ST. FRANCIS INSTITUTE OF TECHNOLOGY
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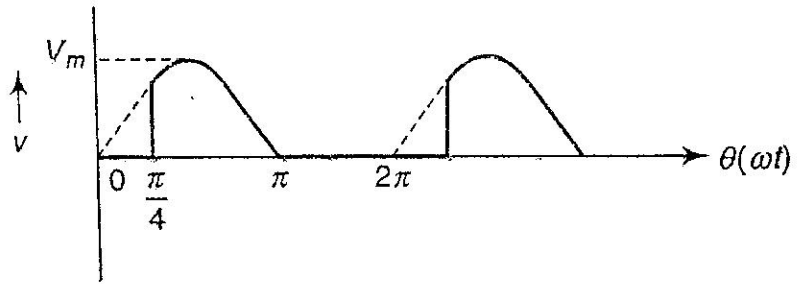
TUTORIAL NO. 5 SUBJECT: B.E.E TOPIC: AC FUNDAMENTALS

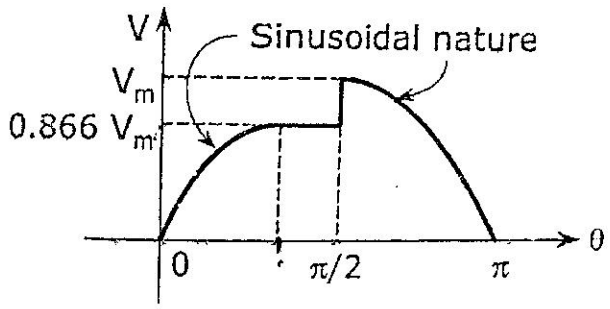
1. An alternating voltage is represented by $v(t) = 141.4sin(377t)$. Derive the RMS value of this voltage. Determine Maximum value, Frequency and Time period. What is Instantaneous value of voltage when $t = 3ms$? (Dec 2017, 8 marks)
Ans. $99.98V, 141.4V, 60Hz, 16.67ms, 127.8V$

2. Find Average value and RMS value of following waveform.



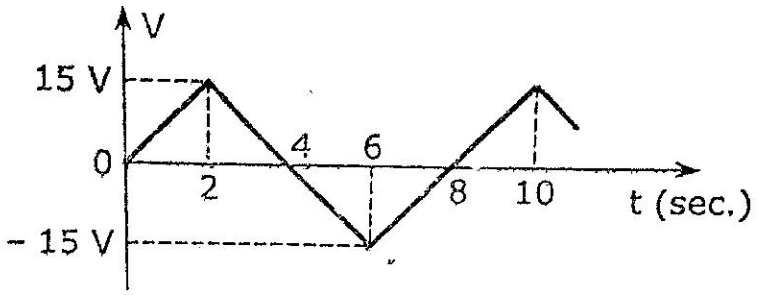
Ans. $V_{avg} = 0.271V_m, V_{rms} = 0.476V_m$.

3. Find Average value and RMS value of following waveform.



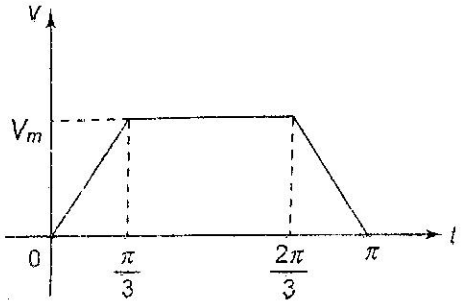
Ans. $V_{avg} = 0.622V_m, V_{rms} = 0.687V_m$.

4. Find Average value and RMS value of following waveform.



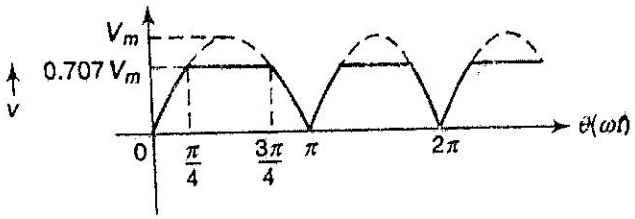
Ans. $V_{avg} = 7.5V, V_{rms} = 8.66V$.

5. Find Average value and RMS value of following waveform.



Ans. $V_{avg} = 0.67V_m, V_{rms} = 0.745V_m$.

6. Find Average value, RMS value, Form and Crest factor of following waveform.

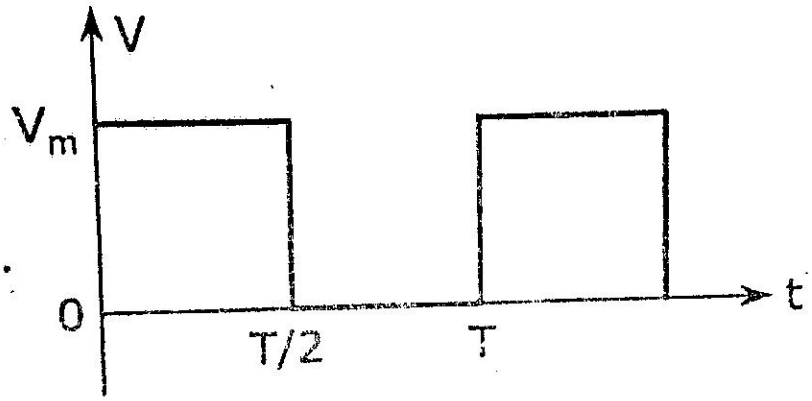


Ans. $V_{avg} = 0.54V_m, V_{rms} = 0.584V_m, K_f = 1.08, K_p = 1.712$

7. An A.C current $i(t)$ is given by $i(t) = 141.4sin(314t)$. Find peak value, frequency, time period and instantaneous value at $t = 3ms$.**May 2008, 4 marks)**

Ans. $141.4A, 50Hz, 0.02s, 114.35A$.

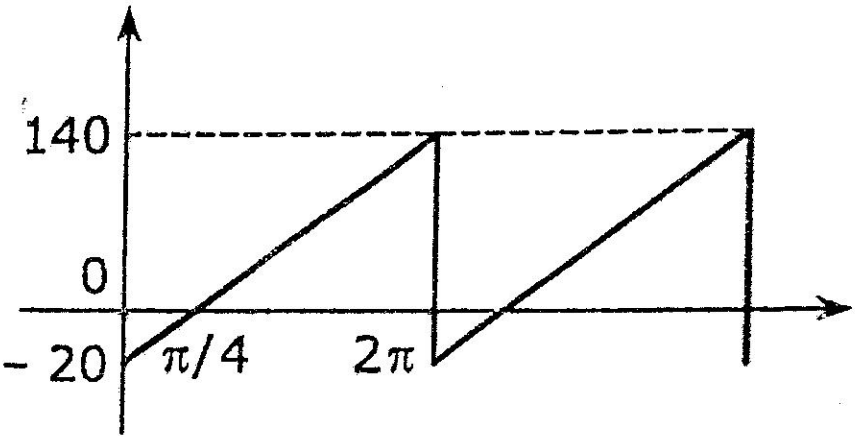
8. Find RMS value of following waveform.**(May 2008, 6 marks)**



Ans. $V_{avg} = 0.5V_m, V_{rms} = 0.707V_m$.

9. Define R.M.S value.**(Dec 2010, 2 marks)**

10. Find RMS value of following waveform.(May 2011, 5 marks)



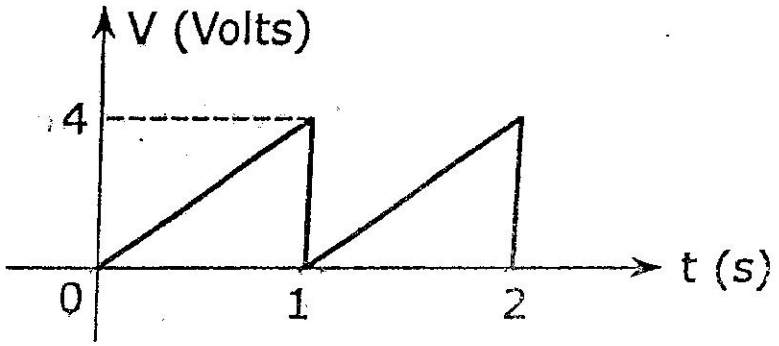
Ans. $V_{avg} = 60V, V_{rms} = 75.701V$.

11. An A.C voltage $v(t)$ is given by $v(t) = 141.4sin(314t)$. Find Frequency, R.M.S value, Average value instantaneous value at $t = 3ms$.(Dec 2012, 3 marks)
Ans. $50Hz, 99.98V, 90.018V, 114.35V$.

12. An alternating current takes $3.375ms$ to reach $15A$ for the first time after becoming instantaneously zero. The frequency of the current is $40Hz$. Find the maximum value of the alternating current. (May 2014, 3 marks)
Ans. $I_m = 19.997A$.

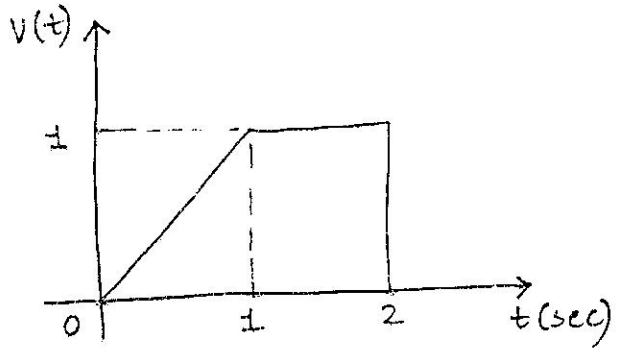
13. Draw an AC waveform, indicate there on and explain instantaneous value, peak value and time period for one cycle of alternating quantity.(May 2015, 3 marks)

14. Find Average value of following waveform.(Dec 2014, 3 marks)



Ans. $V_{avg} = 2V$.

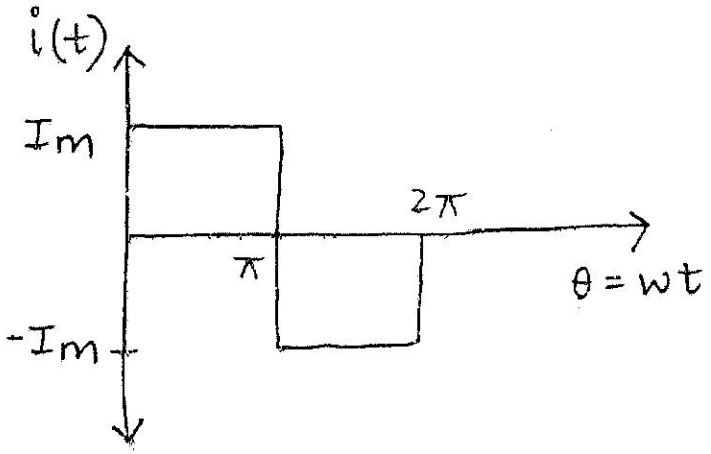
15. Find Average value and RMS value of following waveform.(May 2016, 5 marks)



Ans. $V_{avg} = 0.75V, V_{rms} = 0.81649V$

An alternating current of frequency 50 Hz has a maximum value of $100A$. Calculate its value 1/600 seconds after the instant the current is zero and its value decreasing afterwards.**(May 2018, 3 marks)**
Ans. $50A, -50A$.

Find Average value and RMS value of following waveform.**(May 2016, 5 marks)**



Ans $I_{avg} = I_m, I_{rms} = I_m$