

ಹೊಸ ಪಠ್ಯಕ್ರಮ (೨೦೦೫-೨೦೦೬ ಶೈಕ್ಷಣಿಕ ವರ್ಷದಲ್ಲಿ ಅಭ್ಯಾಸ ಮಾಡಿದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)
New Scheme (For Students studied during the Year 2005-2006)

Code No. **40-NS**

Total No. of Questions : 40]

[Total No. of Printed Pages : 4

July, 2006
ELECTRONICS
(New Syllabus)

Time : 3 Hours]

[Max. Marks : 90

- Note :*
- The question paper has four Parts **A, B, C & D**.
 - Question No. 23 in Part C and Question No. 32 in Part D are from practicals.
 - Read the instructions given for each Part.

PART - A

Note : Answer all questions.

10 × 1 = 10

- Write the symbol of *npn* transistor.
- Name the transistor amplifier which has unity voltage gain.
- What happens to the gain of the amplifier when negative feedback is applied ?
- What is the voltage gain of an ideal Op-Amp ?
- Name the RC oscillator which does not have phase shift in the feedback network.
- Define critical frequency in radio communication.
- Expand the term AGC.
- What is a pair in *K*-map ?
- Convert (101101)₂ into gray code.
- What is uplink signal ?

PART - B

Note : Answer any ten questions.

10 × 2 = 20

- If $\alpha = 0.98$, find the value of β .
- Mention the steps involved to obtain *dc* equivalent circuit of CE-amplifier.
- What is a photo-transistor ? Draw its symbol.
- Determine the voltage gain of a negative feedback amplifier given the open loop gain is 1000 and $\beta = 0.02$.

[Turn over

15. What is buffer amplifier ? Draw the circuit diagram of Op-Amp buffer.
16. Mention the Barkhausen's criterion for sustained oscillations.
17. Define the following terms :
 - a) skip-distance
 - b) skip-zone
 in the radio communication.
18. Mention any two limitations of the AM.
19. Write the four possible minterms for two variables.
20. Draw the pin diagram of IC7400.
21. Write the excess-3 code equivalent of the decimal number (8)₁₀.
22. Define composite video signal.

PART - C

- I. Answer the following question.

1 × 4 = 4

23. Using the following data, calculate the frequency of oscillations for an RC phase shift oscillator. Compare the theoretical and practical values.

R Ω	C μF	T m sec	Frequency	
470	0.1	0.7	Theoretical	Practical
1kΩ	0.1	1.5		

OR

Using the following data, calculate the theoretical and practical values of voltage gain for an Op-Amp inverting amplifier.

$$V_i = 1 \text{ volt}$$

R_i in kΩ	R_f in kΩ	V_o in volts	Voltage gain	
			Theoretical	Practical
1	10	- 9.8		
2	15	- 7.3		

- II. Answer any *five* questions.

5 × 4 = 20

24. With the help of the graph explain the terms
- a) Active region
 - b) Cut-off region and
 - c) Saturation region
- for the IE-transistor characteristics.

25. In a CE-amplifier, find
- the base current
 - the collector current
 - output impedance and
 - power gain.
- Given $R_i = 2 \text{ k}\Omega$, $A_v = 180$, $V_i = 4 \text{ mV}$, $R_c = 5 \text{ k}\Omega$, $R_L = 4.7 \text{ k}\Omega$ and $\beta = 75$.
26. Derive an expression for the input impedance of a voltage series feedback amplifier.
27. Design an inverting adder circuit using Op-Amp, so that the output expression as $V_o = - (0.1 V_1 + 2V_2 + 5V_3)$ for $R_f = 10 \text{ k}\Omega$, where V_1, V_2, V_3 are input voltages.
28. With a neat circuit diagram, explain the working of a transistor Hartley's oscillator. Write the expression for the frequency.
29. Derive an expression for the instantaneous voltage of AM wave.
30. Find the carrier frequency, modulating frequency, modulation index and frequency deviation of an FM wave represented by
- $$V = 10 \sin (8 \times 10^8 t + 5 \sin 1000 t) \text{ mV.}$$
31. What is a full adder ? Explain the working of full adder using block diagrams of two half adders.

PART - D

- I. Answer the following question. 1 × 6 = 6
32. Describe an experiment to study the frequency response of a CB-amplifier.

OR

Describe an experiment to study the RS-flip-flop using NAND gates.

- II. Answer any *five* questions. 5 × 6 = 30
33. a) What is a transistor ? Explain the working of *n-p-n* transistor.
- b) The value of $\alpha = 0.99$. Find the base current if the emitter current is 10 mA. 4 + 2
34. What is a cascade amplifier ? Explain the working of a two-stage RC-coupled amplifier. 6

[Turn over

35. a) With the help of circuit diagram, obtain the expression for the output voltage of Op-Amp integrator.
- b) Calculate the voltage gain of non-inverting Op-Amp with $R_i = 1 \text{ k}\Omega$ and $R_f = 10 \text{ k}\Omega$. 4 + 2
36. a) Explain the generation of oscillations in an LC-tank circuit.
- b) In phase shift oscillator $R_1 = R_2 = R = 1 \text{ k}\Omega$ and $C_1 = C_2 = C = 1 \mu\text{F}$. Determine the frequency of oscillations. 4 + 2
37. Draw the block diagram of SHD receiver and sketch waveforms at different stages. Explain the working of SHD receiver. 6
38. a) Explain the working of DTL NAND-gate.
- b) Express the function $Y = A + \bar{B}C$ in canonical SOP. 4 + 2
39. a) Explain with block diagram, the action of D-flip-flop.
- b) Realise the Boolean expression $Y = ABC + \bar{A}BC + BC + \bar{C}$. 4 + 2
40. a) Draw the block diagram of a monochrome TV receiver. Mention the function of each block.
- b) Write a note on e-mail. 4 + 2
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