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Car engine disassembled, many parts on white background. 3d illustrationFREEAuto spare parts and gears, background for your design. vector illustrationFREEAuto spare parts car on the white background. set with many isolated items for shop or aftermarketFREEHands of a male repairman in blue gloves on a background of a gearbox, close-up repair box predach, repair of used cars, metal background.FREEVarious car or automotive parts on black background with reflection and copy space around productsFREEClose up view of jet engine turbineFREEDetails of the internal combustion engine lying on a white surfaceFREEIndustrial background from part of valves for power, oil or gas industryFREECity car structure overview during driving. 3d illustrationFREEWolf head mascot bite the pistonFREETHree oil filter on white background. 3d illustrationFREETThe cylinder head of the internal combustion engine.FREEModern car technologyFREECar alternator isolated on white.FREESet of various spare parts of engine and gear boxFREESteel turbocharger isolated on white background high resolution 3dFREERepair of the engine, a hand with the tool, automobile serviceFREEFour steel ball bearings isolated on a white backgroundFREEDetailed exposure of a turbo jet engine.FREETwo spark plugs 3d rendered on white backgroundFREEAn internal combustion engine (ice) is a heat engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit.FREECar control gear in isolatedFREEPPerformance race car engine parts detailFREEThe piston of the machine (done in 3d)FREECar parts vector icons set, modern solid symbol collection, filled pictogram pack. signs illustration. set includes icons as engine, tire, gear, radiator, suspension,transmissionGasolineFREEEngine four stroke cycle infographic diagram including stages of intake compression power and exhaust showing parts and valves open and closed for mechanical physics science educationFREECar generator on white (done in 3d)FREEIsolated monochrome illustration of engine piston on white backgroundFREEGroup automobile engine parts isolated on white backgroundFREESpark plug illustration isolated on white background. design element for logo, label, emblem, sign. vector illustrationFREEJet engine tubing and layers of mechanical partsFREECar engine part - close up image of an internal combustion engineFREETiming belt for the car's motor in the store on the counter04FREESet of vintage motorcycle design elements isolated on white background, design element for icon , label, emblem, sign, poster, t shirt.FREEBody of the passenger cars on a black background., 3d renderFREEA large set of gaskets for the engine of a passenger car, separated on a white background. spare auto parts for shop, aftermarket oem. isolated set for repairs.FREEClose up of car engineFREEUnder the cover of the valves of the car in hidr effectFREECrankshaft and pistons (done in 3d)FREEOil filter car done in 3dFREESet of automotive spare parts, isolated on white backgroundFREETHree ball bearings isolated on white backgroundFREESet of motor and spare parts, isolated on white backgroundFREESpare parts car on the white background setFREEOil filter car (done in 3d)FREEAuto spare parts - details of diesel engineFREEAuto mechanicFREEClose up of car engine camshaft gear and chainFREEEngine pistons 3d imageFREEEngine valves components of internal combustion engines. 3d render.FREEMechanical gear on isolated white backgroundFREEDetailed car parts icons - icon setFREESpark-plug isolated on a white background isolated.FREEThe piston of the machine (done in 3d)FREESpark plugFREEClose up of parts in engine head three valve per cylinder systemFREEEEngine rendered on white backgroundFREEEA rusty open four cylinder engine on a junk yardFREESpare parts of motor vehicle forming clutch plate and disc.FREEClose up shot of turbo diesel engineFREEFour connecting rods - spare parts of a diesel engineFREESpare parts of motor vehicle forming clutch plate and disc.FREESpare parts of motor vehicle forming clutch plate and disc.FREEAuto turbine 3d concept. steel turbocharger isolated on whiteFREECar icon setFREEEA lot of different auto spare partsFREECar gearbox on isolated white backgroundFREEThe car's engine closureFREEClose up of a vintage car engineFREERCar assembly kitFREEPiston of a petrol engine isolated on white backgroundFREEFuel pump. car detail. isolated on white background.FREESpare parts for repair engine timing systemFREECylinder crank 3d xray blue transparentFREETTransmission gears , isolated on a white backgroundFREEMechanics background metal gears and wheels mechanics cool blue background mechanical technology backgroundFREECar parts - vector illustrationFREEEngine of internal combustion on whiteFREERealistic car parts and services icons - vector icon set,2FREEAuto mechanic working under the hood of an old car engine.FREEFour pistons - spare parts of a diesel engineFREECar parts and symbols - vector illustrationFREETurbine car on white background (done in 3d)FREECylinderFREEMotorcycle - spare partsFREDigital illustration of engine valve in color backgroundFREEOld car engine spare parts for saleFREEOutline spark-plug on white backgroundFREEDigital illustration of spark plug in colour backgroundFREEIsolated image of an engine oil filter.FREESpark-plugFREECar parts and services icons - vector icon setFREETiming belt isolatedFREEGear metal wheels, isolated on white backgroundFREEFour new piston pins, details of an auto engine.FREECar alternator isolated on a white background. 3d render.FREEA lot of new auto spare parts, over white backgroundFREDisassembled car on a white background.FREEThe design of a cranked shaft of the engine influences capacity, dynamics and profitability of the engine.FREELot of mechanic gears and wheels 3dFREE In this post, we will discuss the engine parts. As you know that an engine is a machine designed to convert one form of energy into mechanical energy. Heat engines burn a fuel to create heat which is then used to do work. The engine has two types one is the internal combustion engine and another one is the external combustion engine.The internal combustion engine is those heat engines that burn their fuel inside the engine cylinder.External combustion engines are those heat engine that burns their fuel outside the cylinder engine.The engine most essential part of automobile industries or we can say that the engine is the heart of an automobile. The function and construction of each engine parts of an internal combustion engine are explained. The key to the engine is as follows.The Main Car Engine Parts Are as Follows:Cylinder BlockCylinder HeadCrank CaseOil PanManifoldsGasketCylinder LinerPistonA Piston RingConnecting RodPiston PinCrank ShaftCamShaftFlywheelsEngine ValvesPoppet valveRotary valveGovernorsRead Also: List of 19 Car Interior Parts [Explained with Functions] PDF1. Cylinder blockFig shows a simple sketch of the cylinder block. It is the basic framework for the engine, and one of the main in engine parts. Cylinder block, cylinder head and crankcase these three parts form the foundation and main stationary body of the automobile engine.A cylinder block consists of three parts:The cylinder in which the piston slid up and down.The port or opening for the valves.The passages for the flow of cooling water.ConstructionThis is a rigid construction made of grey cast iron or aluminium. Either it can be cast integrally with the block or can be cast separately and attached to the block with bolts.The crankcase is shaped simply like a box having no bottom. Oil pan or sump forms the bottom half of the crankcase.WorkingThe function of the crankcase is to provide support for the main journals and bearing of the crankshaft, rigidly maintaining the alignment of their axes of rotation under various engine loads.The crankcase is supported in the crankcase through a number of bearing called the main bearing.4. Oil PanThe bottom half of the crankcase is called the oil pan or sump. It is attached to the crankcase through set screws and with a gasket to make the joint leak proof. The oil pan serves as a reservoir for the storage, cooling and ventilation of engine lubricating oil.At the bottom of the oil sump, a drain plug is provided to drain out the dirty oil at the time of oil replacement. The crankcase, the sump is made of pressed steel sheet or aluminium alloy casting is used.The various functions of the oil pan as follows>To store the oil for the engine lubrication system.Oil pan used to collect the return oil drainingTo serve as a container for impurities or foreign mattersOil pan provides for cooling of the hot oil in the sump.WorkingThe oil pump in the lubricating system draws oil from the oil pan and sends it to all working parts in the engine.The oil drains off and runs down into the pan.Thus there is a constant circulation of oil between the pan and the working parts of the engine.5. ManifoldsThere are separate sets of pipes attached to the cylinder head which carry the air-fuel mixture and the exhaust gases, these are called manifolds. It is generally made of cast iron so that it is able to withstand the high temperature of the exhaust gases.ConstructionIt consists of the air intake, throttle body, intake manifold flange for tail-pipe and flange for a carburettor.WorkingThe air goes into the air intake travels through, throttle body into the intake manifold and from there it goes into the engine through the cylinder head.The inlet manifold carries the air-fuel mixture to the cylinder head.The exhaust manifold is the set of pipes carrying exhaust gases from the cylinder head to the exhaust system.Read also: HowStuWorks.com6. GasketsThese are used to provide a tight fitting joint between two surfaces.Gaskets are found inthe joint between the cylinder head and the cylinder blockBetween crankcase and oil pan.Between the cylinder block and manifold.Materials used for gaskets areRequirement/properties of the gasket as followsConformity: The gaskets should conform to the mating surfaces which may have roughness or warpage.Resistance:It should have resistance to high pressures, extreme temperature and vibrations.Impermeability: The gasket must be impermeable to the fluid.Resistance to chemical attack: the gasket should have resistant to the chemicals such as fuel, products of combustion, coolant and engine oil.Provision of apertures: The gasket must have apertures for any studs, bolts, opening etc..Gaskets produced by the fuel-pro USA as followsCylinder head gaskets.Oil pan gaskets.manifoldgaskets.pumpgaskets.Types of gaskets used in enginesCopper-asbestos gasket.Steel-asbestos gasket.Steel-asbestos-copper gasket.Single steel ridged or corrugated gasket.Stainless steel gasket.7. Cylinder linersThese are cylindrical shapes used in the cylinders to avoid the problem of cylinder wear. It is one of the most important functional parts to make up the interior of an engine.These can be replaced after they are worn out. These are made of special alloy iron containing silicon, manganese, nickel and chromium.Usually, these are cast centrifugally. These liners resistance to wear and corrosion. These liners are of the oil hardening type and offer considerably longer life for the engine.Cylinder liners are of two typesDry liners and wet liners. Let's take the detail view.Dry liners:Construction: The construction of a dry liner is shown in the figure. This liner is made in the shape of a barrel with a flange at the top which keeps it into position.The entire outer surface bears against the cylinder block casting and hence these are ite machined accurately at both outer and inner faces.The liner should not be too loose, otherwise, the heat dissipation becomes poor because of the absence of good contact with the cylinder block.Wet liners:The figure shows a simple sketch of the wet liner. These liners will be in direct contact with the cooling water at their outer face.Thus, these liners need not be machined very accurately at the inner surface. However, they have been machined accurately at the inner surface.They are resisting corrosion with continuous contact with cooling water, and they coated with aluminium at their outer surface.ConstructionAt the top, the liner is provided with a flange which fits into the groove in the cylinder block.At the bottom of the liner is provided with a groove, generally three in number.The middle groove is left empty for drainage for any water that may leak from the upper ring.And in the top and bottom ones are inserted packing ring, made of synthetic rubber.Comparison of the dry and wet linerDry LinersDry liners may be provided either in the original design or even afterwards.The construction of the cylinder block very complicated. The cooling effect is not very good.Accurate machining of dry liners for perfect contact with the cylinder casting is essential.In this type, it cannot be finished before fitting. A leak-proof joint is not necessary.Wet LinersWet liners have to be included in the original design. The construction of the cylinder block is simple.The cooling effect is better because the liner will have direct contact with cooling water.Accurate machining is not essential. In this type, they can be finished before fitting.A leak-proof joint should be made between wet liner and cylinder block.8. PistonsPitons are most important engine parts compared to others. The piston is a cylindrical plug that moves up and down in the cylinder.It helps to convert pressure energy obtained by the combustion of fuel into useful mechanical power and it transfer this power to the crankshaft through the connecting rod.The highest position of the piston reaches in the cylinder is called the Top Dead Centre(TDC) andThe lowest position it reaches is called the Bottom Dead Centre(BDC).It is provided with pistons ring about 3 to 5 provide a good seal between the cylinder wall and piston.The efficiency and economy of the engine primarily depend on the working of the piston.The material used for the piston is mainly,Cast iron,Aluminium alloy.Nowadays aluminium alloys are widely used. It may be either cast or forged.The piston must possess the following qualitiesRigidity to withstand high pressureLight in weight, to reduce the reciprocating mass to perform at higher engine speed.Good heat conductivity,Less noise while operating.Piston clearanceThe piston is usually small in diameter than the bore of the cylinder. The space between the cylinder and the cylinder wall is called the piston clearance. This piston clearance provides a space for a layer of lubricant between the piston and cylinder wall to reduce friction.Generally, piston clearance isProper clearance should be maintained between the piston and the cylinder wall.If the clearance is too small, there will be a loss of power from excessive friction, more wear, seizing of the piston in the cylinder. If the clearance is too much, the piston slap will result. Piston slap means sudden tilting of the cylinder as the piston moves down during the power stroke.It prevents piston seizure due to high temperature. If there is no clearance then it is not possible to reciprocate piston inside the cylinder.Functions of pistonsome of the important function of the piston as follows>To transmit the power developed by fuel combustion to the crankshaft through the connecting rod.To form a seal so that high-pressure combustion gases do not escape to the crankcase.Piston serves as a support for the small end of the connecting rod.To suck the charge and push out the exhaust gases.Constructional FeaturesThe cross-section of a piston is shown in the figure.The top of the piston is called the head or crown.Towards the top of the piston, a few grooves are cut to house the piston rings. The bands left between the grooves are known as lands.The part of the piston below the ring is called Skirt is provided with bosses on the inside to support the piston pin (Gudgeon pin).The distance between the axis of the piston pin and the top of the piston crown is called compression height.Type of pistonsThe various types of pistons are classified depending on the shape, design, operation. The important types of the piston as follows.Cast Iron PistonsForged pistonsCast Steel PistonBI-metal pistonTwo-piece pistonOil-cooled pistonsAnodized pistonTinned pistonsPiston materials: Cast Iron, Aluminium, Lo-Ex Alloy, Invar, Steel alloy. Protective coating: Cadmium plating, Anodised pistons, Tinned pistons, Chromium plating.Read also: All The Information About Internal Combustion Engines (I.C. Engines)9. Piston RingsThe piston rings are fitted into the grooves of the piston to maintain a good seal between the piston and the cylinder wall.The number of piston rings used is about 2 to 4 compression rings and 1 to 2 oil control ring was used but in modern design the number if rings usually three out of which one is the oil control ring.The function of piston ringsTo form a seal for the high pressures gases from the combustion chamber entering into the crankcase.The piston ring provides easy passage for heat flow from the piston crown to the cylinder walls.To maintain sufficient lubrication oil on cylinder walls throughout the entire length the piston travel. hence it minimizes the cylinder wear.ConstructionThe figure shows the piston ring construction.The ring is generally cast individually and machined carefully so that when in the position it is able to exert uniform pressure against the cylinder walls.A gap has been cut at the end.In practice, the piston ring end gap when installed is kept about 0.30 to 0.35mm.The gap is almost closed when the piston is inside the cylinder, so that piston and cylinder.The piston ring end gap may beButt typeFaper typeLap typeMaterial for piston ringsThe material generally used for piston rings isfine-grained alloy cast iron containing silicon and manganese. It has good heat and wears resisting qualities.Chromium plated rings are also used for the top ring, which is subjected to the highest working temperatures and the corrosive action of the combustion products.Types of Piston RingsMainly there are two types of piston rings as follows.Compression rings: Fig shown a simple sketch of Compression rings. these rings effectively seal the compression pressure and the leakage of the combustion gasses. these are fitted in the top grooves. They also transfer heat from the piston to the cylinder walls.Oil control rings: The Figure shows a simple sketch of oil control ring. The main purpose of the oil ring is to scrape the excess oil from the liner and return it back to the oil sump during the downward and upward movement of the piston. It prevents the oil from reaching the combustion chamber. One of two oil control rings is used in a piston. If two rings are used one has fitted above and other is fitted below the gudgeon pin in the piston These rings are provided with drain holes or slots, these slots allow the scraped oil to reach into the oil sump through the piston holes.Read also: Piston Ring Maintenance – marinesight.com10. Connecting RodFig showed a connecting rod. It is fitted in between the piston and crankshaft.The main function of the connecting rod is to convert the reciprocating motion of the piston into the rotary motion of the crankshaft.It must be light and strong enough to withstand stress and twisting forces.Construction:The connecting rod usually has I-beam cross-section and is made of alloy steel of duralumin by drop forging.Nowadays it is also cast from malleable or spheroidal graphite C.I.The small end of the connecting rod has either a solid eye used to connect the piston by the piston pin.The big end of the connecting rod is always split is used to connect the crank pin of the crankshaft.11. Piston PinThe piston pin is also called wrist pin or gudgeon pin. It is used for connecting the small end of the connecting rod and the piston.Construction: It is made hollow to reduce weight and it is made from case hardened steel.Mainly there are three types of piston pins as follows. Set screw types piston pin.Semi-floating piston pinFully floating piston pinFig (a) shown Set screw type piston pin, This pin is fastened to the piston to the piston by a SET SCREW such that the connecting rod end swivel has required by the combined reciprocating and rotary motion of the piston and crankshaft.Fig (b) shown Semi-floating piston pin, It is fastened to the connecting rod with a clamp screw.Fig (c) shown Fully floating piston pin. The pin floats in both the piston bosses and the small end of connecting rod. It is prevented from coming in contact with the cylinder wall by two circlips.12. CrankshaftsThe crankshaft is the engine component from which the power is taken. It is one of the main power transmission sources in all engine parts.The Crankshaft is the first part of the power transmission system in which the reciprocating motion of the piston is converted into the rotating motion with the help of connecting rod.ConstructionThe crankshaft is made of casting or forging of heat treated alloy steel and is machined.A crankshaft consists of crankpins, webs, balancing weight and main journals and oil holes.The big end of the connecting rod is connected to the crankpin of the crankshaft.Centre to centre distance between the crankpin and crankshaft is half of the piston displacement during the stroke.Thus one complete revolution of the crankshaft makes two strokes of the piston.The parts of the crankshaft inside the main bearing are called main journals.Balancing weights are provided on the opposite side web for balancing. The crankshaft has drilled oil passages through which oil flow the main bearing to the connecting rod bearings.The front end of the crankshaft carries three devices thatA gear that drives the camshaft.The vibration damper to control torsional vibration, andThe fan belt pulley. This pulley drives the engine fan, water pump, and generator with a V-belt.The rear end of the crankshaft carries flywheel. The flywheel tends to keep the crankshaft running at constant.Next, to the rear end, the main journal and oil seal is fitted. In some engine, oil return threads are provided which return the lubricating oil to the sump.The crankshafts are generally of two types.In one piece type, all the parts are integral and are formed by drop forging and then machining.In build-up type, the crankpins and journals are fastened to the crank webs.13. Cam ShaftA camshaft is a shaft on which cams are mounted. A cam is a device that changes the rotary motion of the camshaft into the linear motion of the follower. A camshaft is responsible for the opening of the valves.ConstructionA camshaft has a number of cams along the length, two cams for each cylinder, one to operate the inlet valve and the other the exhaust valve.In addition, the camshaft has an eccentric to operate the fuel pump and gear to drive the ignition distributor and oil pump.The camshaft is driven by the crankshaft. The camshaft gear has twice as many teeth as the gear on the crankshaft.Camshaft made from forged alloy steel.This gives 1:2 gear ratio, the camshaft turns at half the speed of the crankshaft.WorkingThus, every two revolutions of the crankshaft produce one revolution of the camshaft and one opening and closing of each valve, in the four-cylinder engine.Thus there is correct opening and closing of the valves takes in relation to the position of the piston in the cylinder. There are three types of camshaft drive mechanism as follows,Gear drive.Chain drive.Belt drive.14. FlywheelThe flywheel used in a transmission system of a vehicle.howrah.org-flywheelConstructionA flywheel is a heavy steel wheel attached to the rear end of the crankshaft.The size of the flywheel depends upon the number of cylinders and the construction of the engine.WorkingDuring the power stroke, the engine tends to speed up and during the other strokes, it tends to slow down.The inertia of the flywheel tends to keep the running of the crankshaft at a constant speed. Hence the engine speed is maintained constant.15. Engine ValvesEngine valves are essential to control the timing of air-fuel mixture entry into the cylinder and combustion products out of the cylinders.ConstructionThese are located at the inlet and outlet opening of the engine cylinder.The valves fit on the valve seats in their closed position.There are three types of engine valves as follows.Poppet valveSleeve valveRotary valve15.1 Poppet valveThis is the most widely used valve in automobile engines. The poppet valve is given the name because of its motion of popping up and down.Its construction is very simple. This is also called a mushroom valve, because of its shape.ConstructionIt consists of a head and a stem. The valve face usually with an angle of 30° to 45° is ground perfectly, since it has to match with the valve seat for perfect sealing.The stem has a spring retainer lock groove and the stem end is in contact with cam for up and down movements of the valve.15.2 Sleeve ValveThe sleeve valve as the name implies, that it is a tube or sleeve kept between the cylinder wall and the piston.ConstructionThe inner surface of the sleeve actually forms the inner cylinder barrel in which the piston slides.The sleeve is in continuous motion and admits and drives out the gases by virtue of the periodic coincidence of port cut in the sleeve with ports formed through the main cylinder casting.Advantages:Simple in construction.Sleeve valves are silent in operation.There is noise because there is no noise-making parts like valve cams, racker arm, tappets valves etc..The tendency of detonation is less.Cooling is very effective as the valve is in contact with water jackets.Disadvantages:High oil consumption for lubrication as a larger area of sleeve surface to be lubricated.Cleaning of the ports and the valve is complicated.15.3 Rotary valveFig showed a simple sketch of Rotary Valve. There are many types of rotary valves. The figure shows the disc type rotary valve. It consists of a rotating disc which has a port. While rotating, it communicates s alternately with the inlet and exhaust manifolds.Advantages:Rotary valves are simple in construction.These valves are manufactured at cheaper costs.They are suitable for high-speed engines.Sresses and vibrations are less compared to poppet and sleeve valves.They are smooth in operation and are uniform and noise-free operation.Disadvantages:It is difficulties in pressure sealing between the rotary disc and cylinder.Efficient valve lubrication is difficult.Materials for valvesThe materials used for inlet and exhaust valve are generally different because of the different operating conditions to which valves are subjected.Silico-chrome steel is the material generally used for inlet valves. For exhaust valves molybdenum as added to the silico-chrome.The recent materials for exhaust valve are austenite steel and precipitation hardening steel is generally used.16. GovernorIn petrol engines, the carburettor control both air and fuel supply to the engine cylinder under speed and load conditions.They vary the supply of air-fuel mixture to meet the given condition. But in the diesel engine, the governor is used to keep the engine speed within limits.The main functions of a governor are to regulate the supply of fuel through some mechanism so that the engine speed remains within its range.Working:On increased load, the engine speed decreases.When the load decreases, the engine speed increases.Without a governor, the engine speed increases at lighter loads and the dynamic stresses damage the engine parts.The governor which is set for a particular engine speed operates a mechanism such that more fuel is injected to increase the engine power.Governor, in this case, operates the mechanism to reduce the supply of fuel in the engine. It is essential to keep the engine speed within limits.Types of Governor:Mechanical Governor or Torque control Governor or Centrifugal governor.Pneumatic Governor,Hydraulic Governor.Download PDF of this articleDownload PDFThat's it thank you for reading if you find this article helpful please share with your friends.Subscribe to newsletter to get notification of our new posts.What are the main parts of a car engine?Parts of a Car EngineCylinder Block, Cylinder Head, Crank Case, Oil Pan, Manifolds, Gasket, Cylinder Liner, Piston, A Piston Ring, Connecting Rod, Piston Pin, Crank Shaft, CamShaft, Flywheels and Engine Valves.What is the application of a cylinder head in a car engine?The cylinder head cast integrally with cylinder blocks also be done in a few cases usually in racing cars to obtain a gas-tight joint. Types of integral heads have advantages over integral construction. However, some heavy-duty engines require higher cooling rates such as copper alloys that can be used in racing cars.What is the function of a Connecting Rod?The main function of the connecting rod is to convert the reciprocating motion of the piston into the rotary motion of the crankshaft.What is the function of piston rings in a car engine?.1. To form a seal for the high pressures gases from the combustion chamber entering into the crankcase.2. The piston ring provides easy passage for heat flow from the piston crown to the cylinder walls.

