# lnlvt k/LIff

# kf7\oqmdsf] ?k/]vf M o; kf7\oqmdsf] cfwf/df lgDgfg';f/ r/0fdf k/LIff lnOg] 5 M

# k|yd r/0f M lnlvt k/LIff k"0ff+s M @))

# låtLor/0f M s\_ k|of]ufTds k"0ff+s M %)

#  v\_ cGtjf{tf{ k"0ff+s M #)

# k|yd r/0f M lnlvt k/LIff of]hgf (Examination Scheme)

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| --- | --- | --- | --- | --- | --- | --- |
| kq | ljifo | k"0ff{s | pQL0ff{s | k/LIff k|0ffnL | k|Zg ;+Vof / c+sef/ | ;do |
| k|yd | k|];;DaGwL | %) | @) | j:t'ut ax'j}slNks(Multiple Choice) | %) x != %) | $% ldg]6 |
| låtLo | ;]jf;DaGwL | !)) | $) | ljifout (Subjective) | !) x!) =!)) | # 306f |

# låtLo r/0f M k|of]ufTds tyf cGtjf{tf{

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| --- | --- | --- | --- |
| ljifo | k"0ff{s | pQL0ff{s | ;do |
| k|of]ufTdsk/LIff | %) | @% | $% ldg]6 |
| cGtjf{tf{ | #) | - | - |

# gf]6 M

# !\_ lnlvt k/LIffsf] dfWod efiff g]kfnL jf c+u|]hL cyjf b'j} x'g ;S5 .

# @\_ kf7\oqmdsf] k|yd / låtLo kq tyf k|of]ufTds k/LIffsf] ljifoj:t' Pp6} x'g]5 .

# #\_ k|yd / låtLo kqsf] lnlvt k/LIff 5'6\6f5'6\6} x'g]5 .

# $\_ j:t'ut ax'j}slNks (Multiple Choice)k|Zgkqx?sf] pQ/ ;xL lbPdf k|To]s ;xL pQ/jfkt ! -Ps\_ c+s k|bfg ul/g]5 eg] pQ/ unt lbPdf k|To]s unt pQ/jfkt )=@ c+s s6\6f ul/g]5 . t/ pQ/ glbPdf To;jfkt c+s lbOg]5}g / s6\6f klg ul/g]5}g .

# %\_ ax'j}slNks k|Zgx? x'g] k/LIffdf s'g} k|sf/sf] SofNs'n]6/ (Calculator) k|of]u ug{ kfOg] 5}g .

# ^\_ ljifout k|Zgsf nflu tf]lsPsf !) cÍsf k|Zgx?sf] xsdf !) cÍsf] Pp6f nfdf] k|Zg jf Pp6} k|Zgsf b'O{ jf b'O{ eGbf a9L efu (Two or more parts of a single question) jf Pp6f k|Zg cGtu{t b'O{ jf a9L l6Kk0fLx? (Short notes) ;f]Wg ;lsg] 5 .

# &\_ o; kf7\oqmd of]hgf cGtu{tsf kq÷ljifosf ljifoj:t''df h];'s} n]lvPsf] eP tfklg kf7qmddf k/]sf sfg"g, P]g, lgod tyf gLltx? k/LIffsf] ldlt eGbf # dlxgf cufl8 -;+zf]wg ePsf jf ;+zf]wg eO{ x6fO{Psf jf yk u/L ;+zf]wg eO{\_ sfod /x]sfnfO{ o; kf7\oqmddf k/]sf] ;Demg''' kb{5 .

# \*\_ k/LIffyL{n] hfGg'kg]{ s'/fx? M

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#  \*=#\_ 5fkfvfgf tyf k|sfzg P]g @)$\*, lgodfjnL @)$(

#  \*=$\_ uf]/vfkq ;+:yfgsf] ljlgdo @)%@ -;+zf]wg ;lxt\_

**k|yd kqsf] PsfO{x?sf] k|Zg;+Vof lgDgfg';f/ x'g]5**

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| k|yd kqsf PsfO{ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| k|Zg ;+Vof | 5 | 8 | 7 | 4 | 5 | 8 | 5 | 2 | 3 | 3 |

**Section A- 30 Marks**

### Work shop technology and Metrology 10%

* 1. Basic tools and Basic handoperations
	2. Machine tools: Lathe, Shaper, Milling, Grinding, Drilling Machines
	3. Metal Joining: Soldering, Brazing, Gas welding, Arcwelding
	4. Types offits
	5. Measurement Tools: Block Gages, Length Bars, Comparators, Vernier Calipers, Hygrometer, Micrometer, Densitometer
	6. Errors inmeasurement

### Material Science and Metallurgy 10%

* 1. Types of Materials, MaterialSelection
	2. Imperfections in Atomic Arrangement: Slip and Twinning, Dislocation, Points and SurfaceDefects
	3. Mechanical Properties and Testing: Tension, Impact, Fatigue, HardnessTest
	4. Cold working and Hotworking
	5. Types ofsteel
	6. Phase Transformation and Heat Treatment: Iron-carbon equilibrium diagram, Hardening, Tempering, Annealing,Normalizing

### Machine Component Design and Drawing 10%

* 1. Types of Projection
	2. Production Drawings
	3. Terminologies of Mechanisms, Mobility and Degrees of Freedom
	4. Design Process
	5. Factors Affecting Choice of Materials for Design: Strength, Toughness, Durability, Hardness
	6. Loading: Tensile, Compressive, Shearing, Bending, Bearing and Torsion
	7. Common Types of Failure: Theories of failure, Stress concentration effects, Ductile and brittle materials, Factor of safety

# Section B- 20 Marks

### Thermodynamics and heatengines 10%

* 1. Basic Concepts: Thermodynamic System, Thermodynamic Property, Pure Substance, ZerothLaw
	2. First Law of Thermodynamics: Control mass and Control volume formulation
	3. Second Law of Thermodynamics: Heat engine, Refrigerator and Heat pump, Kelvin Planck and Clausius Statements,Entropy
	4. Refrigeration: Reversed Carnot cycle, Vapor compression cycle, Absorption refrigeration systems, Refrigerants and theirproperties
	5. Air Conditioning: Psychometric properties and psychometric chart, Heating, cooling, humidification and dehumidification process, Air conditioning systems
	6. Thermodynamic Cycles: Carnot cycle, Otto cycle, Diesel Cycle, Brayton cycle, Rankinecycle
	7. IC engines: Classifications, components, two stroke and four stroke operations, performance of IC engines, Ignition system, Cooling system, Lubrication system
	8. Modes of heat transfer: Conduction, Convection and Radiation

### Pneumatic, Hydraulic and Electric Machines 10%

* 1. Air Compressors: Reciprocating and Rotary, Centrifugal and Axial (Working principle), Pneumatic Piston Cylinders (Working Principle)
	2. Pumps: Centrifugal pump and Reciprocating pump (Working principle), Hydraulicram, Hydraulic Lift
	3. DC Motors: Shunt field, Series field and Compound field motors, Torque- speedcharacteristics
	4. DC Generators: Shunt, Series and Compound field machines, Voltage/speed/load characteristics, Effects of variable load, variabletorque
	5. Synchronous and Induction Machines: Basic structure of synchronous machines, Generator on isolated load, Generator on large system, Synchronous motor

# Section C- 30 Marks

### Industrial Engineering and Management 10%

* 1. Role of production/Operation Management and System Concepts
	2. Plant Location and Plant Layout Design
	3. Production Planning and Control: Selection of materials, methods, machines and manpower
	4. Costing and Estimation, Bill of Materials
	5. Network methods: PERT,CPM
	6. Inventory Control: Inventory costs and Inventory models
	7. Forecasting Techniques: Requirements of forecasting, Time series and Moving average methods, Regression analysis
	8. Quality Management: Importance of quality, Statistical process control
	9. Statistical Analysis: Measurement of central tendency, Deviation,Distribution

### Engineering Economics 10%

* 1. Types of engineering economicsdecisions
	2. Time Value of Money: Simple interest, Compound interest, Continuous compoundinterest
	3. Project Evaluation Techniques: Payback period method, NPV method, Future value analysis, IRR method
	4. Benefit and Cost Analysis: Cost benefit ratio, breakevenanalysis
	5. Corporate tax system in Nepal
	6. Depreciation and itstypes

### Professional Practice 10%

* 1. Ethics and Professionalism: Perspective on morals, Codes of ethics and guidelines of professional engineering practice
	2. Legal aspects of Professional Engineering in Nepal: Provision for private practice and employee engineers
	3. Contract
	4. Tendering law and contract documents

# Section D- 20 Marks

### Maintenance Management 10%

* 1. Maintenance objectives and maintenance costs
	2. Types of maintenance schemes
	3. Basic Maintenance decisions

### Offset Press 10%

* 1. Introduction to offset press
	2. Components of offset press
	3. Use of computer technology in offset press
	4. Current status of offset press Nepal

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| låtLo kqsf PsfO{ | 1 | 4 | 5 | 2 | 3 | 6 | 7 | 8 | 9 | 10 |
| k|Zg ;+Vof | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

of] kf7\oqmd g} k|]; clws[t tx –^ sf] kf7\oqmd sfod ul/Psf] 5 .

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