6/10/26 FN

Name :
Roll No:

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM – 686 666

DEPARTMENT OF MECHANICAL ENGINEERING
SECOND SESSIONAL EXAMINATION, OCTOBER 2026
THIRD SEMESTER (ME)

B24ME2T02 MECHANICS OF FLUIDS

Time – 1.5 Hour **Max: 40 Marks**

PART-A
Answer All Questions

1.	State Bernoulli's equation and list the assumptions in its application.	[CO 3]	3 Marks
2.	Name the various parts of a Venturimeter and explain its working with a neat sketch.	[CO 3]	3 Marks
3.	State the Chezy's equation, explain its various terms and name the condition under which it is applied.	[CO 4]	3 Marks
4.	Name and explain the major and minor losses in pipe flow.	[CO 4]	3 Marks

PART-B
Answer All Questions

5. a	Derive Euler's equation of motion for fluid flow and obtain the Bernoulli's equation for real fluids.	[CO 3]	7 Marks
5.b	A pitot-static tube placed in the center of a 300 mm pipe line has one orifice pointing upstream and other perpendicular to it. The mean velocity in the pipe is 80% of the central velocity. Find the discharge through the pipe if the pressure difference between the two orifices is 60 mm of water. Take the coefficient of pitot tube as 0.98.	[CO 3]	7 Marks
6. a	For low viscosity and high velocity flow through a uniform circular pipe, develop the relationship between frictional head loss and the flow parameters using a suitable force balance equation.	[CO 4]	7 Marks
6. b	Oil is transported from a tanker to the shore at the rate of 0.6 m^3/s using a pipe of 32 cm diameter for a distance of 20 km. If the oil has viscosity of 0.1 N-s/m^2 and density of 900 kg/m^3. Assuming the flow to be either laminar or turbulent as applicable, determine the power required to maintain the flow.	[CO 4]	7 Marks

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MISSION

- To facilitate comprehensive and integrated development of students by providing quality education that encourages sustainable practices
- To mold disciplined and socially committed engineers capable of assuming professional leadership upholding national integrity

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MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM – 686 666

DEPARTMENT OF MECHANICAL ENGINEERING
SECOND SESSIONAL EXAMINATION OCTOBER 2026
FIFTH SEMESTER – (ME)

B24ME3T02 THERMAL POWER ENGINEERING

Time – 1.5 Hour **Max: 40 Marks**

PART-A

Answer All Questions
Assumptions if any, must be clearly stated.

1.	What are the methods for estimating frictional power in an engine?	**[CO 4]**	**3 Marks**
2.	Define the following as related to steam turbine. i) Indicated power, ii) Specific Fuel Consumption, iii) Thermal efficiency.	**[CO 4]**	**3 Marks**
3.	Differentiate between steam stop valve and safety valve.	**[CO 5]**	**3 Marks**
4.	Assume a typical daily electrical load for the institution and draw the load curve showing the variation of load with time.	**[CO 5]**	**3 Marks**

PART-B

Answer All Questions

5.a	Sketch a practical pressure–crank angle diagram for an S.I. engine and mark the different stages of combustion.	**[CO 4]**	**4 Marks**
5.b	The following particulars are obtained in a trial on a 4-S gas engine: Duration of trial = 1 hour, Revolutions = 14000, Net Brake Load = 1470 N, Mean Effective Pressure = 7.5 bar, Gas Consumption = 20000 liters, LCV of fuel at admit conditions = 21kJ/liters, Cylinder Diameters = 250 mm, Stroke = 400mm, Effective Brake Circumference = 4m, Compression ratio = 6.5:1. Calculate (i) Indicated power, (ii) Brake power, (iii) Mechanical efficiency, (iv) Indicated thermal efficiency, (v) Relative efficiency.	**[CO 4]**	**10 Marks**
6. a	Sketch and explain the working of a fluidized bed combustion system.	**[CO 5]**	**4 Marks**
6. b	A base load station having a capacity of 18 MW and a standby station having a capacity of 20 MW share a common load. Find the annual load factors and plant capacity factors of two power stations from the following data: Annual standby station output = $7{\cdot}35 \times 10^6$ kWh, Annual base load station output = $101{\cdot}35 \times 10^6$ kWh, Peak load on standby station = 12 MW, Hours of use by standby station/year = 2190 hours.	**[CO 5]**	**10 Marks**

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