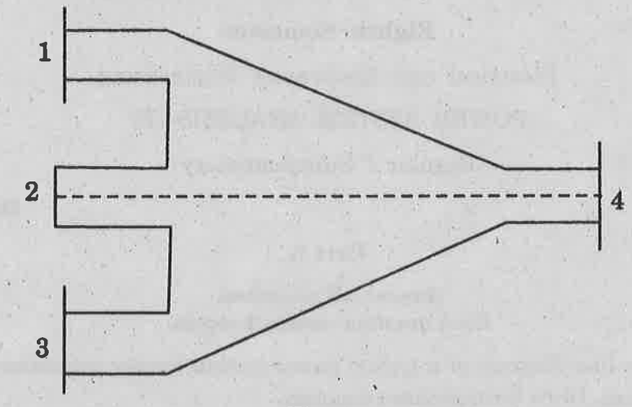

Fig. 1.

Or

12. Find Z bus for the system whose reactance diagram is given in Fig. 2. All reactances are in pu.

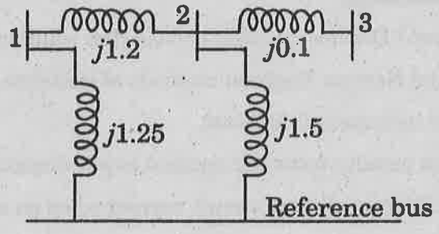

Fig. 2.

13. Explain Newton Raphson method of load flow analysis when :
    (a) System has load buses only.
    (b) System has both generator and load buses.

Or

14. For the system shown in Figure 3, (on page 3) carry out one iteration of load flow solution by Gauss Seidel method. Line admittances are in p.u.

    Bus 1 : Slack bus, V 1.03 $\angle 0°$ pu.

    Bus 2 : PV Bus, $|V| = 1.0$ pu, $Pg = 3$ pu

    Bus 3 : PQ bus, $P_L = 3$ pu, $Q_L = 1$ pu

    Neglect limits on reactive power generation.

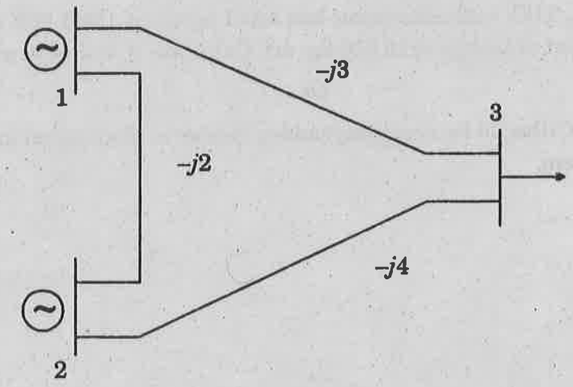

Fig. 3.

15. Explain optimal operation of a power system neglecting losses. What are the system constraints ?

Or

16. For the two bus system shown in Fig. 4, of 100 MW is transferred from plant 1 to the load, a transmission loss of 10 Mw is incurred. Find the required generation for each plant and the power received by the load when the system λ is Rs. 25 / Mwh.

$$\frac{dc_1}{dp_1} = 0.02\ p_1 + 16.0 \text{ Rs./ Mwh.}$$

$$\frac{dc_2}{dp_2} = 0.04\ p_2 + 20.0 \text{ Rs./ Mwh.}$$

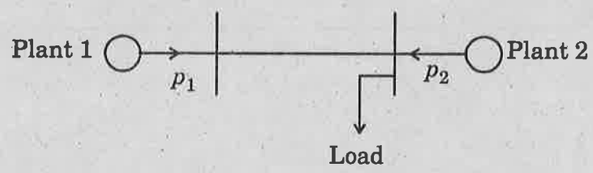

Fig. 4.

17. Explain various methods of analysing three phase faults.

Or

18. A three-phase synchronous generator rated 20 MVA, 13.8 kV has positive, negative, zero sequence reactances of 0.2 pu, 0.3 pu.and 0.15 pu. respectively. The neutral is grounded through a reactance of 0.05 pu. Find the fault current and the line to line voltages when a single line to ground fault occur at generator terminals, with generator operating unloaded at rated voltage.

Turn Over