

नेपाली सेना

V/M अटोमोबाईल प्रा.अम.पदको पाठ्यक्रम

समय:- ३ घण्टा

पूर्णाङ्क :-१००

उत्तीर्णाङ्क:-४०

उद्देश्यहरू

यो पाठ्यक्रम नेपाली सेनाको अटोमोबाईल प्रा.अम.पदका उम्मेदवार छनौट परीक्षाको लागि निर्धारण गरिएको हो । अटोमोबाईल प्रा.अम.पदका उम्मेदवार छनौटको लिखित परीक्षामा सरिक हुने उम्मेदवारहरूको पेशा सम्बन्धी विषयलाई आधार मानि प्रश्नहरू सोधिने छ ।

- (क) लिखित परीक्षाको माध्यम नेपाली/अंग्रेजी भाषा हुनेछ ।
- (ख) निम्न पत्रहरूको पाठ्यक्रमको रूपरेखा अनुसार विषयवस्तु हुनेछ ।
- (ग) लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र अर्को चरणको परीक्षामा सम्मिलित गराईनेछ ।
- (घ) प्रश्न पत्र निर्माण गर्दा सम्भव भएसम्म पाठ्यक्रममा समावेश भएका सबै विषयहरूलाई समेटनु पर्नेछ ।
- (ङ) नेपाली सेनाको तत्कालिन आवश्यकता तथा विविध परिस्थितिमा नेपाली सेना अनुकूल हुने गरी उल्लेखित विवरणहरूमा हेरफेर हुन सक्नेछ ।
- (च) पाठ्यक्रम लागु मिति : २०६६/६।२६ गते देखि

प्रश्नको किसिम	प्रश्नको संख्या र अंक	कैफियत
लामो उत्तर दिनु पर्ने प्रश्न	५×१०=५०	
छोटो उत्तर दिनु पर्ने प्रश्न	५×५=२५	
बस्तुगत	२५×१=२५	

SYLLABUS FOR AUTOMOBILE T/CPL

I. AUTOMOBILE ENGINEERING

HISTORY OF AUTOMOBILE

FUNDAMENTAL OF AUTOMOBILE

Component of an automobile, The basic structure, Power plant, Transmission system, Auxiliaries, Controls, Superstructure

INTRODUCTION OF HEAT ENGINE

Heat engines, Basic engine nomenclature, I.C. engine classification, Four –stroke cycle, spark – ignition engine, Four –stroke compression ignition engine, Two –stroke engine, Comparison of two – stroke and four stroke engine, Fundamental difference between S.I and C.I engine, Function of piston and gudgeon pin, Piston pin, piston rings and its types, Valve and valve mechanism, Definition of auto cycle, two stroke and four stroke, diesel and petrol engine, Requirement for the operation of the engine.

CLUTCHES TRANSMISSION SYSTEM

Introduction, Requirement of clutch, Types of clutches, Principle of friction, clutches, Dry friction clutches, Cone clutch, Single plate clutch, Multi plate clutch, Semi centrifugal clutch, Centrifugal clutch, Clutch operation, Wet clutch, Clutch, components, Clutch plate, Clutch facing, Other clutch components, Preliminary, inspection of clutch, Clutch adjustment, Clutch overhaul, Clutch refacing, Clutch trouble, shooting

TRANSMISSION GEAR BOX

Introduction, Function of transmission, Necessity of transmission, Sliding mesh gear box, Selector mesh gear box, Constant mesh gear box, Synchromesh gear box, Lubricant of gear box, Transfer box, Requirement of automatic transmission fluids, Gear box trouble shooting

PROPELLER SHAFT AND REAR AXLE

Introduction, Propeller shaft, Universal joint, Final drive, Differential, Rear axle, Rear axle drives, Propeller shafts & rear axle trouble shooting,

SUSPENSION SYSTEM

Object of suspension, Types of suspension, Leaf spring, Torsion bars, Rubber spring, Shock absorber, Independent suspension, Stabilizer, Suspension system trouble shooting

FRONT AXLE AND STEERING SYSTEM

Introduction, Factors of wheel alignment, steering geometry, Steering gear box, Steering adjustment, Checking of wheel alignment, Steering trouble shooting,

WHEEL AND TYRE

Types of wheel, Wheel dimension, Types properties, Types of tyre, Tyre materials, Wheel and tyre trouble shooting

BRAKE SYSTEM

Principle, Braking requirements, Brake efficiency, Types of brake, Drum brake, Disk brake, Mechanical brake, Hydraulic brake, Brake fluid and master cylinder, Air brake, Hand brake, Brake shoes, Brake lining, Inspection of brake system, Adjustment, Wheel cylinder, Brake system trouble shooting

COOLING SYSTEM

Introduction, Variation of gas temperature, Areas of heat flow, Heat transfer, Piston and cylinder temperature, Cooling system, Water –cooling, Water –cooling, Comparison of air and water cooling system, Radiators, Cooling fan .

LUBRICATION SYSTEM

Introduction, Types of lubricant system, Parts of lubrication system, Pump system, Crank system, Trouble shooting of lubricant system

REFRIGERATION CYCLE

4. MATERIALS SCIENCE

IRON AND STEEL PRODUCTION:- Introduction, Classification of iron and steel, Blast furnace iron ores and process in pig iron production, Production of steel, Various steel making process, Bessemer process, Open hearth process, Electric process, Duplex process

STRUCTURE OF METALS:- Metal crystals, Space lattice, Metallic bond, Grain size its affection on properties

IRON CARBON SYSTEM:- Effect of carbon in iron, Thermal equilibrium diagram cooling curves solid solution chemical compound and mechanical component and mechanical mixture in iron carbon system

STEEL:- Classification of steel, Effect of alloying element and impurities in steel, Introduction to heat treatment, Types of heat treatment

CARBON STEEL:- Classification of carbon steel, Composition and metallurgy of carbon steel, Effect of carbon on steel, Properties and uses of various carbon steels

ALLOY STEEL:- Classification of alloy steel, Effect of alloying elements on steel, Properties and uses of various alloy steels

HEAT TREATMENT PROCESS:- Introduction to heat treatment of carbon steel, Hardening process, Surface hardening process, Tempering process, Annealing process, Normalizing process

CAST IRON:- Introduction, Types of cast iron, Properties and uses

NONFERROUS METAL:- Introduction, Aluminum & Its alloy: - composition, Properties & uses, Bronze and brass: - properties and uses

MECHANICAL TESTING OF MATTERS:- Testing for elastic and plastic behavior, Testing for fatigue, Testing for hardness

NON DESTRUCTIVE MATTERS:- Introduction, Types of non-destructive testing (X-ray ultrasonic, magnetic tests), Advantage and uses

ENVIRONMENTAL INSTABILITY OF MATTERS:- Introduction, Effect of various agents on detonation of steel, Protective measures

SELECTION OF MATERIALS:- Considerations in materials selection, Some examples in material selection

NON METAL:- Introduction to non-metals, Lubricants :- properties classification and uses, Fuels: properties, classification and uses, Bonding materials, gaskets packing: classification properties uses, Polymers: classification properties, Rubbers and materials used in tire and tubes, Ceramics & minerals classification. Properties and uses, Timbers: classification properties and uses, Material used for upholstery properties and uses

5. COMPUTER CONCEPT

INTRODUCTION OF COMPUTER :- History of computer, Types of computer, Generation of computer

COMPUTER SYSTEM:- Volt guard, Input unite, Central processing unite, Output unite

COMPUTER MEDIA:- Magnetic tape, Floppy disk, Hard disk, CD ROM

HARDWARE:- Monitor, Keyboard, Mouse, Printer, Scanner, Plotter, Introduction to CPU

SOFTWARE:- System software, Application software

OPERATING SYSTEM:- Introduction, Basic terms, Key combination, Commands of MS-dos, Configuration the system, File management

WINDOWS 98:- Introduction, File management

> Explore

> My document

> Recycle bin

PAINT BRUSH

MS WORD ,MS EXCEL

FUEL SUPPLY SYSTEM

Introduction, Types of fuel system, Pressure feed system, Fuel filter, Fuel pump, Types of fuel pump, Carburetion and carburetor, Fuel injectors

1. **DIESEL ENGINE y3D PETROL ENGINE:-** Working principle, Identification of parts and their function, Dismantling assembling of engine systematically, Safety precaution, Lubricants system, Fuel system, Cooling system, Valve timing, F.I.P setting
2. **CLUTH:-** Identification of parts and their function, Trouble shooting, Repair and maintenance, Clutch adjustment
3. **GEAR BOX & TRANSFER CASE:-** Identification of parts and their function, Repair and maintenance of different types of gear box, Assembling and disassembling, Trouble shooting of gearbox, Safety precaution
4. **PROPELLER SHAFT, DIFFERENTIAL AND REAR AXLE:-** Identification of parts and their function, Trouble shooting, Repair and maintenance, Adjustment
5. **BREAK SYSTEM:-** Identification of parts and their function, Trouble shooting in brake system, Repair and maintenance, Adjustment, Safety precaution
6. **STEERING SYSTEM:-** Identification of parts and their function, Trouble shooting in steering system, Disassembling and assembling of steering system, Checking and adjustments, Safety precaution
7. **SUSPENSION SYSTEM:-** Identification of parts and their function, Disassembling and assembling of parts, Checking and replacement, Safety precaution
8. **TYRE:-** Identification, Checking defective tyre & their repair /replacement, Fitting of type
9. **INTRODUCTION OF EQUIPMENT:-** TATA series, Mahindra and mahindra, Suzicki /Maruti, Chinese trucks and jeeps

2. **VEHICLE ELECTRICITY**

BATTERY:- Introduction, Storage battery, Chemical action in the battery, Types of battery, Battery charging, checking stage of charge of batteries, Defect in batteries, Trouble shooting

IGNITION SYSTEM:- Introduction, Circuit layout, Types of ignition system, Distributor, Ignition coil, Spark plug, Ignition timing, Firing order, C.B Point adjustment, Trouble shooting

CHARGING SYSTEM:- Introduction, Working principle Ac to DC converter, DC generator and alternator, Types of Dc generator, Advantage & disadvantage of A.C &DC generator, Adjustment, Trouble shooting

STEERING SYSTEM:- Introduction, Working principle, Starting circuit layout, Types of drive, mechanism, Starting switch, Types of drive mechanism, Trouble shooting

LIGHT SYSTEM:- Head light, parking light, Side light, Auxiliary circuit, Horn, Wiper, Trouble shooting

3. **THERMODYNAMICS**

PROPERTIES OF GASES AND GAS LAWS:- The expansion of gases, Boyles law, Charles laws, The combined gas law, The characteristic, Related problems

INTRODUCTION OF THERMODYNAMICS:- System, Property of a system, State of a system, Cyclic process, Temperature, Heat, Work and energy

FIRST LAW OF THERMODYNAMICS:- Definition of law, Total internal energy, Mechanical equivalent of heat, Related problems

THERMODYNAMICS PROPERTIES OF FLUID:- Internal energy, Enthalpy, Entropy, Specific heat at constant volume, Specific heat at constant pressure, Related problems

BASIC THERMODYNAMICS PROCESS:- Constant volume process, Constant pressure process, Constant temperature process, Adiabatic process, Polytropic process

SECOND LAW OF THERMODYNAMICS :- Definition of law, Thermal efficiency of cyclic heats power plant (heat engine), Related problems

HEAT ENGINE CYCLE:- constant volume cycle, Constant pressure cycle, Mixed cycle, Related problems

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-kf-cd-ejxsn kpfufds kl/lff

- 1= ; do M 45 ldg^
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- 3= k)ff° M 50
- 4= plQ)ff° M 25
- 5= kZgsfj lgdf)ff, kZgef/ -weightage_ / ; dosfj laa/)fM-

S.N.	Topic	Marks	Time-Minutes
1.	Machine Parts Identification	5	5
2.	Vehicle Parts Identification	5	5
3.	Use Various Measuring Instruments	10	10
4.	Detail Description of a Machine	15	10
5.	Skill in using basic tools	5	5
6.	Workshop Practical	10	10
Total		50	45

1. Machine Parts Identification:

k/liffylh layout u/l /flvPsf laleGg Machine Parts sfj Technical gfd n\g" kgj xG% / lb0Psfj Parts sx f sx f kpfju xG% eGg] ; djt vhfpg" kgj % . o; df 5 ksf/sf ; fdgdx? b\vf0g] / k\fojs gfd / kpfju ; lx ePdf 1 cssfj b/n] marks kpfj ul/g] .

2. Vehicle Parts Identification

k/liffylh layout u/l /flvPsf laleGg Machine Parts sfj Technical gfd n\g" kgj xG% / lb0Psfj Parts sx f sx f kpfju xG% eGg] ; djt vhfpg" kgj % . o; df 5 ksf/sf ; fdgdx? b\vf0g] / k\fojs gfd / kpfju ; lx ePdf 1 cssfj b/n] marks kpfj ul/g] .

3. Use Various Measuring Instruments

k/liffylhf0(laleGg ksf/sf Measuring Instrument lb0g] . pQm measuring Instruments kpfju u/\ lbPsfj a:t'sf Density, Weight, Mass kQf nufpg" kgj . k\ t ; lx answer sfj cS 2 kpfj ul/g] .

4. Detail Description of a Machine

k/liffylh s) Ps machine sfj af/df lgDg s'fx? ksf; kfg(kgj % .

- s_ kpfjudf cfpg] cj :yf / o; af^ ug(; lsg] sfdx? =====3
- v_ Working Principal of the machine =====5
- u_ Machine df sfd ug] tl/sf =====7
 - 1. Machine Setup2
 - 2. Functionality Check..... 2
 - 3 Working Procedure3

5. Skill in using basic tools

k/liffylhf0(workshop df kpfju x) s) 5 j ^f tools kpfju ug(nuf0g] % . kpfju ; lx ePdf 1 cS kpfj ul/g] .

6. Workshop Practical

k/liffylx?nf0(Faulty Vehicle sfj fault find out ug(nuf0g] % . pQm faulty Vehicle df ePsf ; d:of kQf nufpg" kg] . k\fojs ; d:of ; lx klxrfj u/df 2.5 marks / fault correction u/df 2=5 marks u/l hDdf 10 marks lb0g] % .

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