R18

Code No: 151AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year I Semester Examinations, July - 2021
ENGINEERING PHYSICS
(Common to CE, ME, MCT, MMT, AE, MIE, PTM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Show Newton's second law is invariant.
b) A block of mass 10Kg is pushed by a force F on a horizontal rough plane moves with an acceleration of $5ms^{-2}$. When the force is doubled its acceleration becomes $18ms^{-2}$. Find the coefficient of friction between the block and rough horizontal plane. ($g=10ms^{-2}$). [7+8]

2.a) Derive the expressions for velocity and acceleration in cylindrical coordinates.
b) When a horizontal force of 200 N is applied on a body, the acceleration produced is 1.0 ms^{-2}. When the force is 300N, acceleration produced in the body is 2.0 ms^{-2}. Find the mass of the body. [7+8]

3.a) Write the complex number notation and phasor representation of simple harmonic motion.
b) Obtain the expression for decay constant and quality factor in damped harmonic oscillator. [7+8]

4.a) Obtain the expression for resonance frequency in series LCR circuit.
b) Discuss the steady state motion of forced damped harmonic oscillator. [7+8]

5.a) Obtain the solution of a wave equation in a string.
b) Discuss impedance matching. [7+8]

6.a) Derive the wave equation for longitudinal waves.
b) Explain the production of standing waves in a pipe closed at one end and obtain over tone frequencies. [7+8]

7.a) Describe the diffraction from a circular aperture.
b) Obtain the expression for resolving power of a grating. [7+8]

8.a) Discuss the losses associated with optical fibres.
b) Write the medical applications of optical fibres. [7+8]

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