B.Tech. 7th Semester (F) Scheme (EE) Examination,

December-2018

MECHANICAL VIBRATIONS

Paper-ME-409-F

*Time allowed : 3 hours]*   *[Maximum marks : 100*

Note : *Attempt five questions in total, selecting one question from each section. Question no. 1 is compulsory.*

1. Explain: 5×4=20

    (a) Degree of freedom

    (b) Logarithmic decrement

    (c) Transient and forced vibrations

    (d) Vibration damper

    (e) Aperiodic motion

Section-A

2. Represent the periodic motion as shown in fig(a) by harmonic series.   20

(a)

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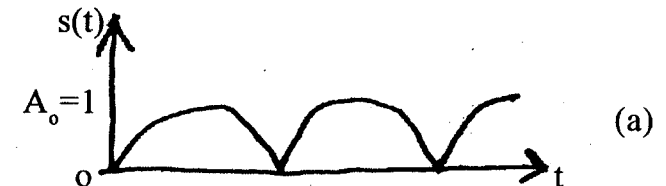
3. Derive natural frequency of free damped vibration when the system is : 20

(i) Under damped

(ii) Critical damped

(iii) Over damped

Section-B

4. Define the term damping. Derive an expression for energy dissipated by damping in case of forced damped harmonic vibration of a single degree of freedom system. 20

5. What are transient vibrations ? Explain the system response to impulse input. 20

Section-C

6. Explain undamped free vibration system after assuming suitable data. 20

7. Determine normal function in transverse vibration for a simply supported beam of length 'l' an uniform cross-section. 20
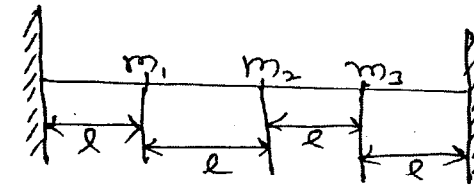
Section-D

8. What are longitudinal and torsional vibration of rod. Explain in detail with mathematical derivation. 20

9. Obtain the three natural frequencies and the corresponding mode shapes for the system shown in fig (a). Assuming tension 'T' in the string to be large. use the matrix method with flexibility influence coefficients.

(a)