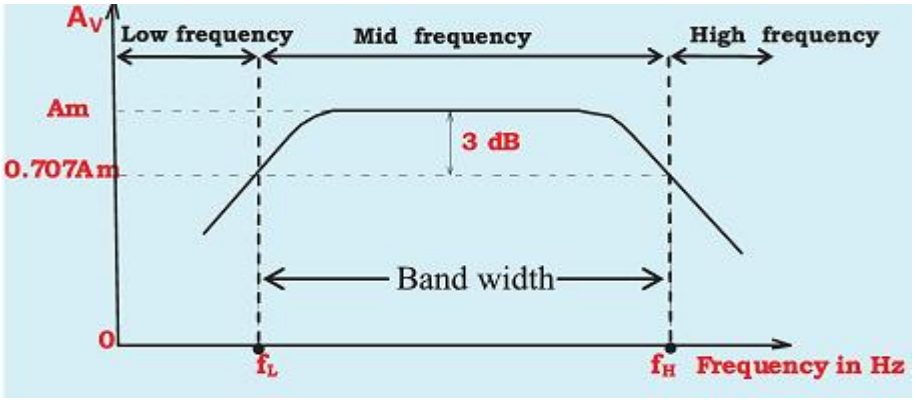
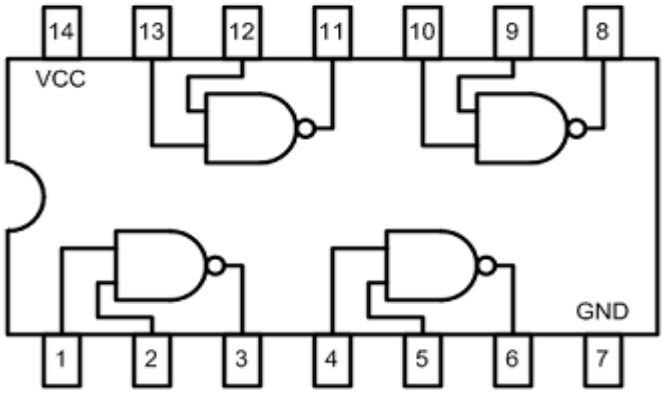
Government of Karnataka
Karnataka School Examination and Assessment Board
II Year PUC Examination March – 2023
SCHEME OF VALUATION

Subject Code: **40(NS)** Subject: **ELECTRONICS**

I MCQ	**PART - A**	MARKS **15x1 =15**
1. c)	Gate	**1**
2. b)	Voltage Divider biasing	**1**
3. a)	180^0	**1**
4. b)	Amplifier	**1**
5. b)	Infinity	**1**
6. c)	Cosine Wave	**1**
7. d)	AB = 1	**1**
8. b)	Transmitter	**1**
9. d)	Infinity	**1**
10. d)	LED	**1**
11. a)	Pair	**1**
12. a)	Half Adder	**1**
13. a)	8 bit	**1**
14. c)	Logical AND	**1**
15. d)	4 GHz	**1**
II	**FILL THE BLANKS**	**5x1 = 5**
16. d)	Input impedance	**1**
17. e)	Heat sink	**1**
18. c)	RC coupled	**1**
19. b)	Modulation index	**1**
20. a)	Data	**1**

III.	**PART B**	**5x2 = 10**
21.	**Any five of the following** Collector Base leakage current when Emitter is kept open (or) I_{CBO} Collector Emitter leakage current when Base is kept open (or) I_{CEO}	 **1** **1**
22.	 Nature of Curve Marking regions	 **1** **1**
23.	$A_{vf} = \frac{Av}{1+Av\beta}$ $Av = 500, Avf = 100$ $\beta = \frac{1}{Af} - \frac{1}{A}$ $= \frac{1}{100} - \frac{1}{500}$ $\beta = 0.008$ (or) 0.8%	**1** **1**
24.	$f = 78Hz, C = 220nF, R = ?$ $f = \frac{1}{2\pi RC\sqrt{6}}$ or $\frac{0.065}{RC}$ $R = \frac{1}{2\times 31.42\times\sqrt{6}\times 78\times 220\times 10^{-9}} = 3.785k\Omega$	**1** **1**
25.	i). Rectifier ii). AC Voltage controller iii). DC Chopper iv). Inverter (Any two each 1M)	**1** **1**
26.	 (Pin Numbers)	**1** **1**
27.	**ALU :** This unit does the arithmetic operations and also does the logical decisions **Accumulator:** it is a device which stores a number and which on receipt of another number, adds the two stored sum. (or) it a intermediate storage of aithmatic and logical data in CPU (or) 8 bit dedicated default storage register which is a part of ALU.	**1** **1**

28. Syntax error **1**
Logical error **1**
Runtime error (Any two)

29. Any two advantages of digital cell phone system. **2**
(each 1M)

IV **PART C** **5x2 = 10**

30. **Any five of the following**
Working of n-channel JFET **1**
Diagram **1**
Case 1(V_{GS} = 0)- (effect) **1**
Case 2(V_{GS}) is increased

31. Any three difference between positive and negative feedback (each 1 M) **3**

Positive feedback	Negative feedback
It is Regenerative feedback, gain increases	It is Degenerative feedback, gain decreases
Feedback signal is INPHASE with source signal Vi=Vs+Vf	Feedback signal is OUT OF PHASE with source signal Vi=Vs-Vf
Suitable for oscillator	Suitable for Amplifier

32. Any three comparison between RC and LC oscillators (each 1 M) **3**

RC Oscillators	LC oscillators
Resistors and capacitors are used in feed back circuit	Inductors and capacitors are used in feedback circuit
Generates low frequency signal	Generates high frequency signals
Examples are phase shift oscillators and wein bridge oscillators	Examples are Hartley and colpitt's oscillators

33. L_1 = 4mH , L_2 = 2mH and C = 10nC, f = ? **2**

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

$= \frac{1}{2\times3.142\times\sqrt{(2\times10^{-3}+4\times10^{-3})\times10\times10^{-9}}}$ **1**

= 20.544

34. Any three waves with meaning (or brief explanation on each wave) (each 1 M)
Ground wave **1**
Sky wave **1**
Space wave etc **1**

35. Need for modulation (any three points with brief explanation) (each 1 M) **3**

36.

$\alpha = 60^0$, $V_{rms} = 230V$, $R = 25\Omega$ — **1**

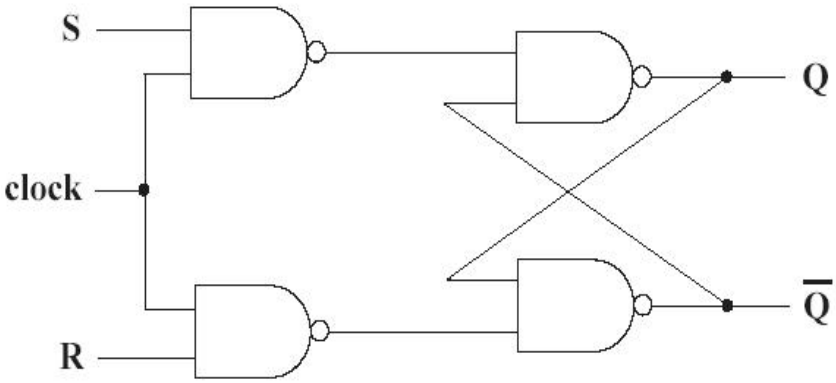
$V_{rms} = \sqrt{2}V_{rms} = 385.5$ — **1**

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

$= 155.25V$ — **1**

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

37. **Logic circuit diagram** — **2**

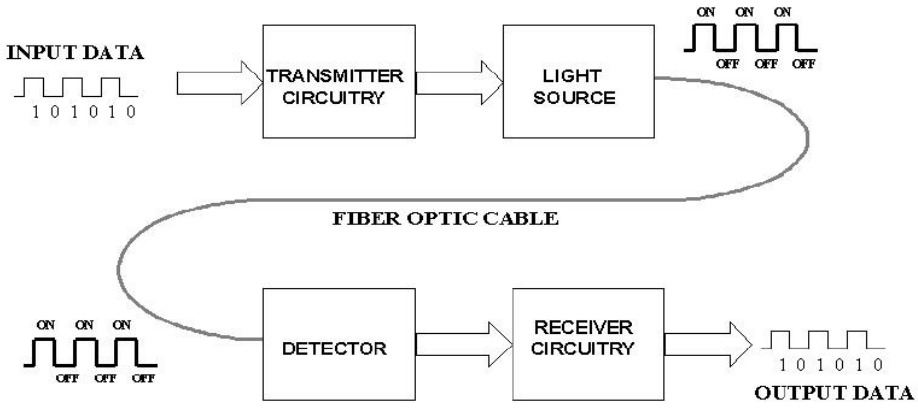


1

Truth table

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

38. **Block diagram of OFC** — **1**



2

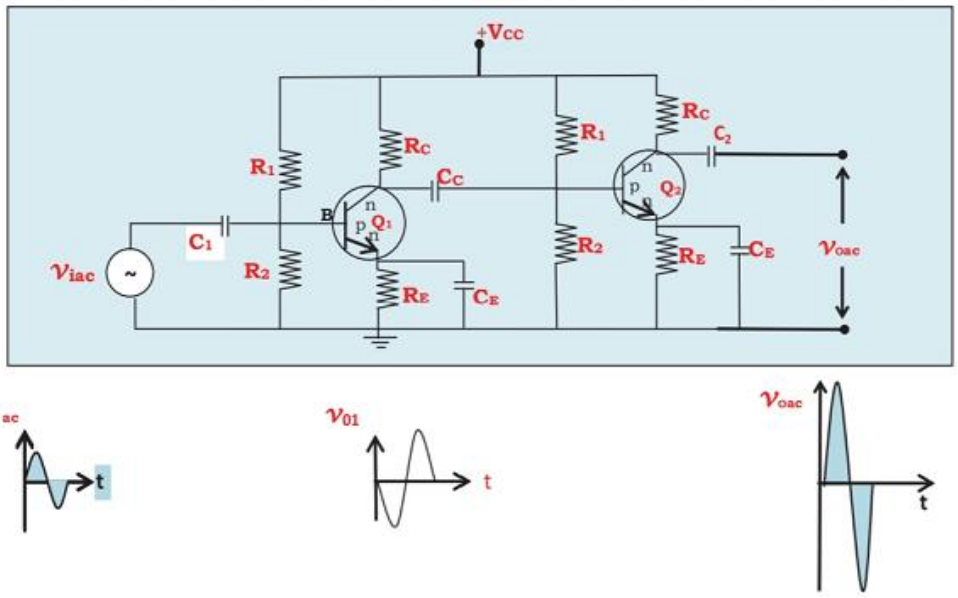
Any two application

(i) Used to achieve high speed data communication

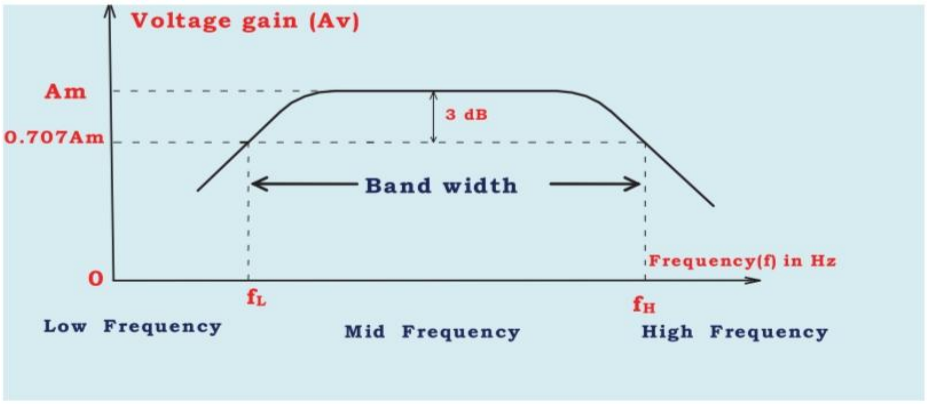
(ii) To achieve errorless far distance communication.

PART D

V	**Any five of the following**	**5x5 = 25**
39.	**Circuit diagram with wave form.**	**2**

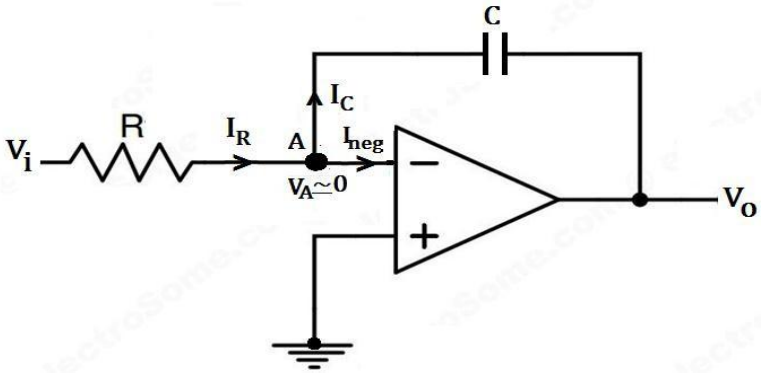


Frequency Response Curve: **1**



Working **2**

40.	**Circuit diagram :**	**1**



Steps Applying KCL and node **1**

Rearranging i = $\frac{dq}{dt}$ **1**

Replacing q = cv, rearranging equation

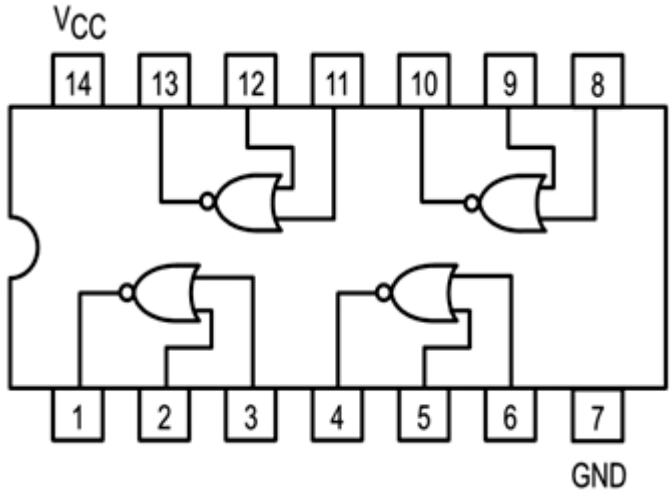
Integrating on both sides **1**

Arriving output expression $V_0 = \frac{1}{RiC}\int Vi\ dt$ **1**

41. Any five difference between AM and FM (each 1 M) **5**

Amplitude modulation	Frequency modulation
It is a process in which amplitude of the carrier varied in accordance with instantaneous voltage of the modulating signal.	It is a process in which frequency of the carrier varied in accordance with instantaneous voltage of the modulating signal.
It has only two side bands	It has infinite side bands
Area of reception is large	Area of reception is smaller than AM and which is limited to LOS
Bandwidth is very less (10KHz)	Bandwidth is very high (200KHz)
Modulation index will be less than 1	Modulation index will be greater than 1

42. Pin diagram of NOR (IC 7402) **1**



Constructing NOT gate & truth table **1**
Constructing AND gate & truth table **1**
Constructing OR gate & truth table **1**
Constructing XNOR gate & truth table **1**

43. ALP to standard two hex numbers

CLR C : Clear carry **1**
MOV, #78H : Load 78H to A **1**
SUBB A, # 4CH : Subtract 4CH from 78H **1**
MOV $R_{0,}$ A : Store difference in R_0 **1**

Verification:
A : 78H 0111 1000 → 0111 1000
R1: 4CH 0110 1100 → 1011 0011
+ 1
0010 1100 **1**

44.

```
# include <stdio.h>
Void main()
{
int p, q, r, s, sum;
float avg;
printf("Enter the four integer number\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.

Transistor CE Amplifier

Given R_1 = 45K, R_2 = 5kΩ, R_C = 10kΩ, R_E = 1kΩ

I_E = 1.3mA, β = 100

$I_E = \frac{26mV}{r_e'} = r_e' = \frac{26\times10^{-3}}{1.3\times10^{-3}} = 20\Omega$ **1**

$Z_0 = R_c \parallel R_L = \frac{10K.10K}{10K+10K} = 5k\Omega$ **1**

$A_V = -\frac{z_0}{r_e'} = \frac{5\times10^3}{20} = -250$ **1**

$A_i = \beta = 100$ **1**

$A_P = A_V . A_i = 250 \times 100 = 25000$ **1**

46.

Stage 1: OP-AMP Subtractor **1**

$$V_0 = \frac{V_2 R_3}{R_2 + R_3}\left[1 + \frac{R_f}{R_1}\right] - \frac{R_f}{R}(V_{0_1})$$ **1**

Or $V_{01} = V_2 - V_1$

$V_{0_1} = 8mV - 2mV = 6mV$ **1**

Stage 2: OP-AMP inverting amplifier **1**

$V_0 = -\frac{R_f}{R}(V_1)$

$= \frac{-6\times10^3}{3\times10^3}(6\text{x}10^{-3})$ **1**

V_0 = - 12 mV

47.

Given $m_a = 75\% = 0.75$ — **1**

$P_C = 12kW$

$P_T = ?$

$P_{S\beta} = ?$

$$P_T = P_C\left[1 + \frac{m_a^2}{2}\right]$$ — **1**

$$P_T = 12 \times 10^3\left[1 + \frac{(0.75)^2}{2}\right]$$

$P_T = 12 \times 10^3\ [1 + 0.281]$

$P_T = 15.37kW$ — **1**

$P_T = P_C + P_{S\beta}$

$P_{S\beta} = P_T + P_C$ — **1**

$= 15.37 \times 10^3 - 12 \times 10^3$

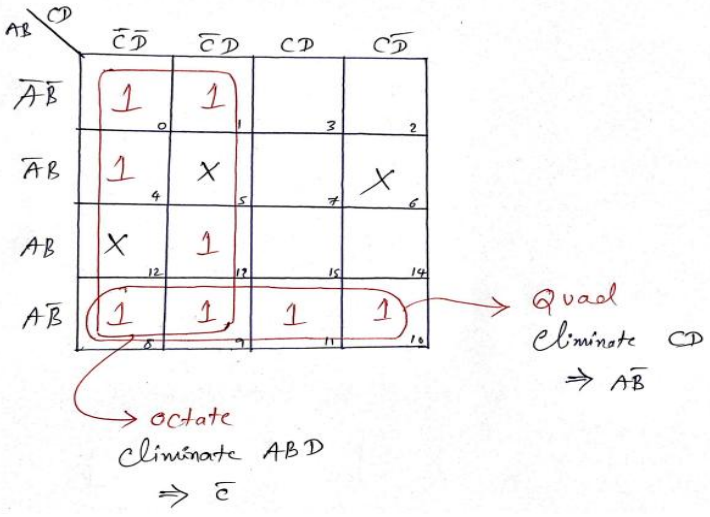
$P_{S\beta} = 3.37kW$

Each side hand $P_{LS\beta} = P_{Us\beta} = \frac{P_{SB}}{2}$

$P_{LS\beta} = P_{Us\beta} = \frac{3.37 \times 10^3}{2} = 1.68KW$ — **1**

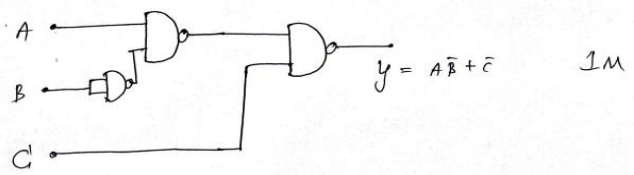
48.

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



$y = \bar{C} + A\bar{B}$ → 4M — **4**

Simplified expression using NAND only



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