# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF AERONAUTICAL ENGINEERING

IV B.TECH I SEMESTER

# R15 SUPPLEMENTARY PREVIOUS QUESTION PAPERS

## LIST OF SUBJECTS

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CODE	NAME OF THE SUBJECT
R15A0368	Mechanical Vibrations and Structural Dynamics

#### MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

#### (Autonomous Institution – UGC, Govt. of India)

#### IV B.Tech I Semester Supplementary Examinations, June 2022

#### **Mechanical Vibrations & Structural Dynamics**

(AE)

Roll No					

Time: 3 hours

Max. Marks: 75

Answer Any Five Questions

All Questions carries equal marks.

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1 A circular disc of mass m and its radius r, spring k as shown in figure.1 obtain its [15M] natural frequency by using Newton's second law method?





- 2 Derive the expression for differential equation of damped free vibration. [15M]
- 3 Find the natural frequencies and mode shapes of a spring mass system, which is **[15M]** constrained to move in the vertical direction as shown in Figure.2

R15





- 4 Derive the co-ordinate coupling for two degree of freedom system. [15M]
- 5 A vibratory body of mass 150 kg-supported on springs of total stiffness 1050 kN/m has **[15M]** a rotating unbalanced force of 525 N at a speed of 6000 R.P.M.If the damping factor is 0.3, determine (a) The amplitude caused by the unbalance and its phase angle, (b) The transmissibility, (c) The actual force transmitted and its phase angle.
- 6 Derive the equation of motion for forced vibration analysis of an undamped system [15M]
- 7 Using matrix iteration method, determine the natural frequencies of the system shown [15M] in Figure.4





8 Derive the general solution for lateral vibrations of the string. [15M]

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