

UNIT-II

S.No.	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	Differentiate between flywheel and governor	L2	CO2	PO2
2	Define the following terms: (a) Coefficient of Fluctuation of Speed, (b) Coefficient of steadiness, (c) Maximum fluctuation of energy and (d) Coefficient of Fluctuation of Energy	L1	CO2	PO2
3	Explain the concept of fluctuation of energy related with turning moment diagram with sketch.	L2	CO2	PO2
4	State the function of flywheel in IC engine.	L1	CO2	PO2
5	Define turning moment diagram? Draw T-θ diagram for Single Cylinder Double Acting Steam Engine	L2	CO2	PO2
6	Smaller fly wheels are used in multi cylinder engines. Justify your answer.	L3	CO2	PO2
7	Define crank pin effort. And Define crank effort.	L1	CO2	PO2
8	What types of stresses are set up in the flywheel rims? And state the advantages of having elliptical section of flywheel arm?	L2	CO2	PO2
9	Why variation in the turning moment of single cylinder 4-stroke IC engine is more as compared to the multi cylinder IC engines?	L2	CO2	PO2
10	Define flywheel with its functions.	L1	CO2	PO2
Part – B (Long Answer Questions)				
11	a) Derive the equation for energy stored in the fly wheel	L2	CO2	PO2
	b) Deduce effective force acting on piston and connecting rod.	L2	CO2	PO2
12	A shaft fitted with a flywheel rotates at 250 r.p.m. and drives a machine. The torque of the machine varies in a cyclic manner over a period of 3 revolutions. The torque rises from 750 N-m to 3000 N-m uniformly during 1/2 revolution and remains constant for the following revolution. It then falls uniformly to 750 N-m during the next 1/2 revolution and remains constant for one revolution, the cycle being repeated thereafter. Determine the power required to drive the machine and percentage fluctuation in speed, if the driving torque applied to the shaft is constant and the mass of the flywheel is 500 kg with radius of gyration of 600 mm.	L3	CO2	PO2
13	The turning moment diagram for a 4-stroke gas engine may be assumed for simplicity to be represented in 4 triangles. The area of which from line of zero pressure suction stroke= $0.45 \times 10^{-3} \text{m}^2$, compression stroke= $1.7 \times 10^{-3} \text{m}^2$,	L3	CO2	PO2

		expansion stroke= $6.8 \times 10^{-3} \text{m}^2$, exhaust stroke= $0.65 \times 10^{-3} \text{m}^2$. Each m^2 represents 3MN-m of energy. Assume resisting torque to be uniform. Determine the mass of the rim of fly wheel required to keep the speed between 202&198rpm. The mean radius of rim is 1.2m.			
14	a)	The crank-pin circle radius of a horizontal engine is 300 mm. The mass of the reciprocating parts is 250 kg. When the crank has travelled 60° from I.D.C., the difference between the driving and the back pressures is 0.35 N/mm^2 . The connecting rod length between centers is 1.2 m and the cylinder bore is 0.5 m. If the engine runs at 250 r.p.m. and if the effect of piston rod diameter is neglected, calculate : 1. pressure on slide bars, 2. thrust in the connecting rod, 3. tangential force on the crank-pin, and 4. turning moment on the crank shaft.	L3	CO2	PO2
S		The turning moment diagram for a multi-cylinder engine has been drawn to a scale of 1 mm to 500 N-m torque and 1 mm to 6° of crank displacement. The intercepted areas between output torque curve and mean resistance line taken in order from one end, in sq. mm are $-30, +410, -280, +320, -330, +250, -360, +280, -260$ sq. mm, when the engine is running at 800 r.p.m. The engine has a stroke of 300 mm and the fluctuation of speed is not to exceed $\pm 2\%$ of the mean speed. Determine a suitable diameter and cross-section of the flywheel rim for a limiting value of the safe centrifugal stress of 7 MPa. The material density may be assumed as 7200 kg/m^3 . The width of the rim is to be 5 times the thickness.	L3	CO2	PO2
16		The crank and connecting rod of a reciprocating engine are 200 mm and 700 mm respectively. The crank is rotating in clockwise direction at 120 rad/s. Find with the help of Klein's construction: 1. Velocity and acceleration of the piston, 2. Velocity and acceleration of the midpoint of the connecting rod, and 3. Angular velocity and angular acceleration of the connecting rod, at the instant when the crank is at 30° to I.D.C. (inner dead centre).	L4	CO2	PO2