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B.E. / B.Tech. DEGREE EXAMINATION, NOV 2020

Fifth Semester

Mechanical Engineering

15UME501 – DYNAMICS OF MACHINERY

(Regulation 2015)

Duration: One hour   Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The coefficient of fluctuation of speed is _____ of maximum   CO1- R
   fluctuation of speed to the mean speed.

   (a) Sum.   (b) Difference   (c) Product   (d) Ratio

2. The amount of energy absorbed by a flywheel is determined from the _____   CO1- U

   (a) Torque-crank angle diagram   (b) Acceleration-crank angle diagram

   (c) Speed-space diagram   (d) Speed-energy diagram

3. The primary unbalanced force is maximum _____ in one   CO2-R
   revolution of the crank.

   (a) Twice   (b) Four times   (c) Eight times   (d) Sixteen times

4. The resultant unbalanced force due to the two cylinders, along the line of   CO2- R
   stroke, is known as _____
   (a) Tractive force   (b) Swaying couple   (c) Hammer blow   (d) Hammer couple

5. In which type of vibrations, amplitude of vibration goes on decreasing every   CO3- U
   cycle?

   (a) Damped vibrations   (b) Undamped vibrations

   (c) Both (a) and (b)   (d) None of the above

6. A shaft carrying three rotors will have _____ .   CO3- R

   (a) No nodes   (b) One node   (c) Two nodes   (d) Three nodes

7. Choose for Example of forced vibrations _____ .   CO4- U

   (a) Electrical bell   (b) Air compressors

   (c) Internal combustion engines   (d) All of the Above

8. Fluid resistance causes damping which is known as _____   CO4- R

   (a) Resistance damping   (b) Fluid damping   (c) Viscous damping   (d) Liquid damping

9. When the sleeve of a Porter governor moves upwards, the governor speed ____   CO5- U

   (a) Increases   (b) Decreases

   (c) Remain unaffected   (d) First increases and then decreases

10. Degree of freedom for gyroscope rotor is _____   CO5- U

   (a) 2   (b) 3   (c) 4   (d) 5

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. If the crank and the connecting rod are 300 mm and 1 m long CO1- App   (8)
    respectively and the crank rotates at a constant speed of 200 r.p.m.,
    determine:
    1. The crank angle at which the maximum velocity occurs
    2. Maximum velocity of the piston.

12. Four masses A, B, C and D are attached to a shaft and revolve in the CO2- App   (8)
    same plane. The masses are 12 kg, 10 kg, 18 kg and 15 kg respectively
    and their radii of rotations are 40 mm, 50 mm, 60 mm and 30 mm. The
    angular position of the masses B, C and D are 60°, 135° and 270° from
    the mass A. Find the magnitude and position of the balancing mass at a
    radius of 100 mm.

13. A vibrating system consists of a mass of 200 kg, a spring of stiffness CO3- App   (8)
    80 N/mm and a damper with damping coefficient of 800 N/m/s.
    Determine the frequency of vibration of the system.

14. A machine part of mass 2 kg vibrates in a viscous medium. Determine CO4- U   (8)
    the damping coefficient when a harmonic exciting force of 25 N results
    in resonant amplitude of 12.5 mm with a period of 0.2 second. If the
    system is excited by a harmonic force of frequency 4 Hz what will be
    the amplitude of vibration when damper with damping.

15. The arms of a Porter governor are 300 mm long. The upper arms are CO5- U   (8)
    pivoted on the axis of rotation. The lower arms are attached to a sleeve
    at a distance of 40 mm from the axis of rotation. The mass of the load
    on the sleeve is 70 kg and the mass of each ball is 10 kg, when the
    radius of rotation of the balls is 200 mm. If the friction is equivalent to a
    load of 20 N at the sleeve, what will be the range of speed for this
    position?