PRN:		Course Code:	P68PC101

First Year M. **Tech** End Semester Examination Winter 2024

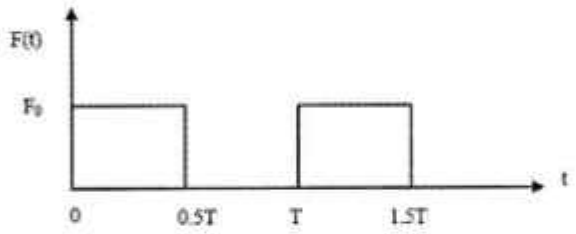
Structural Dynamics 000409

Day and Date: Sat 30 [illegible] 2024 Max Marks: **50**

Time: 10:30AM To 12:30PM Duration: **02** hrs

Instructions: 1) All questions are compulsory.
2) assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

		Marks	Bloom's Level	CO
Q.1	**Attempt any Two from the following**			
a)	What do you understand by Dynamic Magnification Factor?	05	L4	CO1
b)	What do you understand by multiple elastic forces in series and in parallel?	05	L4	CO1
c)	What do you understand by transmissibility?	05	L4	CO1
Q.2	**Attempt any one from the following**			
a)	Express the periodic loading shown in Fig. 1 as a Fourier series. Thus, determine the coefficient a_m and b_m by means of) for the periodic loading `given by	10	L5	CO2



b)	A SDOF system is subjected to a suddenly applied load 'F_0' with a limited duration 't_d'. Determine the response of the undamped system. The system starts at rest.	10	L5	CO2
Q.3	**Attempt any one from the following**			
a)	Explain different type of Machine Foundation.	10	L4	CO3
b)	Describe the machine foundation Design Criteria.	10	L4	CO3
Q.4	**Attempt the following (Any One)**			
a)	Evaluate the fundamental frequency and corresponding modes of a two storeyed building frame. Given the properties from the bottom level as $m_1 = 2m$, $m_2 = 1.5m$, and $k_1 = 3k$, $k_2 = 2k$, where $m = 10000\ kg$ and $k = 10^6\ N/m$. Check orthogonal condition.	10	L5	CO4
b)	State and prove orthogonality condition of mass and stiffness matrix of mode shapes?	10	L5	CO4

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Q.5 **Attempt the following (Any One)**

a)	Explain the Wilson – θ method and New mark – β method	10	L6	CO4
b)	Natural frequency $\omega_1 = 6.50\,rad/\text{sec}$ and $\omega_2 = 12.56\,rad/\text{sec}$; masses are 30 kg and 10 kg respectively and stiffness are $3000N/m$ and $1000N/m$ respectively. Modes of 2DOF shear building are $\phi_1 = \{1.0, 1.732\}$ and $\phi_2 = \{1.0, -1.732\}$. Find the response in all floors if $100\sin 30t$ kN act on top floor.	10	L6	CO4

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