

mock exam

- the mean piston speed u (m/s) can be defined as: (engine speed n in rpm, crank radius r in m, Conrod length L in m, $\lambda=r/L$ a dimensional value)
 - $L n/30$
 - $4rn$
 - $4 \pi n r / 60$
 - $2 n \lambda/r$
- if the engine speed is at idle then
 - $b_{mep}=0$
 - all the parameters are different from 0
 - $\lambda_v =0$
 - $i_{mep}=0$
- the engine flywheel is designed with the aim of
 - regularizing the crankshaft speed
 - compensating torque gaps
 - compensating torque and power gaps
 - regularizing the engine power
- which of the following is not present in the two-stroke engine?
 - displacement
 - compression
 - blowdown
 - intake
- for an SI engine
 - $b_{mep}(\lambda)$ max in rich field, fuel conversion efficiency max lean field
 - b_{mep} and fuel conv η max in rich
 - b_{mep} max in lean, fuel conv η max rich
 - b_{mep} and fuel conv η max in lean
- the fuel air cycle efficiency of a SI engine is lower than the ideal efficiency. which of the following aspects is mainly contributing to this?
 - variation of specific heat c_v with the temperature
 - variation of elastic gas constant R with combustion
 - dissociation
 - none of them bc they contribute to the reduction in a similar way
- under certain steady-state working conditions an engine has a brake power $P_b=50$ kW, volumetric efficiency $\lambda_v=0.86$, mechanical efficiency $\eta_m=0.8$ and fuel consumption $\dot{m}_f=12.4$ kg/h. knowing that the lower heating value of the fuel is $Q_{LHV}=44$ MJ/kg, which is the indicated fuel efficiency of the engine?
 - 0.41
 - 0.38
 - none of the other values is correct
 - 0.33
- consider two versions of the same vehicle, one endowed with a gasoline engine and the other with a Diesel engine of similar maximum power. both of them have a 5-gear manual transmission designed with optimal T_g in top gear (intersection of traction power and coastdown power is occurring at the maximum of the traction power).
 - the Diesel engine will have a higher maximum speed
 - the Diesel engine will have a lower maximum speed
 - both will have the same maximum speed
 - the Diesel engine will have a higher maximum speed and a lower maximum torque

16. in a TC Diesel engine endowed with a HP EGR system, which is the right answer?

none of the others is correct

$p_{\text{exh}} < p_{\text{atm}} < p_{\text{int}} < p_{\text{rail}}$

$p_{\text{rail}} > p_{\text{int}} > p_{\text{exh}} > p_{\text{atm}}$

$p_{\text{exh}} > p_{\text{rail}} > p_{\text{int}} > p_{\text{atm}}$

17. considering the usual schématisation of the connecting rod with two masses in the center of the small and big end and a pure moment of inertia I_0 , choose the correct option

$I_0 > 0$ in general, but can be = 0 or < 0

$I_0 < 0$ always

$I_0 = 0$ in general but can be < > 0

I_0 always > 0

18. in a 4S engine, the geometrical compression ratio is

always equal to the effective compression ration

always higher eff comp ratio

always equal eff expansion ratio

always lower eff exp ratio