

## नेपाली सेना

### प्रा.जम ग्राउण्ड ह्याण्डलिङ्ग पदको लिखित परीक्षाको पाठ्यक्रम

(खुल्ला)

समय: १ घण्टा ४५ मिनेट

पुर्णाङ्क: १००

उत्तिर्णक: ४०

यो पाठ्यक्रम नेपाली सेनाको प्रा.जम ग्राउण्ड ह्याण्डलिङ्ग पदको उम्मेदवार छनौट परिक्षाको लागि निर्धारण गरिएको हो । प्रा.जम ग्राउण्ड ह्याण्डलिङ्ग पदको उम्मेदवार छनौट लिखित परिक्षामा सरिक हुने उम्मेदवारहरूको पेशा सम्बन्धी विषयलाई आधार मानी सोधिने छ ।

१. लिखित परिक्षाको माध्यम नेपाली/अंग्रेजी भाषा हुनेछ ।
२. निम्न पत्रहरूको पाठ्यक्रमको रूपरेखा अनुसार विषयवस्तु हुनेछ ।
३. लिखित परिक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र अर्को चरणको परिक्षामा सम्मिलित गराईनेछ ।
४. प्रश्नपत्र निर्माण गर्दा पाठ्यक्रममा समावेश भएका सबै विषयहरू समेटिने छ ।
५. नेपाली सेनाको तत्कालिन आवश्यकता तथा विविध परिस्थितिमा नेपाली सेना अनुकूल हुने गरी उल्लेखित विवरणहरूमा हेरफेर हुन सक्नेछ ।
६. पाठ्यक्रम लागु मिति २०७१/०९/२८ गते ।

प्रश्नको किसिम	प्रश्नको संख्या र अंक	कैफियत
छोटो उत्तर दिनु पर्ने पश्न	५X४=२०	
बस्तुगत	४०X२=८०	
जम्मा	१००	

**1. Automobile Engineering****18%**

- Basic Engine Terminology in IC Engine
- Types of Engine in terms: -Engine cycle
- Otto Cycle & Diesel Cycle
- No.of Strokes
- Firing Order
- Merit & Demerit of Electric Car
- Concept of Hybrid Car: Series & Parallel System
- Difference between Diesel Engine & Petrol Engine
- Functions of Clutch & Main types of Clutch
- Functions of Carburetor
- Desirable properties of IC Engine Fuels
- Functions, Properties, Types & Viscosity Rating as per S.A.E. of Lubricant.

**2. Workshop Technology:****20%**

- Mechanical Properties of Materials
- Stress - Strain curve
- Destructive & Non-destructive Testing
- Classifications of Iron: Pig Iron, Cast Iron, Wrought Iron, Steel, Classifications of Steel as per IS:7598-1974.
- Stainless Steel with uses: Austenitic Stainless Steel, Martensitic stainless steel, Ferritic Stainless steel
- Types of high speed steel (HSS)
- Cutting Alloys
- Non-Ferrous Alloys:-
  - Application of Aluminium Alloys
  - Copper Alloys:- Bearing metals, Bronze and uses, Brasses and uses
  - Classification of plastics
- Heat Treatment of metals:-
  - Purposes of heat treatment
  - Method of heat treatment:- Annealing, Normalising, Case hardening, Hardening
- Methods of hot/cold Working of Metals:
  - Rolling, Forging, Drawing
- Welding Technology
  - Oxy-acetylene welding and types of flames
  - Arc Welding
  - Inspection and Testing of Welding

- Different Types of Hands Tools and Uses
- Types of fits, meaning of Interchangeability, basic Size, nominal size and actual size
- Measurement and Inspection
  - Linear Measurement
    - ❖ Non-precision Instruments and Uses
    - ❖ Precision Instrument
- Lathe Machine:-
  - Function of Lathe Machine
  - Description of engine Lathe with function of Lathe different Parts
  - Size of a lathe
  - Lathe operation
  - Concept of Cutting speed, feed, and Depth of cut
- Drilling Machine:-
  - Sensitive drilling Machine
  - Upright Drilling M/C
  - Drilling M/C Operation

### **3. Surface Finishing Process**

**4%**

- Lapping
- Honing
- Super Finishing
- polishing
- Buffing

### **4. Fluid Mechanic and Hydraulic machines**

**14%**

- Concept and Derivation for Density, Pressure, Specific Gravity
- Pascal's Law and Its application
- Newton's Law and Viscosity
- Concept of Laminar and Turbulent Flow
- Different between Impulse and Reactions turbines

### **5. Theory of Machine**

**8%**

- Different Types of toothed Gear:- Spur gear, Spiral Gear, Helical Gear, Bevel Gear, Worm and Worm wheel, Rack & pinion.
- Types of Gear Trains:- Simple Gear train, Compound Gear Train, Reverted Train

**6. Thermodynamics****14%**

- Relationship of Scale of Temperature
- Concept of System, Surrounding, Universe, Open System, Closed System, Isolated System, Isothermal Process, Adiabatic Process, Isobaric Process, Isochoric Process
- The First & Second Law of Thermodynamics
- Refrigeration and Heat Pump cycle
- Carnot Cycle

**7. Engineering Drawing****4%**

- Lines and Dimensioning
- First angle and third angle of ortho-graphic projection.
- Sectional Views
- Concept of Isometric Scale.

**8. Basic physics and Electricity****18%**

- Newton's Laws of Motion
- Principle of Conservation of Linear Momentum.
- Work, Power, Energy and Principle of Conservation of Energy.
- Parallelogram Law of Forces
- Resolution of a vector
- Angular Velocity, Time Period, Frequency, Centripetal & Centrifugal Force.
- Concept of Elasticity, Stress, Strain, Modulus of Elasticity.
- Moment of forces, Principle of moment, Centre of Forces & Torque.
- Basic Circuit Components & Symbols
- Ohm's Law & Resistance
- Resistance in Parallel & Series.
- Heating effect of current
- Cells in series & parallel
- Electromagnetic Induction: Faraday's & Lenz's Law
- Working concept of A.C Generator & Transformer
- Concept and uses of Primary Cell & Secondary Cell
- Renewable Sources of energy.
- Electronics Logic Gates

**Practical Exam**

Full Marks : 50

Pass Marks : 25

(a) viva : 40 %

(b) Identification of General tools, machine and their uses: 60 %

## Sample Questions

### Objective questions :

1. The power is obtained by deducting various power losses from indicated power in automobile is called
  - a. H.P.
  - b.B.P.
  - c.both (a) & (b)
  - d. None of above
- 2.Which is multigrade oil viscosity rating as per S.A.E?
  - a. S.A.E 10W/30
  - b. S.A.E 10W
  - c. S.A.E30
  - d.All of above.
- 3.The purest iron is
  - a. Pig Iron
  - b. Cast Iron
  - c.Wrought Iron
  - d. Both (a) & (b).
- 4.If input is 0 & 1 then out put is 0 in digital logic Gates, the gate is
  - a.OR Gate
  - b. AND Gate
  - C. NOT Gate
  - d. None of above.
- 5.Which is not renewable source of energy?
  - a.Hydro power plant
  - b.Solar power plant
  - c.Thermal power plant
  - d. Wind power plant.

### Subjective question:

- 1.What are the advantages & disadvantages of two strokes & four strokes engine?
- 2.What do you meant by interchangeability ?
3. Draw basic D.C. circuit with component & symbols.
- 4.Write down some differences between impulse & reaction turbines.
- 5Write short note with diagram of refrigeration cycle.