

PHY401A: Weekly Quizzes (Odd semester: 2022-23)

Total points: $5 \times 10 = 50$

Date: Tuesday

Time: 13h15-13h25

Quiz no. 10 (more than one answer may be correct)

46. For an algebraic equation, regular perturbation theory cannot be applicable when

- ☒ (a) we do not know the exact solution of the unperturbed equation
- ☐ (b) the equation is a fifth order equation
- ☒ (c) the perturbation is associated with the highest order term
- ☐ (d) the equation has degenerate roots

47. For Duffing oscillator, regular perturbation theory does not work as

- ☐ (a) it corresponds to an exponentially decaying solution in finite time
- ☒ (b) it corresponds to a resonance-like situation even in the absence of any external forcing
- ☐ (c) the oscillator is nonlinear in nature
- ☐ (d) we do not know the exact solution of the unperturbed equation

48. In Poincare-Lindstedt method,

- ☒ (a) the natural frequency of the perturbed system is different from that of the unperturbed system
- ☐ (b) the natural frequency is no longer constant in time
- ☒ (c) it is possible to get rid of the unphysical resonance-like conditions for higher-order solutions
- ☐ (d) the independent variable (time) is written as a power series of the smallness parameters

49. A system of coupled oscillators

- ☒ (a) becomes uncoupled when written in terms of the normal coordinates
- ☐ (b) must not conserve the total mechanical energy
- ☒ (c) oscillate with one single frequency in normal modes
- ☒ (d) exchange energy within themselves

50. Which of the following is(are) correct?

- ☐ (a) a symmetric matrix will always have distinct eigenvalues
- ☒ (b) the eigenmodes of two different eigenvalues will always be orthogonal to each other for a symmetric matrix
- ☒ (c) for a system of coupled oscillators the normal coordinates can be obtained by the linear transformation of the original coordinates
- ☒ (d) one of the eigenfrequencies of a system of couple oscillators may be equal to the natural frequency of one of the oscillators

No Rough Work is Allowed on this Page