

b)	In a test of a four-cylinder, four-stroke petrol engine of 75 mm bore and 100 mm stroke, the following results were obtained at full throttle at a constant speed and with a fixed setting of the fuel supply of 0.082 kg/min. bp with all cylinders working = 15.24 kW bp with cylinder number 1 cut-off = 10.45 kW bp with cylinder number 2 cut-off = 10.38 kW bp with cylinder number 3 cut-off = 10.23 kW bp with cylinder number 4 cut-off = 10.45 kW Estimate the indicated power of the engine under these conditions. If the calorific value of the fuel is 44 MJ/kg, find the indicated thermal efficiency of the engine.	4	4	2	2
13. a)	Draw p- θ diagram for S I Engine and explain different stages of combustion	4	2	3	1
b)	Differentiate between knocking phenomena of S I Engine and C I Engine	4	2	3	1
14. a)	Draw the schematic diagram of Cochran boiler and explain the principle of operation.	4	2	4	1
b)	Compare Fire tube boilers with water tube boilers.	4	4	4	1
15. a)	Explain the principle of operation of counter flow jet condenser along with its advantages and limitations.	4	1	5	1
b)	Steam at an initial pressure of 7 bar and in dry saturated condition flows through a convergent divergent nozzle having a throat area 3.5 sq. cm. The pressure at exit plane is 1.4 bar and the exit velocity is 700 m/s. The flow from nozzle entrance to throat is reversible and adiabatic. Determine the exit area of the nozzle and nozzle overall efficiency.	4	2	5	2
16. a)	Explain the working of a two stage air compressor with a line diagram and P-v plane.	4	2	1	1
b)	Discuss in detail the heat balance test.	4	1	2	1
17.	Answer any <i>two</i> of the following:				
a)	Explain the effect of engine variables on knocking on C I engine.	4	1	3	1
b)	Differentiate between boiler mountings and accessories based on their functions.	4	2	4	1
c)	Derive the equation for the estimation of critical pressure ratio in terms of index of expansion for convergent divergent nozzle.	4	2	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	22.5%
ii)	Blooms Taxonomy Level – 2	57.5%
iii)	Blooms Taxonomy Level – 3 & 4	20%
