മീറ്റിംഗ് മിനിട്സ് (24/01/24)

സമയം.11.00

വേദി: ജോയിൻറ് കൺട്രോളറുടെ ചേമ്പർ

പങ്കെടുത്തവർ

1. ഡോ.സീമ.കെ.എൻ, ജോയിൻറ് കൺട്രോളർ
2. ശ്രീ.മുഹമ്മദ് അസീർ.എ.കെ, ഡെപ്യൂട്ടി കൺട്രോളർ
3. ശ്രീ.സനൽകുമാർ.എ,അസിസ്റ്റൻറ് കൺട്രോളർ
4. ശ്രീ.അൻസാർ.എ,ടെക്നിക്കൽ ആഫീസർ
5. ശ്രീ.സന്തോഷ്കുമാർപി.സി, ടെക്നിക്കൽ ആഫീസർ
6. ശ്രീ.ഉൽക്കർഷ്.എസ്.ആർ ടെക്നിക്കൽ ആഫീസർ
7. ശ്രീമതി.പദ്മജ.ജെ,അക്കൗണ്ട്സ് ആഫീസർ
8 ശ്രീ.ഷറഫുദീൻ.എ,സിസ്റ്റം അനലിസ്റ്റ്

1.Decision taken by the JCTE office on 23/01/24, based on the complaints received from students from various Polytechnic colleges in connection with the Diploma Examination November 2023 and the recommendations of expert committee from different departments.

OUT OF SYLLABUS QUESTION GUIDELINES

R.21	5043D	Part.B Question -8	3 mark
		Part C Question V	7 mark
R.21	3042	Part.C Question No.IV	4 mark
		Part C Question VII	2 mark
		Part C Question X	2 mark
R.21	3051	Part.C Question VI	7 mark
R.21	5021	Part B Question 9	3 mark

R.21	3055	Question III	25 marks
R.21	3044	Part.B Question 8	3 mark
R.21	3033	Part C Question 13	7 mark
R.15	5182	part B question II	Students who have drawn the site plan in the 1:200, 1:400 and 1:800 scales can be considered eligible for getting the marks they deserve .

The above mentioned questions are out of syllabus as recommended by the expert committee. Hence, following guidelines shall be used to calculate the mark/grade of the students who had tried to attend the above specific questions.

a) Calculate the percentage of marks obtained by the student considering the total marks excluding the marks of out of syllabus questions.

b) Then, the proportionate marks of out of syllabus questions shall be calculated based on the above obtained percentage.

c) Marks obtained in the above cases shall be added to get actual marks admissible to the student.

2. 25.01.2024 -ന് ആരംഭിക്കുന്ന ഡിപ്ലോമ പരീക്ഷ മൂല്യനിർണ്ണ ക്യാമ്പിൻറ പ്രവർത്തനം സംബന്ധിച്ച് കമ്മിറ്റി ചർച്ച ചെയ്യുകയും ക്യാമ്പ് ആഫീസർമാർക്ക് നിർദ്ദേശങ്ങൾ നൽകുന്നതിന് സർക്കുലർ അയയ്ക്കുവാൻ D2 സെക്ഷൻ സീനിയർ ക്ലർക്ക് ശ്രീ.അനൂപിനെ ചുമതലപ്പെടുത്തുകയും ചെയ്തു.

3. ക്യാമ്പുകളുടെ സുഗമമായ നടത്തിപ്പിനായി വിവിധ മൂല്യനിർണ്ണയ ക്യാമ്പുകൾ സന്ദർശിക്കുവാൻ JCTE, DCTE, ACTE, TECHNICAL OFFICER എന്നിവരെ നിയോഗിക്കുവാൻ തീരുമാനിച്ചു.

4.SBTE സോഫ്റ്റവെയറിൻറ സെക്യൂരിറ്റി ആഡിറ്റ് ചെയ്യുന്നതിന് JCTE ആഫീസിൽ ലഭിച്ചിട്ടുള്ള പ്രപ്പോസലുകൾ പരിശോധിച്ച് തീരുമാനം എടുക്കുന്നതിന് NIC യ്ക്ക് കത്ത് അയ്ക്കുവാൻ തീരുമാനിച്ചു.

CONTROLLER OF TECHNICAL EXAMINATIONS * TRIVANDRUM * Govt. Of Kerala Dept. Of Techl Edn.

ജോയിൻറ് കൺട്രോളർ

(194) 15/11/23

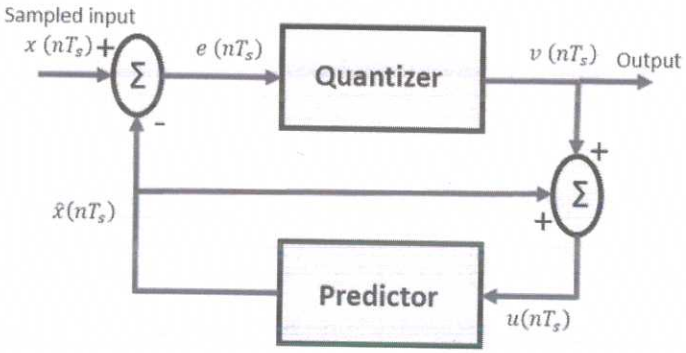
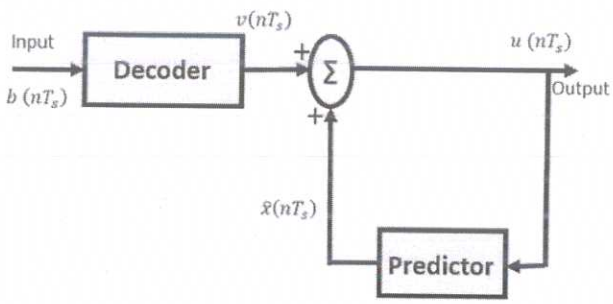
(12) Nov-23

Scoring Indicators (2)

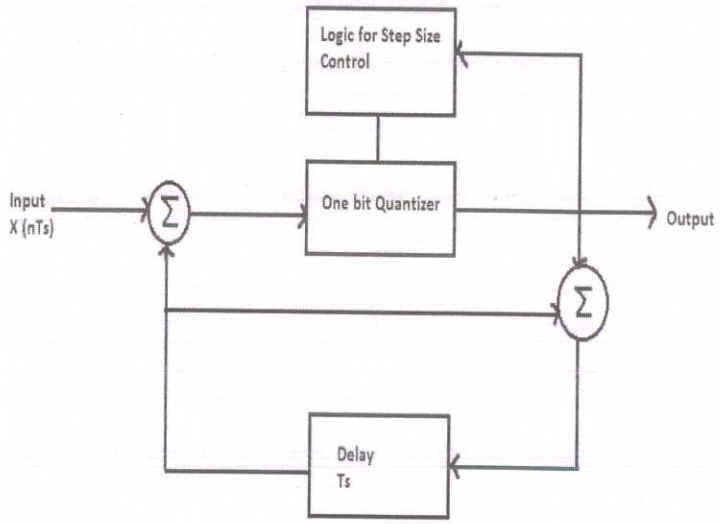
1	Delta Modulation	1	1	
2	It is a rounding error between the analog input voltage value and the output digitized value.	1	1	
3	On-Off Keying	1	1	
4	Amplitude Shift Keying	1	1	
5	Bandwidth and Signal to Noise ratio	1	1	
6	Bits/s	1	1	
7	CDMA, TDMA, FDMA – any two	1	1	
8	Orthogonal/orthogonally shifted	1	1	
9	It is a binary sequence with an autocorrelation that resembles, over a period, the autocorrelation of a random binary sequence	1	1	
II	**PART B**			
1	Companding refers to a technique for compressing and then expanding an analog or digital signal. It is a combination of "compressing", which is done at the transmitter and "expanding", which is done at the receiver. In general, it can mitigate quantization noise, particularly in PCM	3	3	
2	DPCM reduces the redundancy in the message and therefore the overall bitrate will decrease and the number of bits required to transmit one sample will also reduce. Redundancy is eliminated by predicting future samples from previous samples. Thus it reduces the bandwidth requirement	3	3	
3	Granular noise and slope overload. Constant step size is the reason for this problem. Granular noise occurs when the step size is too large for slowly varying signals and granular noise occurs when the step size is too small for signals with large dynamic range.	3	3	
4	The process of mapping input values from a large set of continuous values to certain output values which belong to a countable, smaller set . It is a form of approximating a given signal. The number of levels and bits are related as : $L = 2^q$, where L = number of quantiser levels and q = number of bits	2+1	3	
5	It is a technique by which the total bandwidth available in a communication medium is divided into a series of non-overlapping frequency bands, each of which is used to carry a separate signal. This allows a single transmission medium to be shared by multiple independent signals.	3	3	
6	Synchronous Transmission, data is sent in form of blocks or frames. This transmission is the full-duplex type. Between sender and receiver, synchronization is compulsory. In Synchronous transmission, There is no	3 points	3	

<table>
<tr><td></td><td>gap present between data. It is more efficient and more reliable than asynchronous transmission to transfer a large amount of data.
• Telephonic Conversations
• Video Conferencing
In Asynchronous Transmission, data is sent in form of byte or character. This transmission is the half-duplex type transmission. In this transmission start bits and stop bits are added with data. It does not require synchronization.
• Forums
• email</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>Compare BFSK and BPSK
<table>
<tr><th>Parameter</th><th>BFSK</th><th>BPSK</th></tr>
<tr><td>Bandwidth</td><td>4 x sampling frquecy</td><td>2xsampling frequency</td></tr>
<tr><td>Bit rate</td><td>Suitable upto 1200 bps</td><td>Suitable for very high data rates</td></tr>
<tr><td>System complexity</td><td>Moderately complex</td><td>Very Complex</td></tr>
<tr><td>Noise immunity</td><td>high</td><td>high</td></tr>
<tr><td>Performance in the presence of noise</td><td>Good</td><td>Best</td></tr>
<tr><td>Probability o error</td><td>Low</td><td>low</td></tr>
</table></td><td>3 points</td><td>3</td><td></td></tr>
<tr><td>8</td><td>given as
$P(x_1) = \frac{1}{2},\ P(x_2) = \frac{1}{4}, P(x_3) = \frac{1}{8}, P(x_4) = P(x_5) = \frac{1}{16}$
Entropy
$H(x) = \sum_{k=1}^{n} p_k \log \frac{1}{p_k} = \frac{15}{8}$ bits / symbol.</td><td>3</td><td>3</td><td></td></tr>
<tr><td>9</td><td>○ TDM -
○ It used in ISDN (Integrated Services Digital Network) telephone lines.
○ It is used in PSTN (public switched telephone network).
○ It is used for some telephone system.
○ It is used in wire line telephone lines.
i. FDM - FDM is commonly used in TV networks.
ii. FDM is used for FM & AM radio broadcasting.
iii. First generation cellular telephone also uses FDM.</td><td>3 points of TDM and 3 points of FDM</td><td>3</td><td></td></tr>
</table>

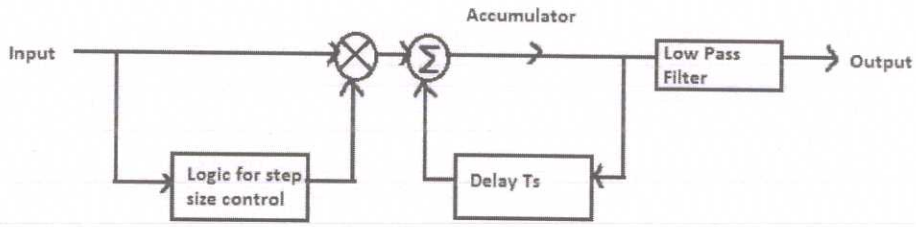
10	FDMA	TDMA	Any three points	3
	FDMA stands for Frequency Division Multiple Access.	TDMA stands for Time Division Multiple Access.		
	Overall bandwidth is shared among number of stations.	Time sharing of satellite transponder takes place.		
	Guard bands between adjacent channels is necessary.	Guard time between adjacent slots is necessary.		
	Synchronization is not required.	Synchronization is necessary.		
	Power efficiency is less.	Power efficiency is high.		
	It requires stability of high carrier efficiency.	It does not require stability of high carrier efficiency.		
	It is basically used in GSM and PDC.	It is basically used in advanced mobile phone systems.		

	PART C		
III	**DPCM Transmitter**  The DPCM Transmitter consists of Quantizer and Predictor with two summer circuits. The predictor produces the assumed samples from the previous outputs of the transmitter circuit. The input to this predictor is the quantized versions of the input signal x(nTs). The same predictor circuit is used in the decoder to reconstruct the original input. **DPCM Reciever**  The predictor assumes a value, based on the previous outputs. The input given to the decoder is processed and that output is summed up with the output of the predictor, to obtain a better output.	Fig 2+2 = 4 marks Exp : 3 marks	7

IV



The transmitter has a summer, a quantizer, a delay circuit, and a logic circuit. The logic circuit gives the input to the quantizer to produce required step size. The step size is kept fixed between some predefined maximum and minimum values.

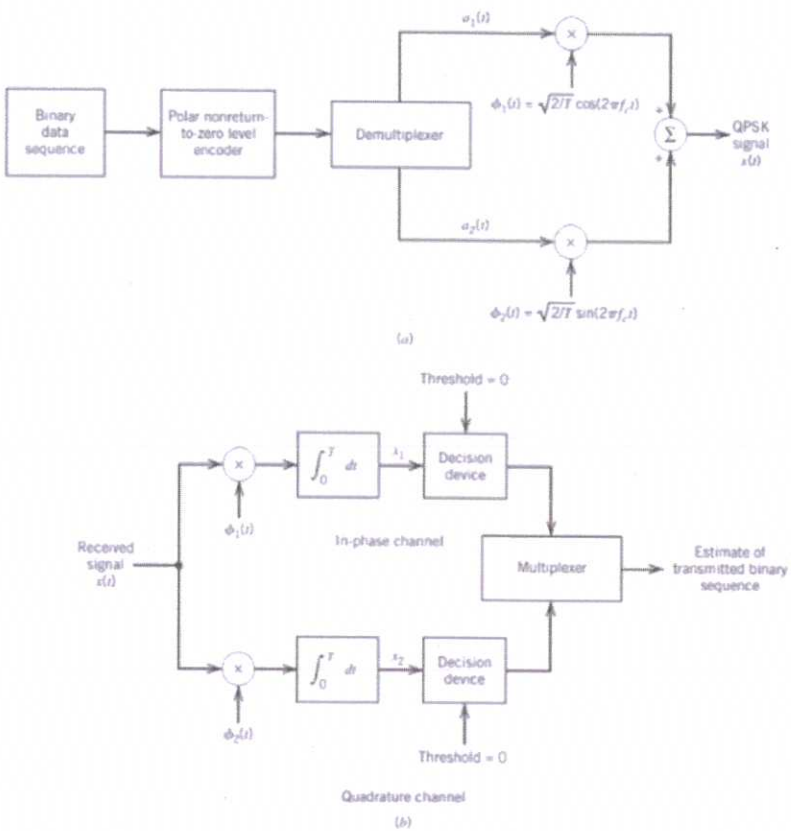


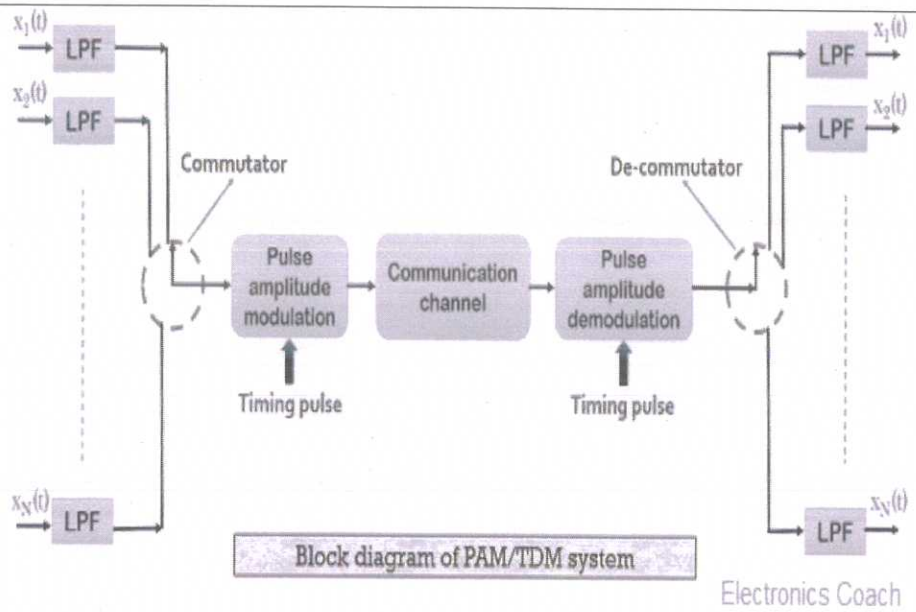
The ADM receiver has two parts. The first part is used to produce the step size from the incoming bits. The bits are then applied to the second part of the receiver which contains an accumulator. The function of the accumulator is to build up the staircase waveform. The signal is then passed through a low pass filter which is used to smoothen the staircase waveform and reconstruct the original signal.

Fig : 2+2
Exp : 3

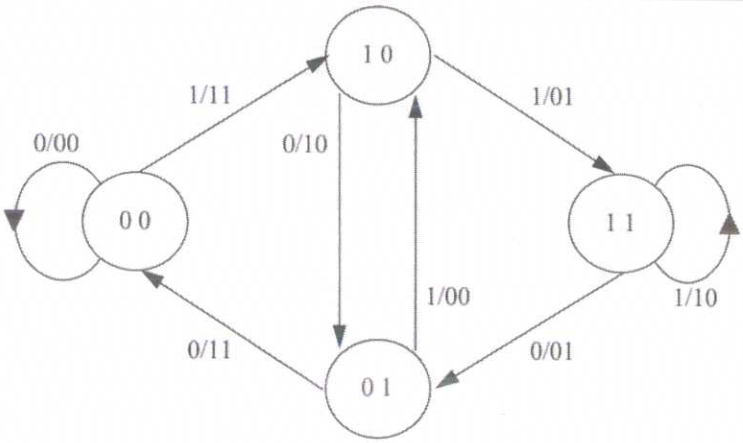
7

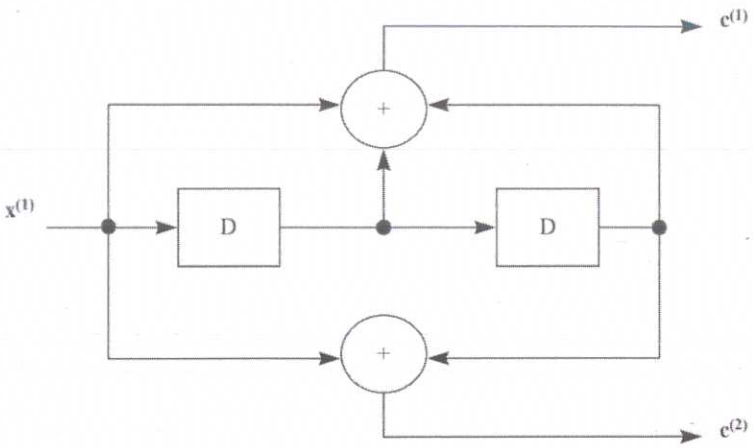
5

V		**Fig : 4** **Exp : 3**	**7**

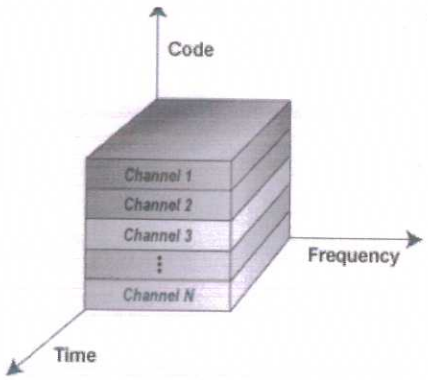
VI	 Advantages of TDM • Simple circuit design. • It uses entire channel bandwidth for the transmission of the signal. • The problem of Intermodulation distortion is not present in TDM. • Pulse overlapping can sometimes cause crosstalk but it can be reduced by utilizing guard time. Thus, is not much serious. Disadvantages of TDM • The transmitting and receiving section must be properly synchronized in order to have proper signal transmission and reception. • Slow narrowband fading can wipe out all the TDM channels.	Fig : 4 Exp : 3	7
VII	State and explain Shannon –Hartley theorem. A system has a bandwidth of 4kHz and a SNR of 28dB at the input to the receiver. Calculate the information carrying capacity of the system Statement - 2 marks. $C = B \log_2(1+S/N)$ $= 37.3 \times 10^3$ bits/sec. problem — 5 marks	5+2 =7	7

VIII	The generator matrix for a (6,3) block code is given below. $\begin{bmatrix}1 & 0 & 0 & 0 & 1 & 1\\ 0 & 1 & 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 1 & 1 & 0\end{bmatrix}$ The generator matrix is of the form $G = [I_K \mid P]$ where I_3 is a 3×3 Identity matrix. and $P = \begin{bmatrix}0 & 1 & 1\\ 1 & 0 & 1\\ 1 & 1 & 0\end{bmatrix}$. The code words are given by $[C_0\ C_1\ C_2] = [m_0\ m_1\ m_2][P]$. $[m_0\ m_1\ m_2]$ is a 8×3 matrix for all the possible combinations of 3 bits. i) $m_0\ m_1\ m_2 = \begin{bmatrix}0 & 0 & 0\\ 0 & 0 & 1\\ \vdots & & \\ 1 & 1 & 1\end{bmatrix}$ $\therefore [C_0\ C_1\ C_2] = \begin{bmatrix}0 & 0 & 0\\ 0 & 1 & 0\\ 1 & 0 & 1\\ 0 & 1 & 1\\ 0 & 1 & 1\\ 1 & 0 & 1\\ 1 & 1 & 0\\ 0 & 0 & 0\end{bmatrix}$ and the final code word is given by $m_0\ m_1\ m_2\ C_0\ C_1\ C_2$		
IX	Sketch the state transition diagram for a binary convolution encoder with k=1,n=2 and K =3	Fig: 4 marks Explanation : 3marks	7



X	Explain a convolutional Encoder with the help of a block diagram. List a few applications of convolutional encoder. 	Fig: 4 marks Exp : 3 marks	U
XI	Different signals can be modulated on the same carrier with the help of different spreading codes to allow many users at the same time. Using orthogonal codes as the spreading codes, interference between the signals is minimal. Also, when signals are received from several mobile stations, the base station is capable of isolating	M4	U

each as they have different orthogonal spreading codes. CDMA has a soft capacity. The greater the number of codes, the more the number of users it can support



CDMA in which each channel is assigned a unique code which is orthogonal to codes used by other users.

Advantages

- Rake receivers can be used to improve signal reception. Delayed versions of time (a chip or later) of the signal (multipath signals) can be collected and used to make decisions at the bit level.
- Flexible transfer may be used. Mobile base stations can switch without changing operator. Two base stations receive mobile signal and the mobile receives signals from the two base stations.
- Transmission Burst – reduces interference.

Applications

- Used in broad band devices such as wireless laptop modems, GPS system units and other innovative devices.
- Some of business related services are exempted from the service charges imposed by the operators making CDMA cost effective.
- CDMA has merged with the GSM technology to give a high-speed 4G or LTE internet services.

XII

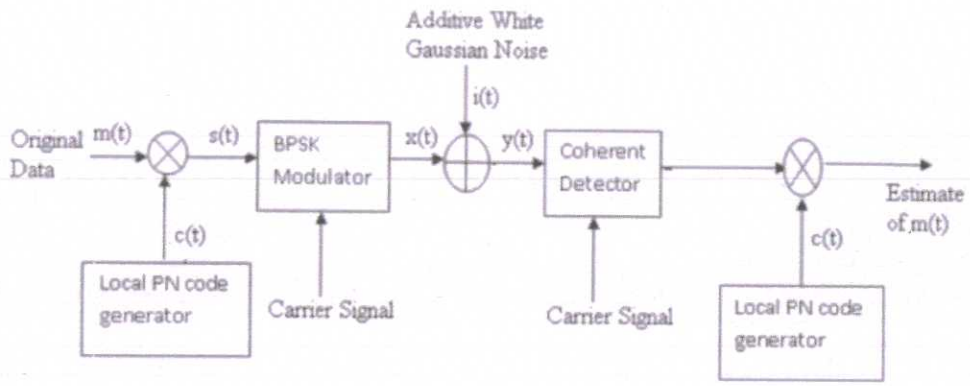
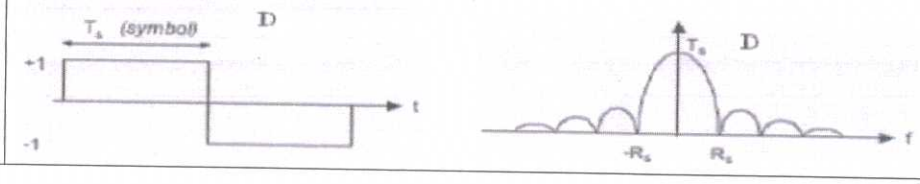


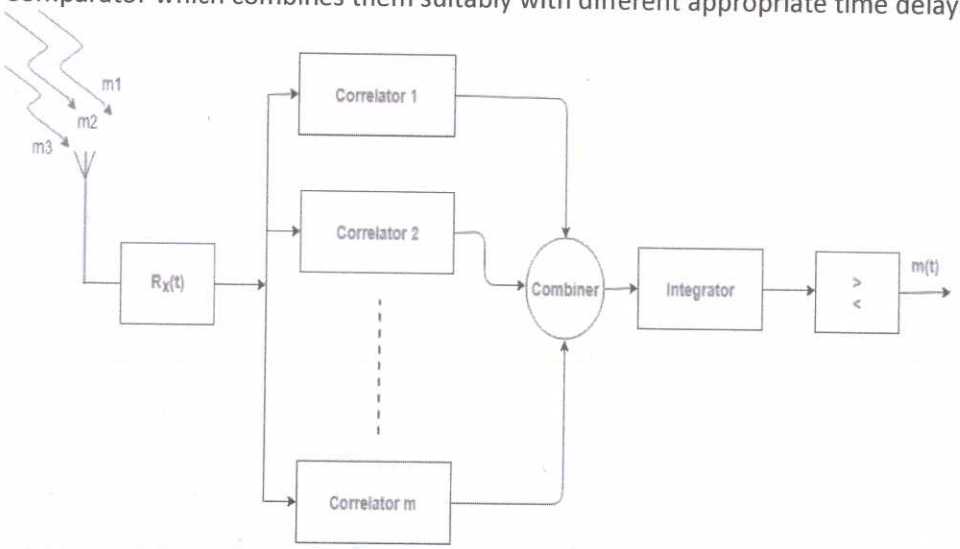
Fig: 4
Exp : 3

7 marks

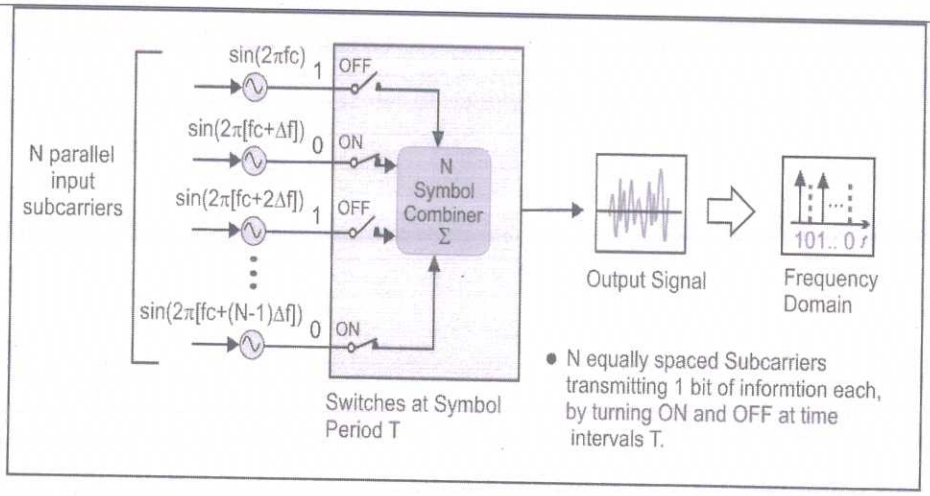
10



XIII	A Rake Receiver is a radio receiver which is designed for the purpose to counter the effects of multipath fading. Due to reflections from multiple obstacles in the environment, the radio channel can consist of multiple copies of the transmitted signal having different amplitude, phases or delays. A rake receiver can resolve this issue and combine them. For this purpose, several sub-receivers are used which are known as "fingers". When the transmitter transmits the signal it travels through the environment which consists of various obstacles and the transmitted signal is reflected by them and is received by the rake receiver from multiple paths. Rake receiver then feeds them to different fingers (correlators). The delays in each received signal are compensated and are fed to the Combiner, Integrator and Comparator which combines them suitably with different appropriate time delays.	Fig : 4 Exp : 3	7



XIV	Orthogonal Frequency Division Multiplexing (OFDM) is a digital multi-carrier modulation scheme that extends the concept of single subcarrier modulation by using multiple subcarriers within the same single channel. Rather than transmit a high-rate stream of data with a single subcarrier, OFDM makes use of a large number of closely spaced orthogonal subcarriers that are transmitted in parallel. Each subcarrier is modulated with a conventional digital modulation scheme (such as QPSK, 16QAM, etc.) at low symbol rate. The combination of many subcarriers enables data rates similar to conventional single-carrier modulation schemes within equivalent bandwidths. In an analog based OFDM system there are N sinusoidal input signals. Each subcarrier transmits one bit of information (N bits total) as indicated by its presence or absence in the output spectrum. The frequency of each subcarrier is selected to form an orthogonal signal set. These frequencies are also known at the receiver for signal recovery. The output is updated at a periodic interval T that forms the symbol period. To maintain orthogonality, T must be the reciprocal of the subcarrier spacing.	Fig : 3 Exp :4	7



Simple OFDM Generation

Prepared By	Scrutiized By
Name Designation College Mobile No Signature	Name Designation College Mobile No Signature