Enrollment No……

**Bachelor of Engineering**
**Fifth Semester Main Examination, Dec-2020**
**Entrepreneurship & Management Concepts [ME-501]**
**Branch: ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note : Attempt any five questions out of eight.**
**All question carry equal marks.**

Q.1 Explain types and characteristics of system.

Q.2 Define functional and cross functional system.

Q.3 Discuss the team work and stress management.

Q.4 Define motivation and Maslow's need Hierarchy.

Q.5 What is TQM? Explain.

Q.6 What is Six sigma? Explain.

Q.7 What is Marketing and importance of marketing?

Q.8 Explain various theory of entrepreneur.

Enrollment No……

**Bachelor of Engineering**
**Fifth Semester Main Examination, December 2020**
**Turbo Machinery [ME-502]**
**Branch-ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note : (i) Attempt any five questions out of eight.**
**(ii) Use of steam table chart is permitted.**
**(iii) Draw neat diagram if necessary.**
**(iv) All questions carry equal marks.**

Q.1 (a) What do you mean turbo machines?

(b) What is Degree of reaction?

Q.2 (a) Write down Principles of impulse and reaction machines

(b) Derive Moment of momentum equation and Euler turbine equation.

Q.3 (a) Write down Application of first and second laws of thermodynamics to turbo machines.
(b) Energy equation for relative velocities for one dimensional analysis

Q.4 (a) Write down application of turbo machinery

(b) Write merit and demerits of turbo machine.

Q.5 (a) How turbo machine different in simple machine

(b) Write down brief introduction of turbo machinery.

.

Q.6 (a) A Francis turbine with an overall efficiency of 70% is required to produce 147.15 kW. It is working under the head of 8 m. The peripheral velocity = $0.30\sqrt{2gh}$ and the radial velocity of flow at inlet is $0.96\sqrt{2gh}$ . The wheel runs at 200 rpm and the hydraulic loss in the turbine are 20% of the available energy. Assume radial discharge, determine
The guide blade angels,
The wheel vane angle at inlet
Dia. of wheel at inlet , and
Width of wheel at inlet.

(b) A centrifugal pump running at 100 rpm. The outlet van angle of the impeller is 450 and velocity of flow at outlet is 2.5 m/s. The discharge through the pump is 200 liters/s when the pump is working against a total head of 20 m. If the manometric efficiency of the pump is 80%, determine
the dia of impeller and the width of the impeller at outlet.

Q.7 (a) Explain the working principle of a centrifugal compressor. Also draw the enthalpy-entropy diagram for the same OR 16. A centrifugal compressor runs at a speed of 15000 rpm and delivers 30 kg of air per second. Exit radius is 0.35m, relative velocity at exit is 100 m/s at an exit angle of 75$^\circ$ . Assume axial inlet and T01=300 K and p01= 1 bar. Calculate
(a) The torque
(b) The power required to drive the compressor
(c) The ideal head developed
(d) The work done
(e) The exit total pressure

(b) Explain the process of cavitations. How can it be avoided? 9. Draw the combined velocity triangle for an axial flow compressor for which the value of degree of reaction is 50% 10. List out the advantages and disadvantages of velocity compounding.

Q.8 (a) Explain the process of cavitations. How can it be avoided? 9. Draw the combined velocity triangle for an axial flow compressor for which the value of degree of reaction is 50%

(b) Explain the concept of radial equilibrium in an axial flow compressor

Enrollment No……

**Bachelor of Engineering**
**Fifth Semester Main Examination, Dec-2020**
**Mechanical Measurement and Control [ME-503]**
**Branch: ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note : 1. Attempt any five questions out of eight.**
**2. All question carry equal marks.**

Q.1 (a) Explain the factors which should be considered while letting an instrument for a specific measurement application.
(b) Describe the significance of measurement.

Q.2 (a) How are pressure measuring instruments classified?
(b) List the advantages and disadvantages of manometer.

Q.3 (a) Explain the working of venturimeter with the help of neat diagram.
(b) What are the requirements of a strain gauge?

Q.4 (a) Explain unbounded strain gauges.
(b) What is control system? What are its elements.

Q.5 (a) Explain an open loop control system.
(b) Explain Least Square Regression analysis and data outlier detection.

Q.6 (a) Explain different types of strain gauges.
(b) Explain Construction and working of LVDT with neat sketch.

Q.7 (a) Explain briefly the transient and steady state response of control system.
(b) Explain modeling of thermal systems in detail.

Q.8 (a) Draw and Discuss general model for a dynamic measurement system.
(b) Explain the following measurement terms: Range, accuracy, bias error, sequential and random tests.

Enrollment No……

## Bachelor of Engineering
## Fifth Semester Main Examination, Dec-2020
## Machine Component Design [ME-504]
## Branch: ME

**Time: 3:00 Hrs** **Max Marks 70**

**Note: 1. Attempt any five questions out of eight.**
**2. All question carry equal marks.**

Q.1 (a) Describe with the neat sketch the principle of operation of an internal expanding brake.
(b) In a plate clutch the axial force is 4500N. The inner radius of contact is 50mm and outside radius is 100mm. assuming uniform wear, determine –
(i) Maximum Pressure
(ii) Minimum Pressure
(iii) Average Pressure

Q.2 A shaft carries a 1000N pulley in the center of two ball bearings which are 2000 mm apart. The pulley is keyed to the shaft and receives 30kw of power at 150 rpm. The power is transmitted from the shaft

through a bearing. The belt drive is horizontal and the sum of the belt tension is 800N. Calculate the diameter of the shaft is permissible stress in bending is 80 $N/mm^2$ and in shear is 45 $N/mm^2$.

Q.3 Design a valve spring of a petrol engine for the following operation conditions :
- Spring load when valve is open = 240 N
- Spring load when valve is closed = 270 N
- Max. Inside diameter of spring = 25 mm.
- Length of spring when valve is open = 40 mm.
- Length of spring when valve is closed = 50 mm.
- Max. Strength = 500 Mpa

Q.4 (a) What is "Stress Concentration"? Define Fatigue Stress Concentration Factor and Index of Sensitivity.
(b) Explain
i) S-NCurve ii) Soderberg Equation

Q.5 (a) Differentiate between a clutch and a coupling. Give a brief classification of clutches.

(b) A simple band brake operates on a drum of 600mm. in a diameter that its running at 200rpm. The band crake has contact angle of 270°, One end is fastened to a fixed pin and other end to the brake arm 125 mm. from the fixed pin. The straight brake arm is 750mm long and placed. Perpendicular to the diameter that bisects the angle of contact. What is the pull necessary on the end of the brake arm to stop the wheel, if 35KW is being observed? What is the direction for this minimum Pull?

Q.6 (a) Define 'Spring Buckling'. Also give the classification of springs.
(b) Design the journal bearing for a centrifugal pump from the following data –
Load on the Journal = 10 KN
Speed on the Journal = 900 KN
Ambient temperature = 150° C

Q.7 (a) What force will be required at a radius of 80 mm to raise and lower a 11 KN cross bar of a plane? The bar is raised and lowered by two 38mm. square thread screws having a pitch of 7mm. The screw is of steel and nut is of bronze 38mm. thick. The collar is of steel and it has an outside diameter of 76 mm. and inside diameter of 38mm. Take coefficient of friction at the threads as 0.11 and at the collar as 0.13.

Q.8 (a) State about the following keys –
i) Rectangular sunk key
ii) Square sunk key
iii) Parallel sunk key

Enrollment No……

**Bachelor of Engineering**
**Fifth Semester Main Examination, Dec-2020**
**Dynamics of Machine [ME-505]**
**Branch: ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note : 1. Attempt any five questions out of eight.**
**2. All question carry equal marks.**

Q.1 (a) Discuss turning moment of crank shaft.
(b) Prove that if the external moment is applied to a link, the constraint forces from a couple

Q.2 (a) Deduce the expression for the inertia force in the reciprocating force neglecting the weight of the Connecting rod.
(b) How governors are classified? Explain the effect of Gyroscopic couple on an Aeroplane.

Q.3 (a) What is meant by balancing of rotating masses? List the effects of partial balancing of Locomotives.
(b) Differentiate between the unbalanced forces caused due to rotating and reciprocating masses

Q.4 (a) Define the friction and friction circle. State types of friction.
(b) Discuss the concept of boundary and film lubrication.

Q.5 (a) Discuss selection of V-belts, ropes and chains for different applications.
(b) What do you mean by dynamical equivalent system? Explain.

Q.6 (a) Describe the graphical method of considering the inertia of the connecting rod of a reciprocating engine.
(b) Do you recommend the uniform pressure theory or uniform wear theory for the friction torque of bearing? Explain

Q.7 Discuss the effect of slip of belt on the pulleys on the velocity ratio of belt drive.

Q.8 A wheel accelerated uniformly from rest to 2000 r.p.m. in 20 second. What is its angular acceleration? How many revolutions does the wheel make in attaining the speed of 2000 r.p.m.?