

**17353****21415**

3 Hours/100 Marks

Seat No.

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- Instructions :** (1) **All** questions are **compulsory**.
(2) Answer **each** next main Question on a **new** page.
(3) Illustrate your answers with **neat** sketches **wherever** necessary.
(4) Figures to the **right** indicate **full** marks.
(5) **Use** of Non-programmable Electronic Pocket Calculator is **permissible**.
(6) Mobilephone, pager and **any** other electronic communication devices are **not permissible** in Examination Hall.

MARKS**SECTION – I****(Electrical Engineering)****50**

1. Solve **any seven** of the following : **(7×2=14)**
- Define following terms and state its unit.
 - Frequency
 - Time period
 - Maximum value
 - Average value.
 - State working principle of PMMC.
 - Define transformation ratio. State its value for step up and step down transformer.
 - List the types of instruments used for making of ammeters and voltmeters.
 - List the methods of fire extinguishing adopted in electrical engg.
 - Define energy conservation and energy audit.
 - Define luminous flux and illumination.
 - Draw the symbol of following circuit elements
 - Trip coil
 - Earth coil

P.T.O.

**MARKS**

- i) State the line and phase relationship between voltage and current in star and delta connection.
- j) Give classification of electric drives.

2. Solve **any three** of the following : **(4×3=12)**

- a) Draw layout of electrical power supply system. Represent different generation, transmission and distribution voltages on it.
- b) List any four types of electrical welding. Give any one application for each.
- c) State the operating principle of dynamometer wattmeter. Explain working of current coil, potential coil and multiplier.
- d) Draw a labelled diagram of a lighting circuit for bedroom.
- e) A pure inductance of 318 mH is connected in series with a pure resistance of 75Ω . The circuit is supplied from 50 Hz source and the voltage across resistor is 170 volts. Calculate supply voltage and the phase angle.

3. Solve **any three** : **(4×3=12)**

- a) List the different types of incandescent and discharge lamp. Give rating and application of each.
- b) List different types of material used in incandescent and discharge lamp.
- c) Explain working principle of electroplating.
- d) Draw a circuit diagram for star-delta starter of 3-ph. induction motor.
- e) State any four factors for selection of motor for different drives.

4. Solve **any three** : **(4×3=12)**

- a) Derive e.m.f. equation of 1- ϕ transformer.
- b) Define efficiency and regulation of transformer. Draw experimental connection diagram of direct loading method.
- c) Compare transformer and auto-transformer w.r.t. following points :
 - i) Circuit diagram
 - ii) Windings
 - iii) Voltage regulation and
 - iv) Applications.
- d) Draw constructional diagram of stator and rotor of 3-ph induction motor label different parts of it.
- e) Explain in brief the machines used in agro system.



MARKS

SECTION – II

(Electronics)

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1. Solve **any seven** of the following : (7×2=14)
 - a) Define resistor and capacitor.
 - b) Define semiconductor and draw energy band diagram for Germanium.
 - c) Draw symbol of light emitting diode and state any two applications of it.
 - d) Draw the symbols of the following :
Induction, PNP transistor, Diode and TRIAC.
 - e) List any two applications of SCR and Triac.
 - f) Define base current amplification factor β . Give relation between α and β .
 - g) Define forward current and peak inverse voltage w.r.t. rectifiers.
 - h) Draw circuit for capacitor input filter or π filter.
 - i) Define universal gates.
 - j) Construct AND and NOT gate using universal gates.
2. Solve **any three** : (4×3=12)
 - a) Define forward biasing of P-N junction. Explain the process of current flow across PN junction.
 - b) Define intrinsic and extrinsic semiconductors. What is doping ? Give classification of extrinsic semiconductor.
 - c) Draw V-I characteristics of SCR. Explain working of SCR in forward conduction mode and reverse blocking mode.
 - d) State four operating modes of triac and represent it on V-I characteristics of it.
 - e) State Demorgan's theorem. Prove the statement using truth table.
3. Solve **any three** : (4×3=12)
 - a) Define following terms w.r.t. amplifiers and give mathematical expression for it.
 - i) Input resistance
 - ii) Output resistance
 - iii) Current gain.

**MARKS**

- b) Draw transistor circuit for CE configuration. Draw O/p characteristics and explain in brief saturation and active region.
- c) Draw symbol of LED and explain its construction. State any two applications of it.
- d) What is digital display ? State types of LED and LCD.
- e) Define regulated D. C. power supply. State necessity of use of regulated power supply. List types of voltage regulators.

4. Solve any three : (4×3=12)

- a) Draw symbol of following logic gates-AND, OR, EX-OR and NAND. State the logic expression and truth table for it.
 - b) Explain working of shunt capacitor filter w.r.t input and output waveform.
 - c) What is P-type of semiconductor ? Explain formation of P-type of semiconductor.
 - d) Compare half wave, centre tap and bridge rectifiers w.r.t. following points.
 - i) Max. efficiency
 - ii) Ripple factor
 - iii) Output frequency
 - iv) Peak inverse voltage.
 - e) Draw characteristics of zener diode. Define zener voltage. State any two characteristics of it.
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