ELEMENTS OF MECHANICAL ENGINEERING (2110006)
IMP QUESTION BANK

Category A (30 Questions)

Sr. No.	Question
	1.INTRODUCTION
1.	What is Prime mover? How are they classified?
2.	Give the statements& explain zeroth law, first law and second law of Thermodynamics.
	3.PROPERTIES OF GASES (+ Numerical)
1.	With usual notations prove that $C_p - C_v = R$.
2.	Explain Isothermal Process. For Isothermal process. Find expression of work done, Change in Internal Energy, Change in Enthalpy and Heat transfer.
3.	What is an adiabatic process? For adiabatic process with the usual notation prove PV^{γ} = constant.
	4.PROPERTIES OF STEAM (+ Numerical)
1.	Write a short note on Separating calorimeter with its limitations.
2.	With neat sketch explain construction and working of throttling calorimeter
3.	What do you mean by Dryness fraction? Describe Combined calorimeter with a neat sketch.
	5.HEAT ENGINES (+ Numerical)
1.	Prove that efficiency of Carnot Engine working between temperature limits T1 andT2 is given by the expression $\eta=\frac{T_1-T_2}{T_1}$
2.	Derive thermal efficiency formula for Rankine cycle.
3.	Derive an expression for efficiency of Otto cycle.
4.	Draw P-V diagram for an ideal Diesel cycle and Derive an expression for its air standard efficiency.
	6.STEAM BOILERS
1.	Differentiate between Fire tube and Water tube boiler.
2.	Discuss construction and working of Cochran boiler with sketch.
3.	Explain with neat sketch the construction and working of Babcock and Wilcox boiler.
4.	Explain very briefly the function of following mountings : (i) Steam stop valve (ii) Feed check valve (iii) Blow-off cock (iv) Water level indicator (v) Pressure gauge (vi) Safety valve (vii) Fusible plug (viii) Economiser (ix) Super heater (x) Air-Preheater.
	7.INTERNAL COMBUSTION ENGINES (+ Numerical)
1.	With neat sketch explain working of four stroke petrol engine with P-V diagram.
2.	Difference between Petrol (S.I.) engine and Diesel (C. I.) engine.
3.	Give difference between Two stroke and Four stroke I.C. Engine
	8.PUMPS
1.	What do you understand by word pump? Draw neat sketch of single acting reciprocating pump with nomenclature.
2.	Explain construction and working of centrifugal pump with sketch.
3.	Write short note on Vane pump
	9.AIR COMPRESSORS

Sr. No.	Question
1.	State uses of compressed air and explain how compressors are classified
	10.REFRIGERATION & AIR CONDITIONING
1.	With neat sketch describe the working of simple vapour compression refrigeration Cycle. (Drawing p-h and T-S chart)
2.	Explain with flow diagram, the working of a vapour absorption refrigerator.
3.	What is refrigeration? What is refrigeration effect? Explain window air conditioner with neat sketch.
	11.COUPLINGS, CLUTCHES & BRAKES
1.	What is function of Coupling? Name only various types of couplings. Explain Oldham coupling.
2.	Explain centrifugal clutch.
3.	Give the classification of brake and describe with neat sketch the working principle of an internal expanding shoe brake.
	12.TRANSMISSION OF MOTION & POWER
1.	Give comparison of belt drive, Chain drive and gear drive. **Or** State the application, advantages and disadvantages of (i) belt drive (ii)chain drive (iii) gear drive

Category – B (34 Questions)

Sr. No.	Question
	1.INTRODUCTION
1.	Define Pressure and explain Absolute Pressure, Gauge Pressure and Atmospheric pressure
2.	Write similarities between heat transfer and work transfer.
3.	Classify thermodynamic system and give example of each.
	2.ENERGY
1.	List various gaseous fuels. State its advantages and disadvantages.
2.	Write short notes on CNG
3.	Write advantages of gaseous fuels over other fuels. Write short note on LPG.
	3.PROPERTIES OF GASES
1.	Derive Expression PV/T=constant with the help of Boyle's law and Charle's law.
2.	Define adiabatic process. Derive the relation between P, V and T for this process. Also derive the expression for work done and change in internal energy for this process.
	4.PROPERTIES OF STEAM
1.	Define the following terms: (i) Dryness fraction of steam (ii) Degree of superheat (iii) Wet steam (iv) Saturation temperature (v) Sensible heat (vi) Latent heat (vii) Enthalpy of evaporation (viii) Heat of superheat
	6.STEAM BOILERS
1.	Explain construction and working of Lancashire boiler.
2.	With neat sketch explain construction and working of pressure gauge.

Sr. No.	Question
3.	Explain fusible plug with neat sketch.
4.	With neat sketch explain construction and working of water level Indicator.
5.	With neat sketch explain construction and working of Air Preheater
6.	With neat sketch explain construction and working of Economiser.
7.INTERNAL COMBUSTION ENGINES	
1.	With neat sketch describe the working of two stroke cycle petrol engine.
2.	Explain working of four stroke Diesel Engine with P-V diagram
8.PUMPS	
1.	Classify centrifugal pumps. With neat sketch explain the function of each part of centrifugal pump.
2.	What is pump? Explain working of double acting reciprocating pump and bucket pump with neat sketch.
3.	What is priming? Why priming is required in centrifugal pump but not in reciprocating pumps?
9.AIR COMPRESSORS	
1.	State the advantages of multistage compressor and explain with P-V diagram the working of two stage compressor.
2.	Classify the air compressor. Differentiate between reciprocating compressor and rotary compressor.
3.	Classify rotary air compressors. Explain the construction and working of centrifugal compressor with neat sketch.
4.	Formula for work done in Reciprocating Air Compressor.
10.REFRIGERATION & AIR CONDITIONING	
1.	What should be the properties of common refrigerants?
2.	Write short note on domestic refrigerator.
3.	Make comparison between vapour compressions and vapour absorption system
4.	Define air conditioning and classify the air conditioning systems.
5.	Write short note on Split AC.
11.COUPLINGS, CLUTCHES & BRAKES	
1.	Explain plate clutch.
2.	Differentiate between Clutch and Brake.
12.TRANSMISSION OF MOTION & POWER	
1.	Compare individual drive and group drive.
2.	Explain types of belt drive.
13.ENGINEERING MATERIALS	
1.	Definitions of various mechanical properties given in book

Numerical

Ch-7 I.C. Engine (Most IMP)

1.	The following readings were taken during the test on a single cylinder four stroke, Oil engine: Cylinder diameter = 270 mm Stroke Length = 380 mm Mean effective pressure = 6 bar Engine Speed = 250 rpm Net load on brake = 1000 N Effective mean Diameter of brake = 1.5 m Fuel used = 10 Kg/Hr C.V. of Fuel = 44400 KJ/Kg. Calculate:- (i) Brake Power. (ii) Indicated Power. (iii) Mechanical Efficiency. (iv) Indicated Thermal Efficiency.
2.	The following reading were taken during the test of four stroke single cylinder petrol engine : Load on the brake drum = 50 kg Diameter of brake drum = 1250 mm Spring balance reading = 7 kg Engine speed = 450 rpm Fuel consumption = 4 kg/hr Calorific value of the fuel = 43000 kJ/kg. Calculate: (i) indicated thermal efficiency (ii) brake thermal efficiency. Assume mechanical efficiency as 70%
3.	During testing of single cylinder two stroke petrol engine following data is obtained, Brake torque 640 NM, Cylinder diameter 21cm, speed 350 rpm, stroke28cm, m.e.p. 5.6 bar, oil consumption 8.16 Kg/hr, C.V. 42705 kj/Kg. Determine Mechanical efficiency Indicated thermal Efficiency Brake thermal efficiency Brake specific fuel consumption
4.	The following results refer to a test on C.I. engine Indicated power - 37 KW, Frictional power - 06 KW, Brake specific fuel consumption - 0.28 Kg/Kwh, Calorific value of fuel - 44300 KJ/Kg. Calculate: (i) Mechanical efficiency (ii) Brake thermal efficiency (iii) Indicated thermal efficiency
5.	During a test on a single cylinder four stroke engine having compression ratio of 6, following data is recorded. Bore =10cm, Stroke=12.5 cm, imep =2.6 bar, dead load on dynamometer =60N, spring balance reading =19 N, Effective radius of flywheel =40cm, fuel consumption =1Kg/hr. Calorific value of fuel is 42, 000 KJ/ Kg, speed =2000RPM, Determine its indicated power, brake power, mechanical, overall efficiency, air standard efficiency.
6.	A two stroke cycle internal combustion engine has a piston diameter of 110 mm and a stroke length of 140 mm. The m.e.p. exerted on the head of the piston is 600 kN/m^2. If it runs at a speed of 1000 r.p.m. Find the indicated power developed.
7.	The following data is available for 2-stroke diesel engine: Bore=10 cm, stroke=15 cm, engine speed=1000 RPM, Torque developed=58 N-m, η_m=80%, indicated thermal efficiency=40%, Calorific value of fuel=44000 KJ/Kg. Find: (a) Indicated Power, (b) Mean effective Pressure & (c) Brake Specific Fuel Consumption.
8.	A four cylinder four stroke petrol engine has 100mm bore and stroke is 1.3times bore. It consumes 4 kg of fuel per hour having calorific value of40500 kJ/kg. If engine speed is 850 rpm. Find its Indicated thermal efficiency. The mean effective pressure is 0.75 N/mm^2
9.	The following data refers to a single cylinder 4 strokes petrol engine. Cylinder diameter = 30 cm, piston stroke = 40 cm, engine speed= 1400 r.p.m, indicated mean effective pressure = 5 bar, fuel consumption= 17.568 kg per hour, calorific value of the fuel is 45000 kJ/Kg; specific gravity of the fuel is 0.8. Determine the indicated thermal efficiency.
10.	During testing of single cylinder two stroke petrol engine following data were obtained. Brake torque 640Nm, cylinder diameter 21cm, speed 350 rpm, stroke length 28 cm, mean effective pressure 5.6 bar, oil consumption 8.16 kg/hr, CV42705 kJ/kg.Determine (i) mechanical efficiency (ii) Indicated thermal efficiency (iii) Brake thermal efficiency (iv) brake specific fuel consumption.
11.	A four cylinder two stroke petrol engine with **stroke to bore ratio 1.2** develops 35 kW brake power at 2200 rpm. The mean effective pressure in each cylinder is 9 bar and mechanical efficiency is 78 %. Determine (1) Diameter and stroke of each cylinder (2) Brake thermal efficiency (3) indicated thermal efficiency. If fuel consumption 8 kg / hr having C.V=43000 kJ/kg.
12.	A 4 cylinder 2-stroke engine develops 30 kW at 2500 rpm. The mean effective pressure of each cylinder is 800 KPa and mechanical efficiency =80 %. Calculate Brake power and mass flow rate of fuel **if L/D = 1.5**, Brake thermal efficiency = 28% and calorific value of fuel = 44000 kJ/kg
13.	A six cylinder 4 Stroke IC Engine is to develop 89.5 KW indicated power at 800 rpm. The stroke to **bore ratio is 1.25**: 1. Assuming mechanical efficiency of80% and brake mean effective pressure of 5 bar. Determine the diameter and stroke Of the Engine.
14.	A four cylinder 4-stroke petrol engine develops 200 kW brake power at 2500 rpm. **Stroke to bore ratio is 1.2**. If mean effective pressure is 10 bar and mechanical efficiency is 81%, calculate bore and stroke of the engine. Also calculate indicated thermal efficiency and brake thermal efficiency if 65 kg/hr of petrol is consumed having calorific value of 42000kJ/kg
15.	The following readings were recorded during the test on single cylinder four stroke diesel engine. (1)Cylinder diameter = 250 mm (2) Stroke length = 350 mm (3) Mean effective pressure = 6.7 bar (4) Speed of engine = 250 r.p.m. (5) Net brake load = 1070 N (6) Effective brake drum diameter = 1.5 m (7) Fuel consumption rate = 10 kg per hour. (8) C.V. of the fuel = 44300 kJ/kg. Calculate: (1) Indicated Power (2) Brake Power (3) Mechanical efficiency. (4) Brake thermal efficiency.

Ch-3 PROPERTIES OF GAS

1.	A gas whose pressure, volume, and temperatures are 2.75 bar, 0.09m^3 and 185°C respectively has the state changed at **constant pressure** until its temperature becomes15°C. Calculate (i) Heat Transferred. (ii) Work Done during the process. Take R= 0.29 KJ/Kg K , and Cp = 1.005 KJ/Kg K.
2.	In air compressor air enters at 1.013 bar and 27 degree centigrade having volume 5.0 m^3/kg and it is compressed to 12 bar **isothermally**. Determine (i) Work done (ii) Heat transfer and (iii) Change in internal energy.
3.	One Kg of gas at 100 kN/ m^2 and 17° C is compressed isothermally to a pressure of2500 kN/ m^2 in a cylinder. The characteristic equation of the gas is given by the equation **PV = 260 T / Kg** where T is in degree Kelvin. Find out(i) The final temperature ii) Final Volume iii) compression ratio iv) change in enthalpy v) work done on the gas.
4.	A cylindrical vessel of 1 m diameter and 4 m length has hydrogen gas at pressure of 100 k Pa and 27° C. Determine the amount of heat to be supplied so as to increase pressure to 125 k Pa. for hydrogen take Cp= 14.307 k J/ Kg K , Cv=10.183 k J/ Kg K
5.	Determine the work done in compressing one kg of air from a volume of0.15m^3 at a pressure of 1.0 bar to a volume of 0.05 m^3 when the compression is (i) isothermal and (ii)adiabatic, Take γ =1.4 Also, comment on your answer.
6.	One kg of gas is compressed **poly tropically** from 150 KPa pressure and 290K temperature to 750 KPa. The compression is according to law $PV^{1.3}$ =constant. Find:(a) final temperature (b) work-done (c) change in internal energy (d)amount of heat transfer and (e) change in enthalpy. Take R = 0.287KJ/kgK and Cp = 1.001 KJ/kgK.
7.	0.67 kg of gas at 14 bar and 290 ºC is expanded to four times the original volume according to the **law $PV^{1.3}$ = Constant**. Calculate: (1) The original and final volume of the gas. (2) The final temperature of the gas. (3) The final pressure of the gas. Take R = 287 J/kgK.
8.	0.3m^3 of air of mass 1 kg at an initial pressure of 5.5 bar expands to a final volume of 0.5m^3 If the expansion is according to the **law $pv^{1.3}$= C,** Find the work done, the change in internal energy and heat received or rejected during the process. Take C_v = 0.708 kJ/kg K and R = 0.287 kJ/kg K for air.
9.	One cubic meter of air at pressure of 1.5 bar and 80°C is compressed to final pressure 8 bar and volume 0.28 m^3. Determine (i) mass of air (ii) index of 'n' compression (iii) change in internal energy (iv) Heat transfer during compression. Take γ = 1.4 and R= 287 J/kgK.
10.	A cylinder contains 0.6 m3 of a gas at a pressure of 1 bar and 90 °C. The gas is compressed to a volume of 0.18 m^3 by the law PV^n = C. The pressure of gas at the end of compression is 5 bar. Calculate: (1) Mass of gas (2) value of index n (3) The change in internal energy of the gas. (4) Work done (5) The heat received or rejected by the gas during the process. Take γ =1.4 and R= 0.294 kJ/kg K.
11.	1 kg of air at 9 bar pressure and 80° C temperature undergoes a non-flow work poly tropic process. The law of expansion is **$PV^{1.1}$ = C.** The pressure falls to 1.4 bar during process. Calculate (1) Final temperature (2) Work done (3) Change in internal energy (4) Heat exchange. Take R=287 J/kg and γ = 1.4 for air.
12.	An ideal gas is heated from 25ºC to145ºC. The mass of gas is 2 kg. Determine (i) Specific heats (ii) change in internal energy, (iii) change in enthalpy. Assume R = 267 J/Kg K and γ =1.4 for the gas.
13.	0.15m3 of air at pressure of 900 kPa and 300 ° C is expanded at constant pressure to 3 times its initial volume. It is expanded **polytropically** following the law $PV^{1.5}$ =C and finally compressed back to initial **state isothermally**. Calculate heat received, heat rejected, efficiency of cycle.
14.	A balloon of spherical shape 6 m in diameter is filled with hydrogen gas at a pressure of 1 bar absolute and 20°C. At a later time, the pressure of gas is 94 per cent of its original pressure at the same temperature : 1) What mass of original gas must have escaped if the dimension of the balloon is not changed? 2) Find the amount of heat to be removed to cause the same drop in pressure at constant volume. Take molecular weight for hydrogen, M = 2 and specific heat constant volume for hydrogen, cv = 10400 J/kg.K

Ch-4 PROPERTIES OF STEAM

1.	Determine the quality of steam for the following cases: (i) P= 10 bar, v = 0.180 m3/kg (ii) P= 10 bar, t= 200°C (iii) P=25 bar , h = 2750 kJ/kg
2.	Determine the **enthalpy and internal energy** of 1 Kg of steam at a pressure 10bar(abs.), (i)when the dryness fraction of the steam is 0.85 (ii) when the steam is dry and saturated (iii) when the steam is superheated to300ºC.Neglect the volume of water and take the specific heat of superheated steam as 2.1 KJ/KgK.
3.	Determine **enthalpy and internal energy** of 1 kg of steam at a pressure of 12 bar when (i) the dryness fraction of steam is 0.8 (ii) steam is dry and saturated (iii) steam is superheated to 280^0 C. Take Cps = 2.1 kJ/kg K.
4.	Find **internal energy** of 1 kg of steam at a pressure of 15 bar when (i) The steam is superheated with temperature of 400^0C. (ii) The steam is wet with dryness fraction =0.9 Take Cps=2.1 kJ/kg K
5.	Calculate the **enthalpy** per kg of steam at 10 bar pressure and a temperature of 300 ºC. Find also the change in enthalpy if this steam is expanded to 1.4 bar and dryness fraction of 0.8. Take specific heat of superheat steam equal to 2.29 kj/kgK.
6.	Calculate **the internal energy** per kg of superheated steam at 10 bar and a temperature of 300^0C. Find also change in internal energy if this steam is expanded to 1.4 bar and dryness fraction 0.8.
7.	1.5 kg of steam at a pressure of 10 bar and temperature of 250^0C is expanded until the pressure becomes 2.8 bar. The dryness fraction of steam is then 0.9. Calculate change in **internal energy**.
8.	What **amount of heat would be required** to produce 5 kg of steam at a pressure of 5 bar and temperature of 250 °C from water at 30° C, take Cps=2.1KJ/Kg K.
9.	Determine **condition of steam** at a 12 bar if 2580 KJ/kg heat is required to produce it from water at 0 degree centigrade.
10.	**How much heat is needed** to convert 4 kg of water at 20^0C into steam at 8 bar and 200^0C. Take Cp of superheated steam as 2.1 kJ/kg K and specific heat of water as 4.187 kJ/kg K.
11.	Calculate **the heat required** to form 2.5 kg dry steam at 1.1 MPa from water at20°C. Determine the amount of **heat removed** at constant pressure to cause the steam to become 0.95 dry. Calculate the specific volume at respective condition.
12.	What is a superheated steam? **How much heat is added** to convert 3 kg of water at 30°C into steam at 8 bar and 210°C? Take specific heat of superheated steam as 2.1 kJ/kg-K and that of water as 4.186 kJ/kg-K
13.	Calculate the total amount of heat required to produce 6 kg of steam at a pressure of 6 bar and temperature of 258 °C from the water at 30 °C. Take specific heat of steam = 2.1 kJ/kg-K. and the specific heat of water = 4.187 kJ/kg-K.
14.	The following information is available from test of a **combined separating and throttling calorimeter.** (i) Pressure of steam in a steam main = 9.0 bar. (ii) Pressure after throttling = 1.0 bar. (iii) Temperature after throttling =115 degree centigrade. (iv) Mass of steam condensed after throttling = 1.8 Kg (v) Mass of water collected in the separator = 0.2 Kg. Calculate the dryness fraction of the steam in the main.
15.	Determine dryness fraction of steam supplied to a **separating and throttling calorimeter.** Water separated in separating calorimeter = 0.45 kg, Steam discharge from throttling calorimeter = 7 kg Steam pressure in main pipe = 1.2 MPa, Barometer reading = 760 mm of Hg, Manometer reading = 180 mm of Hg, Temperature of steam after throttling = 140º C, Take Cps = 2.1 kJ/kg K.
16.	A rigid tank contains 10 kg of water at 90°C. If 8 kg of the water is in the liquid form and the rest is in the vapor form. Draw p-V diagram and identify the point in p-V diagram. Determine 1) the pressure in the tank 2) the volume of liquid and water vapour 3) quality (dryness fraction) of steam and 4) volume of the tank by using dryness fraction

Ch-5 Heat Engines

1.	A hot air engine works on **Carnot cycle** with thermal efficiency of 70%. If final temperature of air is 20 degree centigrade, determine initial temp.
2.	In air standard **Otto Cycle** the Maximum and Minimum temperatures are 1673 K and 288 K. The heat supplied per Kg of air is 800 KJ. Calculate (i) The Compression Ratio. (ii) Efficiency. (iii) Ratio of Max to Min Pressures. Take Cv = 0.718 KJ/Kg K & γ = 1.4 for air.
3.	Determine the compression ratio, the cycle efficiency, and the ratio of maximum to minimum pressure in an air standard **Otto cycle** from following data : Minimum temperature = 25º C Maximum temperature = 1500º C Heat supplied per kg of air = 900 kJ Take Cv = 0.718 kJ/kg K & γ = 1.4
4.	In an **Otto Cycle**, air at 15 ° C and 1 bar is compressed adiabatically until the pressure is 15 bar. Heat is added at constant volume until pressure rises to 40bar. Calculate (i) Air standard efficiency (ii) compression ratio and (iii) mean effective pressure for cycle Assume Cv= 0.718 k J/ Kg KR= 8.134 k J/ k mole K
5.	An **Otto cycle** having compression ratio 8 has pressure and temperature at the beginning of compression are 1 bar and 27°C respectively. If heat transfer per cycle is 1900 KJ/Kg, find pressure and temperature at the end of each process. Take C_V=0.718 KJ/Kg-K.
6.	In an **Otto cycle** the compression ratio is 10. The temperature at the beginning of compression and at the end of heat supply is 300 K and 1600 K respectively. Assume, γ = 1.4 and Cv= 0.717 KJ/KgK. Find: (i) Heat supplied (ii) Efficiency of the cycle.
7.	An engine working on ideal **Otto cycle** has a clearance volume of 0.03m^3 and swept volume of 0.12m^3. The temperature and pressure at the beginning of compression are 100°C and 1 bar respectively. If the pressure at the end of heat addition is 25 bar, calculate i) ideal efficiency of the cycle. ii) Temperature at key points of the cycle. Take $^{\gamma}$ = 1.4 for air.
8.	Calculate the air standard efficiency of the engine working on Otto cycle in which air initially at 1 bar and 20°C is compressed adiabatically to the pressure of 16 bar. Maximum pressure of cycle is 45 bar and adiabatic index γ =1.4.
9.	In **an ideal constant volume cycle** the pressure and temperature at the beginning of the compression are 97 kPa and 50 ºC respectively. The volume ratio is 5. The heat supplied during the cycle is 930 kj/kg of working fluid. Calculate: (1) The maximum temperature attained in the cycle. (2) The thermal efficiency of the cycle. (3) Work done during the cycle/kg of working fluid.
10.	An engine operates on the air standard **diesel cycle**. The conditions at the start of the compression stroke are 353 K and 100 kPa , while at the end of compression stroke the pressure is 4 MPa. The energy absorbed is 700 kJ/kg of air. Calculate (1) the compression ratio (2) the cut-off ratio (3) the work done per kg air (4) the thermal efficiency.
11.	An air standard **diesel cycle** has compression ratio of 16. The pressure and temperature at the beginning of compression stroke is 1 bar and 20 °C. The maximum temperature is 1431 °C. Determine the thermal efficiency and mean effective pressure for this cycle.
12.	In **an ideal diesel** cycle the temperature at beginning and at the end of Compression are 57.0 degree centigrade and 603 degree centigrade respectively. The temperatures at beginning and end of expansion are 1950degree centigrade and 870 degree centigrade respectively. Determine the ideal efficiency of the cycle if pressure at beginning is 1.0 bar. Calculate: maximum pressure in the cycle.
13.	An engine operating on the **ideal Diesel cycle** has a maximum pressure of 44 bar and a maximum temperature of 1600ºC.The pressure and temperature of air at the beginning of the compression stroke are 1 bar and 27 ºC respectively. Find the air standard efficiency of the cycle. For air take γ =1.4
14.	In ideal Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Assume flow rate of 9.5 kg/s. Determine : 1) The pump work, 2) The turbine work, 3) The Rankine efficiency, 4) The dryness at the end of expansion.

Ch-7 I.C. Engine

1(	The following readings were taken during the test on a single cylinder four stroke, Oil engine: Cylinder diameter = 270 mm Stroke Length = 380 mm Mean effective pressure = 6 bar Engine Speed = 250 rpm Net load on brake = 1000 N Effective mean Diameter of brake = 1.5 m Fuel used = 10 Kg/Hr C.V. of Fuel = 44400 KJ/Kg. Calculate:- (i) Brake Power. (ii) Indicated Power. (iii) Mechanical Efficiency. (iv) Indicated Thermal Efficiency.
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23.	A four cylinder four stroke petrol engine has 100mm bore and stroke is 1.3times bore. It consumes 4 kg of fuel per hour having calorific value of40500 kJ/kg. If engine speed is 850 rpm. Find its Indicated thermal efficiency. The mean effective pressure is 0.75 N/mm^2
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26.	A four cylinder two stroke petrol engine with **stroke to bore ratio 1.2** develops 35 kW brake power at 2200 rpm. The mean effective pressure in each cylinder is 9 bar and mechanical efficiency is 78 %. Determine (1) Diameter and stroke of each cylinder (2) Brake thermal efficiency (3) indicated thermal efficiency. If fuel consumption 8 kg / hr having C.V=43000 kJ/kg.
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30.	The following readings were recorded during the test on single cylinder four stroke diesel engine. (1)Cylinder diameter = 250 mm (2) Stroke length = 350 mm (3) Mean effective pressure = 6.7 bar (4) Speed of engine = 250 r.p.m. (5) Net brake load = 1070 N (6) Effective brake drum diameter = 1.5 m (7) Fuel consumption rate = 10 kg per hour. (8) C.V. of the fuel = 44300 kJ/kg. Calculate: (1) Indicated Power (2) Brake Power (3) Mechanical efficiency. (4) Brake thermal efficiency.