

ANALOG AND DIGITAL ELECTRONICS

IT303

TIME ALLOTTED: 3 HOURS

FULL MARKS: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

1. Answer any **ten** from the following, choosing the correct alternative of each question: **10×1=10**

SL	Question	Marks	CO	Blooms Taxonomy Level
(i)	The _____ circuit overcomes the problem of switching caused by jitter on the inputs. a) Astable Multivibrator b) Monostable Multivibrator c) Bistable Multivibrator d) Schmitt Trigger	01	IT303.1	Understanding
(ii)	The output of an exclusive-NOR gate is 1. Which input combination is correct? a) A = 1, B = 0 b) A = 0, B = 1 c) A = 0, B = 0 d) none of the above	01	IT303.2	Analyzing
(iii)	How many AND gates are required to implement the Boolean expression? $AB' + A'B$ a) 1 b) 2 c) 3 d) 4	01	IT303.2	Applying
(iv)	What is another name for a bistable multivibrator? a) an on-off switch b) an oscillator c) a flip-flop d) none of the above	01	IT303.1	Understanding
(v)	An astable 555 timer has the following number of stable states: a) 0 b) 1 c) 2 d) 3	01	IT303.1	Applying
(vi)	The binary numbers A = 1100 and B = 1001 are applied to the inputs of a comparator. What are the output levels? a) $A > B = 1$, $A < B = 0$, $A = B = 1$	01	IT303.2	Analyzing

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	b) $A > B = 0, A < B = 1, A = B = 0$ c) $A > B = 1, A < B = 0, A = B = 0$ d) $A > B = 0, A < B = 1, A = B = 1$			
(vii)	How is a J-K flip-flop made to toggle? a) $J = 0, K = 0$ b) $J = 1, K = 0$ c) $J = 0, K = 1$ d) $J = 1, K = 1$	01	IT303.3	Understanding
(viii)	If an active-HIGH S-R latch has a 0 on the S input and a 1 on the R input and then the R input goes to 0, the latch will be _____. a) SET b) RESET c) CLEAR d) INVALID	01	IT303.3	Analyzing
(ix)	On a J-K flip-flop, when is the flip-flop in a hold condition? a) $J = 0, K = 0$ b) $J = 1, K = 0$ c) $J = 1, K = 1$ d) $J = 0, K = 1$	01	IT303.3	Applying
(x)	Which of these sets of logic gates are designated as universal gates? a) NOR, NAND. b) XOR, NOR, NAND. c) OR, NOT, AND. d) NOR, NAND, XNOR	01	IT303.2	Understanding
(xi)	Register is a? a) Set of capacitor used to register input instructions in a digital computer b) Set of paper tapes and cards put in a file c) Temporary storage unit within the CPU having dedicated or general-purpose use d) Part of the auxiliary memory	01	IT303.3	Applying
(xii)	An SR flip flop cannot accept the following input entry a) Both input zero b) zero at R and one at S c) zero at S and one at R d) Both inputs one	01	IT303.3	Analyzing

GROUP – B
(Short Answer Type Questions)
(Answer any three of the following) $3 \times 5 = 15$

SL	Question	Marks	CO	Blooms Taxonomy Level
2.	Design a Full Subtractor Circuit using logic gates.	05	IT303.3	Understanding

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3.	(i)	Prove the following Boolean identity- $(A+B)(A+B')(A'+C)=AC$.	03	IT303.2	Understanding
	(ii)	Convert Hexa decimal to binary number: $(2E5A)_{16}$.	02	IT303.2	Applying
4.		Explain 1-to-8 De-multiplexer by using logic gates.	05	IT303.3	Understanding
5.		Solve the function using K map method- $F = \sum m(1,2,4,6,7) + \sum d(11,14)$	05	IT303.2	Applying
6.		Describe the operation of a 555 timer in astable mode.	05	IT303.1	Analyzing

GROUP – C
(Long Answer Type Questions)

(Answer any three of the following) 3 x 15 = 45

SL		Question	Marks	CO	Blooms Taxonomy Level
7.		What is Shift register? What are the different types of shift register? Explain the working of Serial in parallel out shift register with logic diagram.	02+ 04 + 09	IT303.3	Analyzing
8.		Represent the following in both SOP and POS using Karnaugh map- $(A'+B'+D')$ $(A+B'+C')$ $(A'+B+D')$ $(B+C'+D)$	08+ 07	IT303.2	Understanding
9.		What is multi-vibrator? Draw and explain the working Principle of CMOS. In a monostable multivibrator $R=100K\Omega$, and the time delay $T=100ms$, Calculate the value of C.	15	IT303.1	Understanding
10.	(i)	Design a 2-bit Magnitude Comparator Circuit.	07	IT303.2	Applying
	(ii)	Explain 4-bit R-2R ladder type D/A converter.	08	IT303.4	Applying
11.		Define Followings <i>any three</i> :			
	(i)	4-bit R-2R ladder type D/A converter	05	IT303.4	Applying
	(ii)	Parity Generator	05	IT303.2	Analyzing
	(iii)	Successive approximation type A/D Converter	05	IT303.4	Understanding
	(iv)	Class AB Amplifier	05	IT303.1	Analyzing
	(v)	Encoder	05	IT303.2	Understanding