Total No. of Questions : 4]

SEAT No. :

P8475

[Total No. of Pages : 2

Oct-22/BE/Insem-55

B.E. (Mechanical)

DYNAMICS OF MACHINERY

(2019 Pattern) (Semester - VII) (402042)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

1) Answer Q1 or Q2, Q3 or Q4.
2) Neat diagrams must be draw whenever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data, if necessary.

UNIT - I

Q1) a) Explain with neat diagram direct and reverse cranks method -radial and V engines. [7]

b) A shaft carries four masses A, B, C and D of magnitude 200 kg. 300kg, 400kg and 200kg respectively and revolving at radii 80mm. 70mm, 60mm and 80mm in planes measured from A at 300mm, 400mm and 700mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70°, C to D 120°, The balancing masses are to placed in planes X and Y. The distance between the planes A and X is 100mm, between X and Y is 400mm and between Y and D is 200mm. if the balancing masses revolve at a radius of 100mm, find their magnitude and angular positions.
Solve using either analytical or graphical method. [8]

OR

Q2) a) Explain condition for static and dynamic balancing and need for balancing. [7]

b) A,B,C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B, C and D are 100kg, 5kg and 4kg respectively. Find the required mass A and the relative angular setting of the four masses so that the shaft shall be in complete balance.
Solve using either analytical or graphical method. [8]

P.T.O.

UNIT - II

Q3) a) Explain with a neat sketch the stability of four wheeler vehicle negotiating turn and derive the limiting speed to maintain stability. **[5]**

b) A ship propelled by a turbine rotor which has a mass of 5 tonnes and a speed of 2100 r.p.m. The rotor has a radius of gyration of 0.5 m and rotates in a clockwise direction when viewed from the stern. Find the gyroscopic effects in the following conditions: 1. The ship sails at a speed of 30 km/h and steers to the left in a curve having 60 m radius. 2. The ship pitches 6 degree above and 6 degree below the horizontal position. The bow is descending with its maximum velocity. The motion due to pitching is simple harmonic and the periodic time is 20 seconds. 3. The ship rolls and at a certain instant it has an angular velocity of 0.03 rad/s clockwise when viewed from stern. Determine also the maximum angular acceleration during pitching. Explain how the direction of motion due to gyroscopic effect is determined in each case. **[10]**

OR

Q4) a) Explain the effect of gyroscopic couple on a naval ship during steering, pitching and rolling. **[7]**

b) An aeroplane makes a complete half circle of 50 meters radius, towards left, when flying at 200 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it. **[8]**

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Oct-22/BE/Insem-62
B.E. (Mechanical Engineering)
PRODUCT DESIGN AND DEVELOPMENT
(2019 Pattern) (Semester-VII) (Elective - IV) (402045 A)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of electronic pocket calculator is allowed.*
5) *Assume suitable data, if necessary.*

Q1) a) Explain product development process. [7]

 b) Explain Morphology of product design by ASIMOW. [8]

OR

Q2) a) Write a short note on Product Life Cycle. [6]

 b) Explain Engineering Design process. [5]

 c) Explain the reasons for product failure in brief. [4]

Q3) a) Explain Technology of S Curve with suitable example. [7]

 b) Explain QFD (Quality Function Deployment) approach of modern product development. [8]

OR

Q4) a) Explain Customer need Models in brief. [6]

 b) Explain market segmentation in detail with suitable example. [5]

 c) Illustrate the philosophy of TRIZ methodology. [4]

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Oct-22/BE/Insem-59

B.E. (Mechanical)

INDUSTRIAL ENGINEERING (Elective - III)

(2019 Pattern) (Semester - VII) (402044D)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

1) Solve Q.1 or Q.2, Q.3 or Q.4.
2) Figures to the right side indicate full marks.
3) Use of electronic calculator is allowed.
4) Assume suitable data, if necessary.

Q1) a) Discuss the characteristics of management science. **[8]**

b) Define Productivity and Explain productivity improvement methods for organization. **[7]**

OR

Q2) a) Define and explain what do you understand by industrial engineering? What is its importance? **[6]**

b) Output = Rs 10000, Human input = Rs 3000, Material input = Rs 200, Capital input = Rs 300, Energy input = Rs 100, Other miscellaneous input = Rs 50 The values are in terms of base year rupee value. Compute different productivity indices. **[9]**

Q3) a) Write short notes on : **[6]**

i) Work Study

ii) SIMO Chart

b) A group of 10 person working 8 hours per day (one shift) on a group of engine lathes produced 320 pieces of a component. During the study, it was observed that workmen were idle for 20% of the total available time and 80% of the time they worked at an average performance of 75%. Estimate standard time for the job assuming. **[9]**

P.T.O.

i)   The operation to be completely manual.

ii) The person are entitled to 20% allowance for this type of work.

<div align="center">OR</div>

Q4) a) Describe briefly flow diagrams and string diagrams. How are they useful in plant layout study?   [7]

b) What is method study? What are its objectives? How does it differ from work measurement?   [8]

<div align="center">□□□</div>

Oct-22/BE/Insem-62

B.E. (Mechanical Engineering)
PRODUCT DESIGN AND DEVELOPMENT
(2019 Pattern) (Semester-VII) (Elective - IV) (402045 A)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

1) Answer Q1 or Q2, Q3 or Q4.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to the right indicate full marks.
4) Use of electronic pocket calculator is allowed.
5) Assume suitable data, if necessary.

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b) Explain market segmentation in detail with suitable example. [5]

c) Illustrate the philosophy of TRIZ methodology. [4]

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