6E7141

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6E7141

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical and Electronics Engineering
6EX3-01 Computer Architecture
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Explain advantages and limitations of RISC architecture.
2. Explain different data types used in computer systems.
3. What is a system bus? Explain its types.
4. Explain the concept of virtual memory and its need.
5. Compare optical disks and magnetic disks.
6. Explain the operation of control unit.
7. Explain the difference between 16-bit and 32-bit microproeessors.
8. Differentiate between parallel port and serial port.
9. What is meant by pipelining?
10. What do you mean by Memory Management Unit?

PART - B
(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Compare CISC and RISC architectures in terms of instruction set, execution time, and hardware complexity.
2. Compare fixed-point and floating-point representation.
3. Analyze the organization of system memory and explain how it affects overall computer performance.
4. Analyze features of PCI Express that make it suitable for high-speed applications.
5. Explain Instruction Level Parallelism (ILP) and analyze how it enhances processor throughput.
6. Explain the architecture of a System-on-Chip (SoC).
7. Explain various addressing modes of 80×86 in detail.

PART - C
(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Explain the architecture and functional units of a general computer system. Also explain input/output unit, memory unit, ALU, control unit, and their interaction during instruction execution with the help of block diagram.
2. Describe binary multiplication and division algorithms. Also explain hardware implementation and performance considerations.
3. What is Direct Memory Access (DMA)? Explain DMA Controller in detail with the help of suitable diagram.
4. Explain the architecture of 8086 microprocessor in detail. Also explain block diagram, functions of Execution Unit (EU) and Bus Interface Unit (BIU), and their interaction.
5. Explain the architecture of a Digital Signal Processor (DSP). Also explain the features in detail with suitable applications.

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6E7142

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical and Electronics Engineering
6EX4-02 Power System - II
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Define load flow analysis and Define slack bus, PV bus, and PQ bus.
2. Differentiate between Gauss-Seidel and Newton-Raphson methods.
3. What is swing equation? Draw power angle curve.
4. Explain the concept of state estimation.
5. Derive the expressions for real and reactive power at a bus.
6. What is spot pricing?
7. What is demand side management? What is electricity market?
8. Compare SVC and STATCOM.
9. What will happen if all buses are taken as PQ buses? Why is reactive power not controlled at PQ bus?
10. Why is equal area criterion not valid for multi-machine systems?

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Explain the formation of bus admittance matrix using inspection method.

2. A 2-Bus power system has the following data:

   Bus 1 is slack bus: $V_1 = 1.05\angle 0^\circ$

   Bus 2 is a load bus with $P_2 = -0.5$ p.u and $Q_2 = -0.2$ p.u

   Line admittance: $Y_{12} = -j10$

   Using Gauss-Seidel method, determine the voltage at bus 2 after one iteration. Assume initial voltage $V_2^{(0)} = 1\angle 0^\circ$.

3. Explain excitation system in synchronous generators. Describe the working of PMU and WAMS.

4. Differentiate between preventive control and emergency control.

5. Discuss power system security assessment.

6. Explain regulatory framework in power systems.

7. Explain different electricity market models in detail.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Solve the load flow problem of a two-bus system using Gauss-Seidel method.

2. Analyze system stability using equal area criterion.

3. Explain load frequency control of a single-area system with block diagram.

4. Discuss various methods of voltage control in power systems.

5. Describe SCADA system in detail with block diagram.

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6E7143

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical and Electronics Engineering
6EX4-03 Power System Protection
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Explain modeling of CT and PT with standards.
2. A transformer has CT ratios of 1000/5 on primary and 500/5 on secondary. Calculate whether differential protection will operate for a fault current of 500 A on secondary side.
3. Explain the concept of reach in protective relays.
4. Explain Plug Setting Multiplier (PSM) and Time Multiplier Setting (TMS). How does it affect relay operation.
5. Define directional relay and explain its need.
6. What is aliasing and how can it be avoided?
7. What is restraining coil in differential relay and why is it used?
8. Why are digital relays faster than electromechanical relays?
9. Distinguish between reliability and selectivity in protection systems.
10. What is zone protection in distance relays?

PART - B
(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Explain generator protection schemes in detail. Discuss stator and rotor fault protection methods.
2. Explain the concept of digital protection and its advantages.
3. Explain out-of-step protection in power systems.
4. A feeder is protected by an overcurrent relay with plug setting of 150% and CT ratio of 200/5. The relay current setting is 4 A. Calculate the fault current at which the relay operates.
5. Explain relay testing methods and procedures in protection systems.
6. Discuss relay coordination in radial and ring main systems with suitable diagrams.
7. Describe distance protection of transmission lines with characteristics.

PART - C
(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Discuss the working and classification of circuit breakers used in protection. Compare different types of circuit breakers.
2. Describe overcurrent protection. Discuss time-current characteristics of overcurrent relays.
3. Explain computer-aided protection schemes.
4. Describe under-frequency and under-voltage protection schemes.
5. Describe busbar protection schemes. Compare different busbar arrangements and their protection requirements.

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6E7144

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical Engineering
6EE4-04 Electrical Energy Conversion and Auditing

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is the need of energy conservation?
2. What are the issues of power Quality?
3. What do you mean by tariff?
4. Define auditing types?
5. Difference between energy sources?
6. What is heat capacity?
7. What do you mean by power factor improvement?
8. How we calculate motor efficiency?
9. Define the scenario of energy?
10. Discuss benchmarking performance?

PART - B
(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Explain energy audit and also discuss different types of energy audit?
2. What is "Green House Effect"?
3. What is energy strategy for the future and also explain energy conservation?
4. Explain electrical load management and maximum demand control?
5. Define energy pricing with it's features?
6. Discuss energy balance diagrams in details?
7. What instruments used for energy audit, Explain?

PART - C
(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Explain the important features of the Energy Conservation Act?
2. Discuss solar hybrid power system with suitable diagram?
3. Explain the role of training and awareness in energy management programme?
4. Elaborate the automatic power factor controllers and also explain why the selection and location of capacitors in electrical system performed?
5. Explain the energy efficiency light control for assessing existing lighting system in a facility?

6E7145

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6E7145

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical and Electronics Engineering
6EX4-05 Electric Drives
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Write the torque equation of a DC Motor.
2. Define the base speed of a DC motor.
3. List the methods of electric braking for DC motors.
4. Name the method of speed control of a DC Motor Drive.
5. Write the expression for output voltage of single-phase fully controlled AC-DC converter with continuous mode of conduction.
6. Write the expression for the average output voltage of a DC chopper in terms of duty cycle.
7. Define the duty cycle of a chopper.
8. Write expression for synchronous speed for induction motor.
9. Define slip in an induction motor.
10. State the effect of supply voltage variation on induction motor torque.

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. What is electric drive? Draw a block diagram of an electric drive. Discuss the advantages of Electric drives.
2. Discuss constant torque and constant power operation of DC motor drive.
3. A 200 V, 875 rpm, 150A separately excited DC motor has an armature resistance of 0.06 ohms. It is fed from a single phase fully-controlled rectifier with an AC source voltage of 220 V, 50 Hz. Assuming continuous conduction. Calculate
   i) Firing angle for rated motor torque and 750 rpm.
   ii) Firing angle for rated motor torque and -500 rpm.
   iii) Motor speed for delay angle (α) 160 degree and rated torque
4. Discuss multi-quadrant chopper fed DC drive.
5. Draw and explain the equivalent circuit of an induction motor. Derive the torque equation and discuss the torque-speed characteristics.
6. Discuss that the maximum torque as independent of rotor resistance and maximum slip is independent of voltage in induction motor drive.
7. Name the methods of starting and speed control of Induction motor. Why stator voltage control is suitable for speed control of induction motors in fan and pump drives? Discuss.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Discuss close loop control of DC Drive.
2. A 230 V, 960 rpm and 200 A separately excited DC motor has an armature resistance of 0.02 ohms. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction.
   i) Calculate duty ration of chopper for motoring operation at rated torque and 350 rpm
   ii) Calculate duty ration of chopper for braking operation at rated torque and 350 rpm
3. A 220 V, 1500 rpm, 50 A separately excited motor with armature resistance of 0.5 ohms, is fed from a 3-phase fully controlled rectifier. Available AC source has a line voltage of 440 V, 50 Hz. A star-delta connected transformer is used to feed the armature so that motor terminal voltage equals rated voltage when converter firing angle is zero.
   i. Calculate transformer turn ratio.
   ii. Determine the value of firing angle when (a) motor is running at 1200 rpm and rated torque; (b) when motor is running at -800 rpm and twice the rated torque.

4. Discuss the static rotor resistance control of wound rotor induction motor drive. Draw a close loop speed control block diagram and obtain the relation for total rotor resistance in terms of chopper duty cycle.

5. Explain the V/f (voltage-frequency) control method of an induction motor drive with suitable characteristics, advantages and limitations.

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6E7148

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026
Electrical Engineering
6EE5-13 Electrical and Hybrid Vehicles (El.-II)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is meant by vehicle performance analysis?
2. Define transmission characteristics in conventional vehicles.
3. What is the role of an internal combustion engine in HEVs?
4. What is series hybrid traction?
5. What is the role of an inverter in electric vehicles?
6. What are the basic components of an electric drive-train?
7. What is the function of a fuel cell in EVs?
8. What are the main energy storage devices used in electric vehicles?
9. What is the need for energy management in hybrid vehicles?
10. What is the objective of energy optimization in HEVs?

PART - B
(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Explain various forces acting on a vehicle and their effect on performance.
2. Discuss the impact of hybrid vehicles on energy consumption and environment.
3. Discuss the configuration and control of DC motor drives in EVs.
4. Compare series and parallel hybrid configurations.
5. Discuss vehicle power source characterization and transmission system behaviour.
6. Compare different energy storage systems used in EVs (Battery, fuel cell, supercapacitor).
7. Explain the challenges in implementing energy management strategies.

PART - C
(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. Develop and explain mathematical models for vehicle performance analysis.
2. Discuss configuration, control, and classification of induction motor drives in EVs.
3. Explain various hybrid drive-train configurations with advantages and disadvantages.
4. Discuss the design considerations for sizing and selection of energy storage systems.
5. Explain optimization-based energy management strategies with suitable examples.

6E1575

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6E1575

B.Tech. VI-Sem. (Back) Examination, April/May - 2026

Electrical & Electronics Engg.

6EX4-05 Electric Drives

EE, EX

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks: 42

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Four questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is flux weakening, and how does it enable high-speed operation in a DC motor?
2. What measures can be taken to minimize the armature current ripple in a DC motor?
3. What is the plant transfer function in the context of a separately excited DC motor drive system?
4. What are salient features of frequency control method?
5. Draw the speed-torque characteristics of a three phase induction motor and mention its operating regions?
6. What are the effects of harmonics in VSI fed induction motor drives?
7. Provide the equations governing motor load dynamics - Fundamental torque equation.
8. Define operating point.
9. Sketch the constant torque and constant power modes of operation of DC motor drive based on range of speed control.
10. What is steady state equilibrium condition for stability of a drive?

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×8=40)**

1. Draw the speed torque characteristics of a separately excited dc motor. Justify your answer with the help of derivation of expression for speed ùm as a function of torque.
2. Derive the expression of speed for Class A chopper fed separately excited DC motor, for the continuous current conduction mode of operation. Draw the corresponding waveforms of one cycle for current and output voltage clearly indicating the time of operation.
3. Draw the block diagram for separately excited dc motor with armature voltage control and derive the associated transfer function.
4. Comment with relevant justification that:-
   a) "Constant torque loads are not suitable for AC voltage controller fed induction motor drive".
   b) "Stator voltage control method is more suitable for fan and pump motor drives".
5. Explain the effect of unbalanced source voltages on the performance of induction motor.
6. Draw the performance characteristics of induction motor and different modes of region in adjustable frequency induction motor drive. Discuss the variation of torque, stator current, stator voltage, rotor flux with respect to rotor speed variation.
7. Describe the static rotor resistance control method used in three-phase induction motor drives, and illustrate the scheme with a neat schematic diagram.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Four questions. **(4×15=60)**

1. Discuss vector control of induction motor through schematic block diagram. Write necessity of direct torque control and limitation of vector control method.
2. Compare and explain static Scherbius and static Kramer slip power recovery control techniques for induction motors, including relevant derivations and illustrations.
3. Examine the combined effect of simultaneous variation in applied voltage and frequency on the torque–speed characteristics, and propose suitable operating conditions for optimal performance.
4. Analyze the operating principle of Space Vector PWM (SVPWM) and explain how it improves DC bus utilization compared to conventional PWM techniques.
5. Describe the operation of a four-quadrant chopper-fed DC motor drive with neat diagrams. Explain each quadrant of operation.
