Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous College U/s UGC Act 1956)

B. Tech. SEMESTER-II, SEMESTER END EXAMINATION – SUMMER 2025

Subject Code: 1EL201 **Date: 26-05-2025**

Subject Name: BASIC ELECTRONICS

Time: 11:00 AM to 01:30 PM **Total Marks: 70**

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

		Marks	BL	CO
Q.1	**Multiple-Choice Questions**	**[05]**		
	(a) What is the use of a Rectifier circuit?	**1**	**R**	**1**
	(i) To amplify the input signal **(ii)** To convert AC to DC supply			
	(iii) To filter out **(iv)**To disturb the signal			
	(b) The efficiency of Half Wave Rectifier is _____.	**1**	**R**	**1**
	(i) 50% **(ii)** 40.6%			
	(iii) 82% **(iv)** 45%			
	(c) In Varactor Diode if Reverse voltage is increased, the capacitance is _____.	**1**	**A**	**2**
	(i) increased **(ii)** No change			
	(iii) decreased **(iv)** none of these			
	(d) FET is a _____ device.	**1**	**U**	**4**
	(i) Current Controlled **(ii)** Frequency Controlled			
	(iii) Voltage Controlled **(iv)** none of these			

(e)	What is the main advantage of FET which makes it more useful in industrial applications? **(i)** Semiconductor device **(ii)** Less cost **(iii)** Voltage controlled operation **(iv)** Small size	**1**	**A**	**4**

Q.2 Attempt Any Two **[10]**

(a)	Explain V-I characteristics of P-N junction diode.	**5**	**R**	**1**
(b)	Explain Full wave rectifier with necessary derivation (V_{dc} & V_{rms}) & waveforms.	**5**	**A**	**1**
(c)	Classify Clamper circuits ad Explain any one clamper circuit.	**5**	**N**	**1**

Q.3 Attempt Any Two **[10]**

(a)	Explain Zener diode ad its characteristics.	**5**	**R**	**2**
(b)	Explain Varactor Diode.	**5**	**U**	**2**
(c)	Explain Light Emitting Diode (LED).	**5**	**R**	**2**

Q.4 Attempt Any Two **[10]**

(a)	Draw and Explain the construction, operation and characteristics of N-Channel JFET.	**5**	**A**	**4**
(b)	Compare FET and BJT.	**5**	**N**	**4**
(c)	Explain the construction, operation and characteristics N-Channel D-type MOSFET.	**5**	**R**	**4**

SECTION B

		Marks	BL	CO
Q.5	**Multiple-Choice Questions**	**[05]**		
(a)	Input A='0' B='1' and C='1' for 3 –input Ex-OR gate. What is output?	**1**	**U**	**5**
	(i) '0' **(ii)**'1'			
	(iii) Toggle **(iv)** High impedance state			
(b)	In CE configuration of transistor , input circuit and output circuit are Reverse biased. So transistor will operate in	**1**	**U**	**3**
	(i) Active region **(ii)** Saturation region			
	(iii) Cut-OFF region **(iv)** Highly saturation			
(c)	2's complement of decimal number "$(17)_{10}$" in 8-bit binary format is	**1**	**A**	**5**
	(i) $(0001\ 1000)_2$ **(ii)**$(0001\ 0001)_2$			
	(iii)$(1111\ 0000)_2$ **(iv)**$(1110\ 1111)_2$			
(d)	Conversion of binary number $(1000)_2$ to octal is	**1**	**A**	**5**
	(i)10 **(ii)**8			
	(iii)0 **(iv)**5			
(e)	In DC load line the co-ordinate (Vce, Ic) at saturation point in CE configuration is	**1**	**U**	**3**
	(i) (0, Ic max) **(ii)**(Vcc, 0)			
	(iii)(Vcc , Ic max) **(iv)** (0, 0)			
Q.6	**Attempt Any Two**	**[10]**		
(a)	Explain working of NPN transistor with necessary diagrams.	**5**	**R**	**3**
(b)	Draw and explain voltage divider biasing with necessary equations. Enlist TWO advantages of voltage divider bias method compare to fixed bias method.	**5**	**U**	**3**
(c)	What is stability factor? Derive the expression for stability factor of collector feedback bias circuit .	**5**	**U**	**3**
Q.7	**Attempt Any Two**	**[10]**		
(a)	Make 2- input OR gate and AND gate using Diode circuit. Justify all logical input combination with resultant output of circuit.	**5**	**U**	**5**
(b)	What do you mean by universal gate? Enlist universal gates. Draw symbol and give truth table of each. Make OR gate using listed universal gate.	**5**	**R**	**5**
(c)	Give number conversion to binary , octal, hexadecimal, 1's complement, 2's complement, 9's complement and 10's complement of given decimal number $(81)_{10}$	**5**	**E**	**5**

Q.8 Attempt Any Two **[10]**

(a)	It is desired to set operating point at 2V , 1mA by biasing silicon transistor with collector feedback resistor R_B. if β =100 , find the value of R_B. Draw the circuit diagram and mention all given and obtained values.	**5**	**E**	**3**
(b)	Explain in detail : Transistor as Switch	**5**	**A**	**3**
(c)		**5**	**E**	**5**
	(i) Using 2's complement, Find addition of $(35)_{10}$ with $(20)_{10}$			
	(ii) Using 2's complement, Find subtraction of $(35)_{10}$ with $(20)_{10}$			
	(iii) Using 9's complement, Find subtraction of $(35)_{10}$ with $(0001\ 0111)_2$			

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