*Total No. of Questions :8]* *[Total No. of Printed Pages :2*



Roll No .....

# EX-601

## B.E. VI Semester

Examination, June 2017

## Communication Engineering

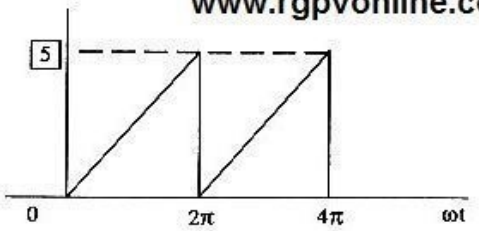
***Time : Three Hours***

***Maximum Marks : 70***

***Note:*** i) Answer any five questions.
ii) All questions carry equal marks

1. a) Find the continuous term Fourier transform of $x(t) = u(t)$ sin $\omega t$.
   b) Find the exponential Fourier series for signal shown below:






2. a) The probability density function for a random variable $X$ is given by $f(x) = x/10$ for $x = 1, 2, 3, 4$. Write out the probability distribution of $X$ as a table and calculate the probability that $X$ is less than 3, $P(X<3)$.
   b) Draw and explain the block diagram of Armstrong system of generating. FM signals.





3. a) For an AM-DSBFC modulator with a carrier frequency $f_c = 100$kHz and a minimum modulating signal frequency $f_m(\text{max.}) = 10$kHz. Determine:
      i) Frequency limits for upper and lower side bands
      ii) Bandwidth
      iii) Upper and lower side frequencies produced when the modulating signals is a single frequency 3kHz tone.
   b) Determine carrier swing maximum and minimum frequencies attained and the modulation index of FM signal generated by FM at 101.6MHz carrier with a 8kHz sine wave causing a frequency deviation of 40kHz.
4. a) Describe the modes of operation for Gunn diode.
   b) What are parametric devices? Explain the working of a parametric up converter.



5. a) Derive the power output for two cavity klystron amplifier.
   b) Explain the fabrication techniques of a monolithic microwave integrated circuit.
6. a) Determine the Nyquist rate and Nyquist sampling interval for the signal s(t) = sinc(100πt).
   b) For a PCM system with following parameters, determine:
      i) Minimum sample rate
      ii) Minimum no. of bits used in the PCM code.
      Maximum analog input frequency = 4kHz.
      Maximum decoded voltage at receiver = ±2.55V.
      Minimum dynamic range = 46dB.
7. a) Discuss the advantages of data communications and explain QPSK and QAM techniques with neat diagram.
   b) Briefly describe the functional characteristics of a transponder for a satellite system.
8. a) Draw the block diagram of satellite link and explain.
   b) Discuss briefly the multiple access techniques used in satellite communications.

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