Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Fluid Mechanics [ME225T]
Branch- ME

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

Note: (i) Attempt any five questions.

(ii) All question carry equal marks. Assume suitable data if necessary.

Q.1 (a) A wooden cylinder of specific gravity 0.6 and circular in cross-section is required to float in oil(specific gravity 0.90).Find the L/D ratio for the cylinder to float with it's longitudinal axis vertical in oil. Find L/D ratio for the cylinder.
(b) An orifice meter with orifice diameter 10cm is inserted in a pipe of 20cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives readings of 19.62 N/cm2 and 9.81N/cm2respectively.coefficient of discharge is given as 0.6.Find the discharge of water through pipe.

Q.2 (a) Discuss the condition of equilibrium of a floating body.
(b) A rectangular plate 0.6mx1.2m is submerged in an oil bath of specific gravity 0.8. The maximum and minimum depth of the plate are 1.6m and 0.75m from the free surface. Calculate the hydrostatic face on the plate and depth of center of pressure.

Q.3 (a) What is venturi meter? State the expression of discharge through venturimeter.
(b) Define moment of momentum equation. Where this equation is used? \

Q.4 (a) Explain dimensionless numbers?
(b) Distinguish between steady and unsteady flow

Q.5 (a) State and derive Pascal's law.
(b) What is meant by centre of pressure? How does it vary with depth of fluid?

Q.6 (a) Define velocity potential function and stream function.
(b) Explain uniform flow with source and sink.

Q.7 (a) Define fundamental units and derived units.
(b) Define Reynold's number and Froude's number.

Q.8 (a)Derive Bernoulli's theorem for steady flow of an incompressible fluid from consideration of Momentum.
(b). Explain following laws:- (i) What is Euler's Law? (ii) What is Stoke's law?

Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Machine Drawing & CAD [ME226T]
Branch-ME

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

Note: Attempt any five questions. All questions carry equal marks.

Q.1 (a) What are software and hardware required to produce CAD drawing. Explain any one in each.
(b) Difference between CAD, CAM & CIM?

Q.2. Explain following commands
(a)Line and polyline (b) Circle (c) Hatching (d) Text (e) Dimensioning

Q.3 (a) How we can analysis the CAD design.
(b) Draw any five conventional representations of machines components.

Q.4 (a) How a square thread is drawn in schematic from?
(b) What is purpose of shaft? Draw and discuss various types of shaft.

Q.5 (a) What is CAD? With example.
(b) Write Advantage and disadvantages of CAD?

Q.6 (a) What are the facilities that are useful for creating geometric entities in drafting system?
(b) What are various construction facilities available for modelling in a 3D modelling system?

Q.7 (a) Draw any five convectional representations of machines components.
(b) Draw a sectional front view and top view double riveted Butt Joint chain riveting to join plates of thickness 15 mm.

Q.8 (a) Discuss two methods normally followed while dimensionally a drawing.
(b) Sketch the following welding symbol along with respective illustration.
(i) Single V-Butt weld (ii) Fillet weld

Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Energy Conversion [ME227T]
Branch - ME

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

Note : (i) Attempt any five questions.
(ii) All question carry equal marks.

Q.1 a) What is the importance of lubrication in CI engines? Enumerate lubrication system explain any one of them with neat sketch.
b) Explain the factors that limits the extent of supercharging of SI and CI engines

Q.2 a) Explain the thermodynamic cycle of a supercharged IC engine.
b) Describe the operation of splash lubrication system with the help of neat sketch.

Q.3 a) Explain with neat sketch the phase of combustion in CI engine.
b) Explain briefly basic method of generation air swirl in CI engines combustion chambers.

Q.4 a) Explain with neat sketch the working principle of a solex carburetor.
b) What are the functional requirements of injection system? Explain injection system which is used in multi-cylinder diesel engine.

Q.5 a) What do you understand by pre-ignition in S.I. engine? What are its causes and remedy?
b) Draw and explain the performance characteristics curve of SI engines.

Q.6 a) What are the two basic types of internal combustion engines? What is the fundamental difference between them?
b) Explain valve timing diagram for four stroke cycle spark ignition engine.

Q.7 a) Explain the phenomenon of auto-ignition. Explain how auto-ignition is responsible for knocking in SI engines.
b) Explain the main factors that influence the flame speed.

Q.8 Write the short note:

i) Turbo charger ii) Scavenging system

Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Machine Design-I [ME228T]
Branch : ME

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

Note: 1. Attempt any five questions. All question carry equal marks.
2. Answer should be precise & to be point only.
3. Assume suitable data if necessary & state them clearly.

Q.1 (a) State the cause of stress concentration in brief.
(b) Write and explain the general consideration in Machine Design.

Q.2 (a) Explain Overberg Equation.
(b) Explain Goodman and Modified Good man's diagram.

Q.3 (a) What do you understand by stress concentration?
(b) Explain S-N Curve

Q.4 (a) Write Reynolds Equation for journal Bearing. State its significance
(b) State brief about selection of ball and roller bearing

Q.5 (a) State about various types of springs.
(b) Define spring Buckling.

Q.6 (a) Explain briefly about boundary lubrication in Journal Bearing.
(b) Explain about static and dynamic load capacities?

Q.7 (a) Define spring. Its types and objectives.
(b) What are the various permanent and detachable fastenings? Give a complete list with different types of each category.

Q.8 Define the terms:-
(i) Notch Sensitivity (ii) cyclic loading

Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
System Engineering [ES221T]
Branch-CS/EX/EC/IT/ME

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

Note: (i) Attempt any five questions out of eight.
(ii) All question carry equal marks.

Q.1 (a) Discuss origin of system Engineering.
(b) Explain system engineering fields.

Q.2 (a) Discuss structure of complex systems.
(b) Explain system environment, interfaces.

Q.3 (a) Discuss complexity of modem systems.
(b) Explain concept development and exploration.

Q.4 (a) Discuss system operational requirements.
(b) Explain Implementation of concept exploration.

Q.5 (a) Discuss reducing program risk.
(b) Explain functional analysis and design.

Q.6 (a) Explain prototype development as a risk mitigation technique.
(b) Explain test planning and preparation.

Q.7 (a) Explain operational test and evaluation.
(b) Write short notes on any two:
(i) Production operations
(ii) System engineering approaches
(iii) Integrating testing

Q.8 (a) Explain the concept of modeling systems.
(b) Explain the system life cycle phase and the product development life cycle phases.

Enrollment No……

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Mathematics-III [MA220T]
Branch-CE/ME

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

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

Q.1 (a) State and prove Cauchy's theorem.
(b) Show that the function $e^x(cosy + isiny)$ is analytic and find its derivative.

Q.2 (a) Using Cauchy's integral formula prove that : $\int_c^3 \frac{e^{2z}}{(z+1)^4} dz = \frac{8\pi e^{-2}}{3} i$, where C is the circle $|z| = 3$.
(b) Find the imaginary part of the analytic function whose real part is $x^3 - 3xy^2 + 3x^2 - 3y^2$.

Q.3 (a) Find the real root of the equations $x^3 - 9x + 1 = 0$ by the method of false position.
(b) Apply Newton Raphson method to solve $3x = cosx + 1$.

Q.4 (a) Using Newton's forward Interpolation formula, find the value of $f(1.6)$,if

x:	1	1.4	1.8	2.2
y:	3.49	4.82	5.96	6.5

(b) Solve the following system by Gauss elimination method

$$6x_1 + 3x_2 + 2x_3 = 6$$
$$6x_1 + 4x_2 + 3x_3 = 0$$
$$20x_1 + 15x_2 + 12x_3 = 0$$

Q.5 (a) Apply Lagrange's formula to find the value of x when f(x) = 0 given that

x:	30	34	38	42
$f(x)$:	−30	−13	3	18

(b) Solve initial value problem $\frac{dy}{dx} = 1 + xy^2$, $y(0)$=1 for $x = 0.4, 0.5$ by using Milne's method when it is given that

x:	0.1	0.2	0.3
y:	1.105	1.223	1.355

Q.6 (a) Solve the equation $\frac{dy}{dx} = x + y$ with initial condition $y(0) = 1$ by Runge kutta rule from $x = 0$ to $x = 0.4$ with $h = 0.1$

(b) Evaluate $\int_{0.5}^{0.7} x^{1/2} e^{-x} dx$ approximately by using a suitable formula.

Q.7 (a) Solve the following by Euler's modified method, the equation $\frac{dy}{dx} + \log(x + y), y(0) = 2$ at $x = 1.2$ and 1.4 with $h = 0.2$

(b) Use picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$ and $\frac{dy}{dx} = x - y$

Q.8 (a) Solve the following by Euler's modified method, the equation $\frac{dy}{dx} + \log(x + y), y(0) = 2$ at $x = 1.2$ and 1.4 with $h = 0.2$

(b) Solve the following by Gauss Seidel iteration Method

$$10x + y + z = 12$$

$$2x + 10y + z = 13$$

$$2x + 2y + 10z = 14$$