



**Khaja Banda Nawaz University, Kalaburagi**  
**Faculty of Engineering and Technology**  
**Question Bank**

**Sub: Basic Electronics Sub Code: 19KBELN25**

**Semester: Two Section:02**

1. Perform the following. i) convert  $(25.375)_{10}$  into binary equivalent. ii)  $(20E.CA)_{16}$  into binary  
iii) Subtract  $(11010.10)_2$  from  $(10110.01)_2$ . iv)  $(101111)_2$  from  $(10111)_2$  using Two's complement method. [2+2+2+2=8 Marks]
2. Convert the following numbers to their hexadecimal equivalent. i)  $(49.5)$  and ii)  $972.625$   
iii) convert  $(294.6875)_{10}$  into octal iv) subtract  $(1010)_2$  from  $(1111)_2$  using one's complement method. [3+3+3+3=12 marks]
3. Convert i)  $(EAD.FE)_{16} = (?)_{10} = (?)_8$  ii)  $(712.15)_8 = (?)_2 = (?)_{10}$ . [4+4=8 Marks]
4. Subtract i)  $(1111.101)_2$  from  $(1001.101)_2$  using 1's complement method.  
ii) Subtract  $(11101.111)_2$  from  $(11111.101)_2$  using 2's complement method. [4+4=8 Marks]
5. What are universal gates? Using NAND gates implement i) OR gate and ii) NOR gate [3+3=6 marks]
6. Simplify  $Y = AB + AC + ABC (AB + C)$ . Implement the same using gates. [5 marks]
7. Simplify the following i)  $Y = (B + CA)(C + AB)$  ii)  $Y = AB + AC + BD + CD$  [4+4=8 marks]
8. Explain with truth table and logic diagram Demorgan's theorem [8 marks]
9. Design Full Adder and Implement it using two half adders [6 marks]
10. What is PN junction diode. Explain with neat sketch V-I characteristics of PN junction diode. [6 marks]
11. Derive an expressions for average dc current and average dc voltage of Full wave rectifier [8 marks]
12. With appropriate circuit diagram explain the DC load line analysis of Semi-conductor diode [8 marks]

13. In a full wave rectifier, the input is from 30-0-30V transformer. The load and diode forward resistances are  $100\Omega$  and  $10\Omega$  respectively. Calculate the average voltage, dc output power, ac input power, rectification efficiency and percentage regulation. [10 marks]
14. With a neat circuit diagram and waveforms explain the working of full-wave bridge rectifier and show that its ripple factor is 0.48. [10 marks]
15. Explain the operation of Capacitor Filter with Full wave Rectifier [10 marks]
16. With neat circuit diagram and relevant waveforms, derive expressions for ripple factor of Full wave rectifier with capacitor filter. [8 marks]
17. In a FWR with a capacitor filter, the load current from the circuit operating from 230V,50Hz supply is 10mA. Establish the value of capacitor required to keep the ripple factor less than 1%. [8 marks]
18. Define  $\alpha_{dc}$  and  $\beta_{dc}$  and Establish a relationship between  $\alpha_{dc}$  and  $\beta_{dc}$  [6 marks]
16. With neat diagram explain output characteristics of npn transistor in CE- configuration. [6 marks]
19. A transistor has  $\alpha=0.9$ . If  $I_E=10\text{mA}$ , find the values of  $\beta$ ,  $I_B$  and  $I_C$ . [6 marks]
20. In a Common Emitter transistor circuit if  $\beta = 100$  and  $I_B = 50\mu\text{A}$ , compute the values of  $\alpha$ ,  $I_E$  and  $I_C$ . [6 marks]
21. Draw common emitter circuit and sketch the input and output characteristics. Also explain operating regions by indicating them on characteristics curve. [8 marks]
22. What is operational amplifier. Explain the importance of inverting and non-inverting amplifier. [8 marks]
23. Define the terms i) Common Mode gain  $A_c$  and Common Mode Rejection Ratio(CMMR). ii) Differential Gain  $A_d$  and iii) Slew Rate [9 marks]
24. List the various ideal and practical op-amp characteristics. [6 marks]
25. Draw internal block diagram of op-amp and mention the role of each stage. [5 marks]
26. The input to the basic differentiator circuit is a sinusoidal voltage of peak value of 10mV frequency 1.5KHZ. Find the output if,  $R_f=100\text{K}\Omega$ . And  $C_1=1\mu\text{F}$ . [6 marks]

27. Design an adder circuit using an op-amp to obtain an output voltage of  $V_o = -[2V_1 + 3V_2 + 5V_3]$ . [5 marks]
28. With a neat diagram, explain how an op-amp can be used as a differentiator. Explain how Op-Amp can be used as i) Integrator ii) Voltage Follower. [8 marks]
29. Draw the three input inverting summer circuit and derive an expression for its output voltage. [6 marks]
30. Explain with block diagram various elements of communication system [8 marks]
31. What is modulation. Explain need of modulation. [8 marks]
32. What is Modulation index? Define modulation index for AM. [6 marks]
33. With neat block diagram explain principle and working of optical Fiber communication [8 marks]
34. List the advantages and applications of optical Fiber communication [6 marks]
35. A 220 watts carrier is modulated to a depth of 50%. Calculate the total power. [5 marks]
36. What is Transducer? Explain with examples Active and passive Transducers. [8 marks]
37. Explain principles of Transduction. What are primary and secondary transducers? [8 marks]
38. What is an oscillator? Explain n working of Wein bridge oscillator [8 marks]
39. Draw the transistorized R-C phase shift oscillator and explain its operation. [8 marks]
40. Explain the Barkhausen criteria for oscillators with special reference to the condition  $A\beta < 1$ ,  $A\beta > 1$ ,  $A\beta = 1$ . [8 marks]
41. What is Barkhausens criteria for sustained oscillations. [6 marks]
42. Estimate the values of R and C for an output frequency of 1KHz in RC phase shift oscillator. [6 marks]