KARNATAKA SCHOOL EXAMINATION AND ASSEMENT BOARD
SECOND PU – ELECTRONICS EXAM – 2023
SCHEME OF VALUATION

PART – A

I. Multiple Choice Questions.

1. C – Gate
2. B - Voltage Divider biasing
3. A – 180
4. B – Amplifier
5. B – Infinity
6. C - Cosine Waves
7. D – AB = 1
8. B – Transmitter
9. D – Infinity
10. D – LED
11. A – Pair
12. A – Half Adder
13. A – 8 bit
14. C – Logical AND
15. D – 4 GHz

II. Fill in the Blanks

16. D – Input Impedance
17. C – Heat Sink
18. C – RC Coupled Amplifier
19. B – Modulation Index
20. A – Data

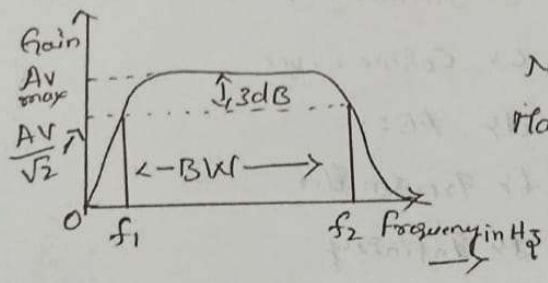
PART – B

PART B

III Any five 5×2 = 10

21) I_{CBO} & I_{CEO} (Each carries one mark)

22)



Natural Curve – 1M

Marking regions – 1M

23) $A_{vf} = \frac{A_v}{1 + A_v\beta}$ $A_v = 500$, $A_{vf} = 100$

.... 1M

$\beta = \frac{1}{A_f} - \frac{1}{A}$

$= \frac{1}{100} - \frac{1}{500}$

$\beta = 0.008$ or 0.8%. ... 1M

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24) $f = 78Hz$ $C = 220nF$ $R = ?$

$f = \frac{1}{2\pi RC\sqrt{6}}$ OR $\frac{0.065}{RC}$ — 1M

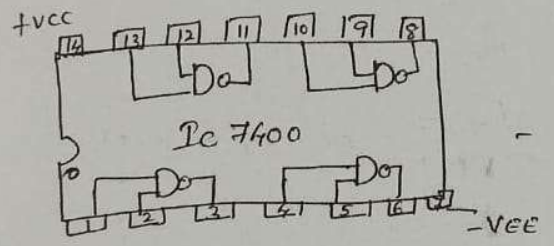
$R = \frac{1}{2 \times 3.142 \times \sqrt{6} \times 78 \times 220 \times 10^{-9}}$

$R = 3.785\ K\Omega$ — 1M

25) 1) AC to DC Rectifier
2) Ac to AC Voltage Controller
3) DC to Ac Chopper
4) DC to AC Inverter

Any two each - 1M

26)



- 2M

27) ALU : This unit does the arithmetic operations and also does the logical decisions — 1M

Accumulator : It stores the number, adds the two and Stores the sum. It can Sense the Signal, Clear & Compliment etc — 1M

28) Syntax error
Logical error
Runtime error

Any two 2M.

29) Any two advantages Each 1M

PART C

IV Any five 5×3 = 15

30) Working of n-channel JFET

Diagram — 1M

Case① $V_{GS} = 0$ — (effect) — 1M

Case② V_{GS} is increased (effect) 1M

31) Any three differences each 1M

32) Any three comparisons each 1M

33) $L_1 = 4mH$, $L_2 = 2mH$, & $C = 10nF$ $f = ?$

$$f = \frac{1}{2\pi\sqrt{L_T C}} \quad \text{where } L_T = L_1 + L_2 \quad \text{--- 1M}$$

$$f = \frac{1}{2\times 3.142 \times \sqrt{(2\times10^{-3} + 4\times10^{-3}) \times 10\times10^{-9}}} \quad \text{-- 1M}$$

$f = 20.544\ KHz$ ——— 1M

34) Any three waves with meaning. 1M each.
(Or Brief explanation on each wave)

Ground wave
Sky wave
Space wave. etc.

36) Any three needs (with brief explanation)

Each - 1M

(a) Lengthy transmitter antenna (b) operation range (c) Missing signals etc

36) $\alpha = 60^\circ$, $V_{rms} = 230V$, $R = 25\Omega$

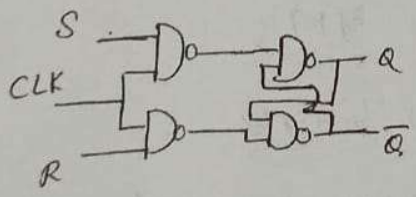
$V_m = \sqrt{2} \times V_{rms} = 325.2$ — 1M

$V_{dc} = \frac{V_m}{\pi}[1 + \cos\alpha] = \frac{325.2}{3.142}[1 + \cos(60)]$

$V_{dc} = 155.25V$ 1M

$I_{dc} = \frac{V_{dc}}{R} = \frac{155.25}{25} = 6.21A$ .. 1M

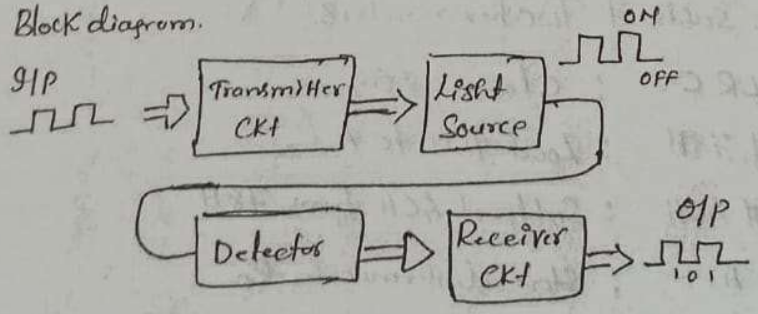
37) Diagram — 1M



Truth Table. 2M

CLK	S	R	Comment
1	0	0	Hold
1	1	0	Set
1	0	1	Reset
1	1	1	Invalid.

38) Block diagram.



1M

Any two Applications . 1M each

PART D

V. Any five — 5 × 5 = 25

39% CKt. Diagram with wave form (o/p & i/p) — 2M
Frequency Response Curve — 1M
Working — 2M.

40% CKt diagram — 1M
Steps: Applying KCL at node
Rearranging $i = dq/dt$
Replacing $q = CV$, rearranging equation } 3M
Integrating on both sides
Arriving o/p $V_0 = -\frac{1}{RC}\int V_i\,dt$ — 1M

41% Any five differences, each 1M.

42% Pin diagram of XNOR (IC 7402) — 1M
Constructing NOT, AND, OR & XNOR respectively — 4M along with truth table.

43% ALP to subtract two hex numbers.

```
CLR C        : Clear carry.
MOV A, #78H  : Load 78H to A
SUBB A, #4CH : Subtract 4CH from 78H
MOV R0, A    : Store difference in R0
```

Verification

A- 78H = 0111 1000 -> 0111 1000

R1- 4CH = 0100 1100 -> 2's comp 1011 0011

+1

1 0010 1100

C4

R_0 -> 2CH 2 C

449

```
# include <stdio.h>
  Void main()
{
  int P, Q, R, S, Sum;
  float avg;
  Printf("Enter the four integer num\n");
  Scanf("%d %d %d %d", &P, &Q, &R, &S);
  Sum = P+Q+R+S;
  avg = Sum/4;
  Printf("sum = %d\n avg = %f\n", Sum, avg);
}
```

45) Given $R_1 = 45K\Omega$, $R_2 = 5K\Omega$, $R_C = 10K\Omega$, $R_L = 10K\Omega$
$R_E = 1K\Omega$, $I_C = 1.3mA$, & $\beta = 100$ Transistor-Si

(1) $r'_e = \frac{26mV}{I_E} = \frac{26\times10^{-3}}{1.3\times10^{-3}} = 20\Omega$ — 1M

(3) $A_V = -\frac{Z_o}{r'_e} = \frac{5\times10^3}{20} = -250$ — 1M

(2) $Z_o = R_C \| R_L = \frac{10\times10^3 \times 10\times10^3}{10\times10^3 + 10\times10^3} = 5K$ — 1M

(4) $A_i = \beta = 100$ — 1M

(5) $A_p = A_i \times A_V$
$= $ ~~[illegible]~~
$A_p = 100 \times 250 = 25000$ — 1M

46) Stage ① op amp Subtractor

$$V_o = -\frac{R_f}{R_1} V_1 + \left(1 + \frac{R_f}{R_1}\right) \times \left(\frac{R_3}{R_2 + R_3}\right) V_2$$

(OR) $V_{o1} = V_2 - V_1$ $\left[\because R_1 = R_2 = R_3 = R_f = R \text{ Same}\right]$

$V_{o1} = 8\times10^{-3} - 2\times10^{-3}$
$V_{o1} = 6\times10^{-3}$ — 3M

Stage ② $V_o = -\frac{R_f}{R_1}(V_{o1})$

$$V_0 = -\frac{6\times10^{3}}{5\times10^{3}}(6\times10^{-3})$$

$$V_0 = -1.2\times10^{-3}\,V \quad \text{—} \quad 2M$$

4.7) Given $m_a = 0.75$, $P_c = 12\,KW$, $P_T = ?$ $P_{SB} = ?$

$$P_T = P_c\left[1+\frac{m_a^2}{2}\right] \quad \text{—} \quad 1M$$

$$P_T = 12\times10^{3}\left[1+\frac{(0.75)^2}{2}\right]$$

$$P_T = 15.37\,KW \quad \text{——} \quad 1M$$

$$P_T = P_c + P_{SB} \quad \text{—} \quad 1M$$

$$P_{SB} = P_T - P_c$$

$$= 15.37 - 12$$

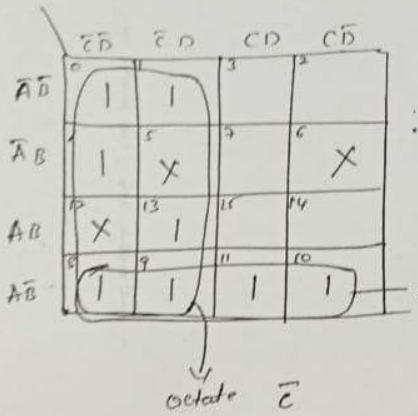
$$P_{SB} = 3.37\,KW \quad \text{——} \quad 1M$$

Power in each side band $P_{LSB} = P_{USB} = \frac{P_{SB}}{2}$

$$P_{LSB} = P_{USB} = \frac{3.37\times10^{3}}{2} = 1.68\,KW \quad \text{—} \quad 1M$$

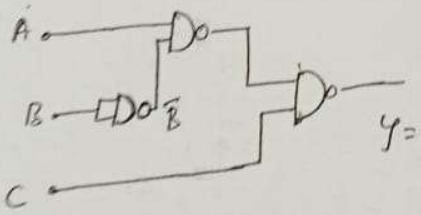
4 & 4 Karnaugh Problem

$Y = \sum m(0,1,4,8,9,10,11,13) + \sum d(5,6,12)$



— 4M

$Y = \bar{C} + A\bar{B}$



— 1M

— END —