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RETEST EXAMINATION-2025

November/December, 2025

Semester : 3rd (Old)

Branch : Common

Subject Code : EL/ET-304 (Old)

**FUNDAMENTAL OF ELECTRICAL
& ELECTRONICS ENGINEERING**

Full Marks – 70

Time – Three hours

**The figures in the margin indicate full marks
for the questions.**

Instruction :

(i). Objective questions 1, 2 and 3 are compulsory.

(ii) Answer any *five* questions from the rest.

1. Fill in the blanks : 1×5=5

(a) An insulator has _____ temperature coefficient of resistance.

(b) $Y=A.B$ is the Boolean expression of _____ gate.

[Turn over

(c) A transistor has _____ terminals.

(d) A semi-conductor is an extremely pure form is known as _____.

(e) 1 B.O.T = _____ kWh

2. Choose the correct answers :

1×5=5

(a) The back emf of DC motor

(i) aids the applied voltage

(ii) aids the armature current

(iii) opposes the applied voltage

(iv) None of the above

(b) The rate of doing work is called as

(i) power

(ii) energy

(iii) force

(iv) All of these

(c) How many electrical degree make one cycle ?

(i) 270°

(ii) 180°

(iii) 120°

(iv) 360°

(d) The ratio of true power to the apparent power is called as

(i) form factor

(ii) peak factor

(iii) power factor

(iv) rms value

(e) The base of transistor

(i) is doped lightly (ii) is not doped

(iii) is doped heavily (iv) None of these

3. Match the following Columns : $1 \times 5 = 5$

Column - A	Column - B
(a) one half cycle	(i) silicon
(b) inductance	(ii) OR gate
(c) semiconductor	(iii) Henry
(d) $0+1=1$	(iv) safety element
(e) fuse	(v) alternation.

4. (a) Define Kirchhoff's laws (KCL and KVL) with suitable examples $2+2=4$

(b) A Wheatstone bridge ABCD is arranged as follows: $AB=1\Omega$; $BC=2\Omega$; $CD=3\Omega$; $DA=4\Omega$. A resistance of 5Ω is connected between B and D. A 4 V battery of internal resistance 1Ω is connected between A and C. Calculate the values of current in each resistor. 7

5 (a) Define work, power and energy. 3

(b) Explain the relation between kilo-watt hour and kilo calorie. 3

- (c) Three resistors are connected in series across a 12 V battery. The first resistor has a value of 1Ω , second has a voltage drop of 4V and the third has a power dissipation of 12W. Calculate the value of the circuit current. 5
- 6 (a) Define Faradays laws of electromagnetic induction. 2
- (b) Explain the emf equation of DC generator. 4
- (c) An 8-pole DC shunt motor with 778 wave connected armature conductors and running at 500 rpm, supplies a load of 12.5Ω resistance at terminal voltage of 250V. The armature resistance is 0.24Ω and field resistance is 250Ω . Find the armature current, induced emf and flux per pole. $1+2+2=5$
- 7 (a) The instantaneous current is given by the equation $i = 120\sin 314t$, calculate frequency, time period, maximum current, rms value of current and average value of current. 5
- (b) A resistance of 20Ω , an inductance of 0.2 H and a capacitance of $200\mu\text{F}$ are connected in series across 220V, 50Hz mains. Calculate the impedance, power and power factor consumed by the circuit. Also find the circuit current and voltages across R, L and C. 6

- 8 (a) Define semiconductor and write the types of semi-conductor. $2+2=4$
- (b) Explain the operation of PNP transistor. 4
- (c) Differentiate between intrinsic and extrinsic semi-conductor. 3
- 9 (a) What is fuse ? Write the operation of fuse ? $1+2=3$
- (b) Mention four safety rules required for electrical installation. 3
- (c) Deduce the emf equation of transformer. 5
- 10 (a) What are the basic logic gates ? Draw the symbol and truth table for these gates. $2+3=5$
- (b) Write short note about 8085 microprocessor. 3
- (c) Name the different types of house wiring. 3