PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

PG DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

TRANS DISCIPLINARY COURSE
(Common to PG Programmes)

BASIC ELECTRONICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	In a series connection of resistors: a) Voltage remains same across each resistor b) Current remains same through each resistor c) Power remains same across each resistor d) Resistance remains same across each resistor	K1	CO1
	2	Which colour represents digit **5** in resistor coding? a) Red b) Green c) Blue d) Yellow	K2	CO1
2	3	Which law states that the current through a conductor is directly proportional to the applied voltage? a) Faraday's Law b) Ohm's Law c) Kirchhoff's Law d) Coulomb's Law	K1	CO2
	4	Kirchhoff's Voltage Law is based on the conservation of: a) Current b) Charge c) Energy d) Resistance	K2	CO2
3	5	The charge of an electron is: a) $+1.6 \times 10^{-19}$ C b) -1.6×10^{-19} C c) $+9.1 \times 10^{-31}$ C d) -9.1×10^{-31} C	K1	CO3
	6	Atomic number of an element represents: a) Number of neutrons b) Number of protons c) Number of electrons + protons d) Number of neutrons + protons	K2	CO3
4	7	Decimal number 255 in binary is: a) 11110000 b) 11111111 c) 10101010 d) 11101111	K1	CO4
	8	BCD uses how many bits to represent a decimal digit? a) 2 b) 4 c) 8 d)16	K2	CO4
5	9	The output of an OR gate is 0 only when: a) Any one input is 0 b) All inputs are 1 c) All inputs are 0 d) Inputs are unequal	K1	CO5
	10	The XOR gate output is the same as: a) (A + B)' b) AB' + A'B c) AB + A'B' d) A + B	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the relationship between voltage, current, and resistance using Ohm's Law with a simple example.	K2	CO1
		(OR)		
	11.b.	Describe how capacitors are connected in series and calculate the total capacitance value.		
2	12.a.	Draw a simple series circuit and apply Kirchhoff's Voltage Law (KVL) to calculate the voltage across each resistor.	K3	CO2
		(OR)		
	12.b.	Explain the Current Divider Rule using an example.		
3	13.a.	Explain the V–I characteristics of a Zener diode in forward bias and reverse bias with a simple sketch.	K3	CO3
		(OR)		
	13.b.	Describe the difference between conductors, semiconductors, and insulators using the energy band diagram.		
4	14.a.	Analyze and convert the hexadecimal number 3F9 into binary and octal. Show each stage of conversion.	K4	CO4
		(OR)		
	14.b.	Convert the decimal number 245 into BCD code. Then, represent the same number in Excess-3 code.		
5	15.a.	Simplify the Boolean expression (A+B)(A+C) using Boolean algebra laws and show each step clearly.	K4	CO5
		(OR)		
	15.b.	Analyze and simplify the Boolean function F(A,B,C)=A'BC+AB'C+ABC'. Write the minimized expression.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Derive the formula for the equivalent resistance of resistors connected in series.	K4	CO1
2	17	Explain the Maximum Power Transfer Theorem. Show how to calculate the load resistance that receives maximum power from a source.	K4	CO2
3	18	Analyze the construction of a PN junction diode. Explain how potential barrier is formed.	K4	CO3
4	19	Compare BCD code and Excess-3 code with examples. Why is Excess-3 preferred in error detection?	K4	CO4
5	20	Examine about the operation and truth table of all the Logic gates.	K4	CO5

Z-Z-Z END