

**5th Sem. / Mechanical Engg.**  
**Subject : Machine Design**  
Time : 3 Hrs. M.M. : 100

**SECTION-A**

**Note:** Objectives questions. All questions are compulsory (10x1=10)

**(Course Outcome/CO)**

- Q.1 Write types of machine design. (CO-1)  
Q.2 What is standard? (CO-2)  
Q.3 What is angle between the principal planes. (CO-4)  
Q.4 Define equivalent twisting moment. (CO-3)  
Q.5 Define equivalent bending moment. (CO-5)  
Q.6 What is the material of key? (CO-6)  
Q.7 Define flank of thread. (CO-1)  
Q.8 What is function of knuckle joint? (CO-6)

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- Q.9 What are uses of rivets? (CO-6)  
Q.10 Classify couplings? (CO-6)

**SECTION-B**

**Note:** Very Short answer type questions. Attempt any ten parts 10x2=20

- Q.11 Write the factors which affects factor of safety. (CO-1)  
Q.12 Explain briefly stress concentration. (CO-3)  
Q.13 State maximum principal or normal stress theory. (CO-4)  
Q.14 Name various type of loads on shaft. (CO-3)  
Q.15 What is the effect of keyway on the strength of shaft? (CO-6)  
Q.16 Explain ACME thread with the help of neat sketch. (CO-6)  
Q.17 Define dead load and live load. (CO-1)  
Q.18 What is the function of Gib in cotter joint? (CO-6)  
Q.19 List various applications of knuckle joint. (CO-6)  
Q.20 What is the Unwin's formula in case of river? (CO-5)

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- Q.21 Define efficiency of riveted joint. (CO-6)  
Q.22 Write functions of flexible coupling. (CO-6)

**SECTION-C**

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.23 What is machine design? What are its different types? Explain. (CO-1)  
Q.24 (a) What are different methods to reduce stress concentration? Explain. (CO-1)  
      b) Explain maximum shear stress theory. (CO-4)  
Q.25 a) Define strength of riveted joints. (CO-6)  
      b) Which materials are generally preferred for making a shaft? Enlist the important properties of material should have. (CO-6)

- Q.26 A solid steel circular shaft has tensile stress and ultimate shear stress of 800 MPa and 620 MPa respectively, is subjected to a torsion moment of 130000 Nm and bending moment of 4000 Nm. Assume FOS=5, find diameter of shaft. (CO-5)

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**SECTION-D**

**Note:** Long answer type questions. Attempt any two questions. 2x20=40

- Q.27 Design a Knuckle joint to transmit a load of 100 KN. The permissible stress for the joint material in tension, shear and crushing are (CO-6)  
Tensile stress = 75 N/mm<sup>2</sup>  
Shear stress = 60 N/mm<sup>2</sup>  
Crushing stress = 150 N/mm<sup>2</sup>

- Q.28 a) Give the Nomenclature of screw thread with neat sketch. (CO-1)  
      b) What are requirements of a good shaft coupling. (CO-1)

- Q.29 Design a CI flange coupling to connect two shaft 100mm diameter running at 250 r.p.m for transmitting 4000 N-m torque. Take permissible shear stress for shaft, Bolt and Key as 50 MN/m<sup>2</sup> and shear stress for CI as 0.8 MN/m<sup>2</sup>. (CO-6)

**(Note:** Course outcome/CO is for office use only)

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**5th Sem. / Mechanical Engineering****Subject : Machine Design**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Multiple choice Questions. All questions are compulsory  
(10x1=10)

(Course Outcome/CO)

**Q.1** Stress produced in the member due to falling load is  
(CO-1)

- a) Impact load      b) Fatigue stress
- c) Fatigue limit      d) Endurance limit

**Q.2** Shock resistance of steel is increased by adding.  
(CO-2)

- a) Nickel      b) Chromium
- c) Nickel and Chromium
- d) Sulphur, lead and phosphorus

**Q.3** The planes on which the maximum shear stress acts are called  
(CO-4)

- a) Maximum shear plane
- b) Principal plane
- c) Normal plane
- d) Major principal plane

**Q.4** One of the following which one is better method of making a shaft  
(CO-5)

- a) Cold rolling      b) Hot rolling
- c) Cold drawing      d) Machine turning.

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**Q.5** Shafts are made of  
(CO-5)

- a) Cast iron      b) Wrought iron
- c) Mild steel      d) High speed steel

**Q.6** Shear failure is more conductive at  
(CO-6)

- a) Slow rate of loading
- b) high rate of loading
- c) high shear stress
- d) low shear stress

**Q.7** The sleeve or muff coupling is designed as.  
(CO-6)

- a) Thin cylinder      b) Thick cylinder
- c) Solid shaft      d) Hollow shaft.

**Q.8** The rivet head used for boiler plate riveting is usually  
(CO-6)

- a) Snap head      b) Pan head
- c) conical head      d) Counter sunk head.

**Q.9** Riveted joints mostly fail by  
(CO-6)

- a) Crushing of rivets      b) Bending of plates
- c) Tearing of plates
- d) Shearing of rivets

**Q.10** The distance between the two adjacent crests is called  
(CO-6)

- a) Lead      b) Root
- c) Pitch      d) Crest

**SECTION-B**

**Note:** Objective type questions. All questions are compulsory.  
10x1=10

**Q.11** Hook's law holds good up to \_\_\_\_\_ limit. (CO-1)

**Q.12** The ratio of ultimate stress to design stress is known as\_\_\_\_\_.  
(CO-1)

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**Q.13** The property of a material to be drawn into wires is called  
(CO-2)

**Q.14** The maximum shear stress theory is used for \_\_\_\_\_ materials.  
(CO-4)

**Q.15** What is shaft?  
(CO-5)

**Q.16** Shaft are made of mild steel and \_\_\_\_\_.  
(CO-5)

**Q.17** The type of stresses developed in the keys are \_\_\_\_\_.  
(CO-6)

**Q.18** What is a flange coupling?  
(CO-6)

**Q.19** A rivet is described by \_\_\_\_\_.  
(CO-6)

**Q.20** A lap joint is always in \_\_\_\_\_ shear  
(single/double).  
(CO-6)

**SECTION-C**

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions.  
12x5=60

**Q.21** Explain in detail the general considerations in machine design.  
(CO-1)

**Q.22** Define twisting load and modulus of rigidity.  
(CO-2)

**Q.23** Define ductility and malleability.  
(CO-3)

**Q.24** State the theory of failure applied for brittle materials.  
(CO-4)

**Q.25** What is maximum stress theory?  
(CO-4)

**Q.26** Classify and explain different types of shafts.  
(CO-5)

**Q.27** What is the difference between a shaft and an axle?  
(CO-5)

**Q.28** What are the desirable properties of shaft material?  
(CO-5)

**Q.29** What are the advantages and disadvantages of a key joint?  
(CO-6)

**Q.30** Discuss the function of coupling.  
(CO-6)

**Q.31** Explain the purpose and types of coupling.  
(CO-6)

**Q.32** Give the various advantages to riveted joint over welded joint.  
(CO-6)

**Q.33** What are advantages of welded joints over riveted joint.  
(CO-6)

**Q.34** Explain how a welded joint differ from riveted joint.  
(CO-6)

**Q.35** Write screw thread nomenclature with diagram.  
(CO-6)

**SECTION-D**

**Note:** Long answer type questions. Attempt any two out of three questions.  
2x10=20

**Q.36** Briefly, explain the following terms.  
(CO-1)

- a) Stiffness      b) Endurance limit
- c) Ductility      d) Malleability
- e) Static load

**Q.37** A solid shaft is transmitting 1 MW at 240 r.p.m. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20% Take the maximum allowed shear stress 60 N/mm<sup>2</sup>  
(CO-5)

**Q.38** Explain the procedure for designing a butt joint.  
(CO-6)

**Note:** Course Outcome (CO) mentioned in the question paper is for official purpose only.

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**Branch : 5th Sem (Mechanical)**  
**Subject:- Machine Design**

Time : 3Hrs. M.M. : 100

**SECTION-A**

- Note:** Multiple choice questions. All questions are compulsory (10x1=10)
- Q.1 The limiting strength for brittle material is  
a) Yield stress b) Breaking stress  
c) Ultimate stress d) Any of the above
- Q.2 According to Unwin's formula the relation between diameters of rivet hole (d) thickness of plate (t) is given by  
a)  $d =$  b)  $d = 6$   
c)  $d = 2t$  d)  $d = 6t$
- Q.3 Riveted joints mostly fail by  
a) Crushing of rivets b) Bending of plates  
c) Tearing of plates d) Shearing of rivets
- Q.4 A woodruff is generally used in  
a) Machine tool industry  
b) Automobile industry  
c) Textile industry  
d) Hydraulic industry
- Q.5 Crank Shaft is made by  
a) Forging b) Costing  
c) Pressing d) Drawing

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Q.6 The plane on which maximum shear stress act are called

- a) Maximum shear plane
- b) Principle plane
- c) Normal Plane
- d) Major principle plane

Q.7 The sleeve or muff coupling is designed as a

- a) Thin cylinder b) Thick cylinder
- c) Solid shaft d) Hollow shaft

Q.8 The cotter are made up of

- a) Wrought Iron b) Mild steel
- c) High carbon steel d) Cast iron

Q.9 In knuckle joint pin is likely to fail in

- a) Tension b) Compression
- c) Shear d) Double Shear

Q.10 A screw is specified by its

- a) Major diameter b) Minor diameter
- c) Pitch diameter d) Pitch

**SECTION-B**

**Note:** Objective type questions. All questions are compulsory. (10x1=10)

- Q.11 Define bearing stress.  
Q.12 Define principle stresses.  
Q.13 Define equivalent twisting moment.  
Q.14 What is feather key ?  
Q.15 Name the different parts of socket & spigot joint.  
Q.16 What is lap welded joint ?

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Q.17 Define fullering process.

Q.18 Define back pitch.

Q.19 Write the function of flexible coupling

Q.20 Write the function of power screws.

**SECTION-C**

**Note:** Short answer type questions. Attempt any Four questions out of Six questions. (4x10=40)

- Q.21 Explain the gernal procedure of designing the new machine ?
- Q.22 Define stress concentration. Explain the methods of reducing stress concentration.
- Q.23 A steel shaft is subjected to a bending moment of 10KNm and a torsional moment of 25 KNm. They yield strength of the shaft is 700 MPa. Find the diameter of the shaft by using max. shear theory Take E= 200 GPa and F.O.S=4
- Q.24 A rectangular sunk key 25mm wide, 16 mm thick and 100mm long is required to transmit 1 KNm torque from a 120mm diameter shaft. Calculate the induced shear and crushing stresses is the key.
- Q.25 A plate 1.8 mm long 85mm thick is welded to another plate at right angles to each other by 20 mm fillet weld. Find the value of max torque that can be induced if the allowable shear stress is 110MPa.
- Q.26 Explain various types of screw threads used in power screws

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**SECTION-D**

**Note:** Long answer type questions. Attempt any two questions out of three questions. (2x20=40)

- Q.27 A solid shaft is subjected to a bending moment of 3050Nm and torque of 11 KNm. The shaft is made of 46C8 steel having ultimate tensile stress of 775 MPa and ultimate shear stress of 600MPa. Assuming a FOS as 5. Determine the diameter of shaft
- Q.28 Design and draw a knuckle joint to transmit a load of 150KN with the design stressed as tensile stress is  $80N / mm^2$ , shear stress  $50N/mm^2$  crushing stress  $160N/mm^2$
- Q.29 A double riveted lap joint is to be designed for 16mm thick plate. The riveting is of zig-zag type. The following premissible stresses may be assumed tensile stress = 110 MPa shear stress = 75 MPa and crushing stress= 150MPa state how the joint will fail and find the efficiency of joint.

**SECTION-A**

- Note :** Multiple choice questions. All questions are compulsory. (10x1=10)
- Q.1 The property of the material to retain deformation is called (CO-1)  
a) Strength b) Toughness  
c) Plasticity d) Elasticity
- Q.2 For designing ductile materials, which of the following theories is/are used? (CO-4)  
a) Maximum shear stress theory  
b) Shear stain energy theory  
c) Both A & B  
d) None of the above
- Q.3 The desirable property for the material of the shafts is (CO-3)  
a) It should have high strength  
b) It should have good machinability  
c) It should have low notch sensitivity factor  
d) All of the above
- Q.4 While designing shafts, type of loading on the shafts may be (CO-5)  
a) Twisting  
b) Bending  
c) Combination of twisting and bending moments  
d) All of the above

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- Q.5 Shape of a Woodruff key is like a (CO-1)  
a) Semi-circle b) Sphere  
c) Cylinder d) Trapezoid
- Q.6 Which of the following is a permanent fastening? (CO-6)  
a) Keys b) Bolts  
c) Cotter c) Rivets
- Q.7 The transverse fillet weld is designed for (CO-2)  
a) Tensile strength b) Compressive strength  
c) Bending strength d) Shear strength
- Q.8 A cotter joint is used to transmit (CO-6)  
a) Axial tensile load only  
b) Axial compressive load only  
c) Axial tensile and compressive loads  
d) Combined axial and twisting load
- Q.9 The largest diameter of an external or internal screw thread is known as (CO-1)  
a) Pitch diameter b) Major diameter  
c) Minor diameter d) Lead
- Q.10 the sleeve or muff coupling is designed as (CO-5)  
a) Thin cylinder b) Thick cylinder  
c) Solid shaft d) Hollow shaft

**SECTION-B**

- Note :** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 Name the various types of machine design. (CO-1)
- Q.12 What is maximum principal stress theory? (CO-4)
- Q.13 Name various types of the shafts. (CO-5)
- Q.14 Define equivalent bending moment. (CO-5)
- Q.15 Define keyway. (CO-2)
- Q.16 Define the terms related to screwed joint; (1) Pitch (2) Flank. (CO-2)

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- Q.17 What do you mean by angle of thread? (CO-1)  
Q.18 Enlist the permanent and temporary joints. (CO-6)  
Q.19 What is the necessity of shaft coupling? (CO-5)  
Q.20 In which cases the use of threaded joint are not recommended? (CO-4)

**SECTION-C**

- Note :** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Explain how factor of safety is selected? (CO-4)  
Q.22 Explain fatigue and endurance limit. (CO-4)  
Q.23 What is maximum stress theory? (CO-4)  
Q.24 What is the difference between a shaft and axle? (CO-5)  
Q.25 What effect has a key way on the strength of the shaft. (CO-5)  
Q.26 What are the desirable properties of shaft materials? (CO-3)  
Q.27 What is a key? Write the various uses of key. (CO-1)  
Q.28 Explain how a welded joint differ from riveted joint? (CO-1)  
Q.29 What is the difference between lap joint and butt joint? (CO-1)  
Q.30 How do you differentiate between a knuckle joint and cotter joint? (CO-1)  
Q.31 Why gibbs are used in cotter joint? Explain with the help of a neat sketch the use of single and double gib. (CO-6)  
Q.32 Explain the purpose and types of couplings. (CO-6)  
Q.33 What are the factors to be investigated while selecting a coupling. (CO-6)

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- Q.34 Discuss the advantages offered by threaded joints. (CO-6)  
Q.35 Write screw threads nomenclature with diagram. (CO-2)

**SECTION-D**

- Note :** Long Answer type question. Attempt any two questions. (2x10=20)
- Q.36 The shaft and the flange of a marine engine are to be designed for flange coupling. The flange is forged on the ends of the shaft. The following data is given. Power of engine = 4MW; speed of the engine = 110 rpm; Permissible shear stress in bolts and shafts = 70MPa; No.'s of bolts = 10; P.C.D. Of bolts = 1.8 x Dia of shaft. Calculate  
(1) Diameter of the shaft  
(2) Diameter of the bolts  
(3) Thickness of the flange  
(4) Diameter of the flange
- Q.37 Two plates of 25mm thickness each are to be joined with a single riveted double cover butt joint. Calculate diameter of the rivet, rivet pitch, cover thickness and mode of failure of the joint. The working stresses in tension and shearing are 100 MPa and 80 MPa respectively. (CO-4)
- Q.38 Find the diameter of a shaft which transmits 60KW at 60 rpm. If the maximum torque is 30% greater than the mean torque and the limit of torsional stress is  $60 \text{ MN/m}^2$  and the transverse modulus of elasticity is  $9 \times 10^4 \text{ MN/m}^2$ , calculate the maximum angle of twist in 3m length. (CO-5)

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- Q.30 Explain potentiometer. (CO-3)  
 Q.31 Classify cutting tool used in CNC machines. (CO-2)  
 Q.32 Explain tool compensation. (CO-4)

#### SECTION-D

- Note:** Long answer type questions. Attempt any three questions.  $3 \times 10 = 30$
- Q.33 What are the main problems in mechanical and electrical components of CNC machines. (CO-5)  
 Q.34 Explain FMS with advantages and limitations. (CO-6)  
 Q.35 Explain working of CNC system in detail. (CO-1)  
 Q.36 Explain different types of slide ways used in CNC machines in the detail. (CO-2)

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**5th Sem. / Mechanical / Mechatronics /  
Prod. (T & D) / Fabrication / Auto  
Subject : CNC M/C & Automation**  
 Time : 3 Hrs. M.M. : 100

#### SECTION-A

- Note:** Objectives questions. All questions are compulsory  $(10 \times 1 = 10)$
- (Course Outcome/CO)**

- Q.1 DNC stands for \_\_\_\_\_. (CO-1)  
 Q.2 Full form of ATC is \_\_\_\_\_. (CO-2)  
 Q.3 Functions of slide ways. (CO-2)  
 Q.4 Write the functions of tachometer. (CO-3)  
 Q.5 Full form of CIM. (CO-6)  
 Q.6 Name the types of encoder. (CO-3)  
 Q.7 Name the various input devices of CNC Machines. (CO-1)

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- Q.8 Write two types of control system. (CO-3)  
 Q.9 G90 stands for \_\_\_\_\_. (CO-4)  
 Q.10 Write two limitations of CNC machines. (CO-1)

#### SECTION-B

- Note:** Very Short answer type questions. Attempt any ten parts  $10 \times 2 = 20$
- Q.11 Define law of Robotics. (CO-6)  
 Q.12 Define binary coding. (CO-1)  
 Q.13 Name different motions of robots. (CO-6)  
 Q.14 Define feedback control system. (CO-3)  
 Q.15 Define automation. (CO-6)  
 Q.16 Name part programming format. (CO-4)  
 Q.17 Define tool magazine. (CO-2)  
 Q.18 Name different types of transducer. (CO-3)  
 Q.19 Define LVDT. (CO-3)  
 Q.20 Define machine zero. (CO-4)

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- Q.21 Define Do loop. (CO-4)  
 Q.22 Name types of control loops. (CO-3)

#### SECTION-C

- Note:** Short answer type questions. Attempt any five questions.  $5 \times 8 = 40$
- Q.23 What are different types of robotic motion. (CO-6)  
 Q.24 Differentiate between NC and CNC system. (CO-1)  
 Q.25 Explain cutter radius compensation. (CO-4)  
 Q.26 Write a short note on online fault finding techniques. (CO-5)  
 Q.27 Differentiate the terms of do loop and mirror image. (CO-4)  
 Q.28 Differentiate between encoder and decoder. (CO-3)  
 Q.29 Explain servo motor. (CO-3)

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## 5th Sem. / Mechanical Engg

## Subject : CNC Machines and Automation

Time : 3 Hrs.

M.M. : 100

## SECTION-A

**Note:** Multiple choice Questions. All questions are compulsory  
(10x1=10)

(Course Outcome/CO)

- Q.1 The setting of tools to a specific length, away from the machine is called (CO-1)  
a) Tool on setting b) Specific setting  
c) Presetting d) Post setting
- Q.2 CNC drilling machine is considered to be a type of (CO-1)  
a) Point-to-point controlled machine  
b) Straight line controlled machine  
c) Continuous path-controlled machine  
d) Servo-controlled machine
- Q.3 The purpose of using recirculating ball screw nut mechanism in CNC machine is \_\_\_\_\_. (CO-1)  
a) To reduce the setup time  
b) For higher surface finish  
c) For carrying out up milling  
d) To remove backlash
- Q.4 A stepper motor (CO-1)  
a) Can control the angular displacement quite precisely  
b) Cannot control the angular displacement precisely  
c) Cannot be used for positioning of tables and tools in CNC machine tools

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- d) Cannot be readily interfaced with microprocessor-based controller

- Q.5 Which of the following feedback device translate physical motion into electrical data? (CO-1)  
a) Encoder b) transducer  
c) Digital system monitoring  
d) None of the above
- Q.6 \_\_\_\_\_ is not types of NC program reader? (CO-1)  
a) Card readers  
b) Punched tape readers  
c) Laser taper reader  
d) Mechanical tape reader
- Q.7 The function of sideways in CNC is to \_\_\_\_\_. (CO-1)  
a) Reduce friction b) Reduce Wear  
c) Improve smoothness  
d) All of the mentioned
- Q.8 M-codes are also known as (CO-2)  
a) modal codes b) spindle speed codes  
c) machine codes  
d) miscellaneous codes
- Q.9 Which of the following code will give circular interpolation clockwise? (CO-4)  
a) G00 b) G01  
c) G92 d) G02
- Q.10 Which of the following code is used in programming in absolute coordinates? (CO-2)  
a) G92 b) G01  
c) G91 d) G02

## SECTION-B

**Note:** Objective type questions. All questions are compulsory.  
10x1=10

- Q.11 The CNC control system which has feedback element are also called as \_\_\_\_\_. (CO-1)
- Q.12 Expand PLC (CO-6)

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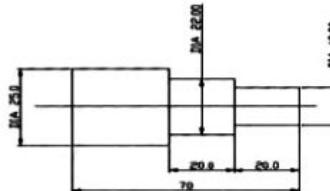
- Q.13 The axis perpendicular to work holding surface of a CNC machine is (CO-3)  
Q.14 The two feedback device used in CNC machine are \_\_\_\_\_ and \_\_\_\_\_ (CO-1)  
Q.15 The input command, In servo motor is in the form of \_\_\_\_\_ (CO-1)  
Q.16 G-codes are also known as \_\_\_\_\_ (CO-1)  
Q.17 \_\_\_\_\_ code will give circular interpolation anti-clockwise (CO-2)  
Q.18 \_\_\_\_\_ code will give circular interpolation anti-clockwise. (CO-3&CO4)  
Q.19 Expand LVDT (CO-1)  
Q.20 Give binary equivalent of 27 (CO-1)

## SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. 12x5=60
- Q.21 Enlist the advantages of DNC over conventional machines (CO-1)  
Q.22 Explain the type of DNC (CO-1)  
Q.23 Describe the rules for axis identification in CNC (CO-2)  
Q.24 Write short note on servo motor (CO-1)  
Q.25 Explain roller type sideways. (CO-5)  
Q.26 Describe various swarf remove methods in CNC machines. (CO-5)  
Q.27 Write short note on 18 degree ATC (CO-1)  
Q.28 Explain various functions performed while management of toolroom (CO-1)  
Q.29 Write short note on tachometers. (CO-1)  
Q.30 Explain the concept of tool radius compensation (CO-7)  
Q.31 Describe mirror image and its command (CO-7)  
Q.32 What are the common faults in PC components of NC operations. (CO-5)  
Q.33 Discuss the concept of A.I (CO-6)  
Q.34 Write a finishing cut program of step turning. (CO-6)

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- Q.35 Write a finishing cut program of step turning. (CO2&CO3)

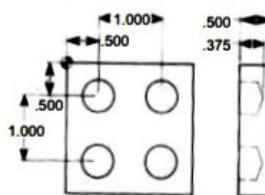


## SECTION-D

**Note:** Long answer type questions. Attempt any two out of three questions. 2x10=20

- Q.36 Give a detailed specifications of CNC lathe machine. (CO-3)  
Q.37 Write short note on following:  
a) Opto interrupt  
b) Any 5 NC words  
Q.38 Write blind hole cut program of the following object. Assume any missing data and dimensions: (CO-2)

**Note:** Course Outcome (CO) mentioned in the question paper is for official purpose only.



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### SECTION-A

- Note:** Multiple choice questions. All questions are compulsory. (10x1=10)
- Q.1 In a DNC system. (CO-1)  
a) Many machine tools can be controlled simultaneously.  
b) Only a single machine tools can be controlled.  
c) NC machine cannot be controlled.  
d) None of the mentioned
- Q.2 In part programming, interpolation is used for obtaining \_\_\_\_ trajectory. (CO-2)  
a) Helicoidal b) Pentagonal  
c) Triangular d) Zig-zag
- Q.3 DNC stands for (CO-2)  
a) Direct Numerical Complain  
b) Direct Numerical Control  
c) Direct Note Control  
d) Direct Note Complain.
- Q.4 Full form of MCU is (CO-1)  
a) Machine computer unit  
b) Machine control unit  
c) Machine control universal  
d) Machine computer universal

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- Q.5 M-Codes are also known as (CO-2)  
a) Preparatory codes b) Spindle speed codes  
c) Tool selection codes d) Miscellaneous codes
- Q.6 Which is not the type of part programming format? (CO-2)  
a) Fixed block format  
b) Variable block format  
c) Tab sequential format  
d) Word address format
- Q.7 Which of the following code will give a linear interpolation movement? (CO-7)  
a) G00 b) G01  
c) G78 d) G65
- Q.8 Match the following (CO-7)  

NC code	Definition
P. M05	1. Absolute coordinate system
Q. G01	2. Dwell
R. G04	3. Spindle stop
S. G09	4. Linear Interpolation

  
a) P-2, Q-3, R-4, S-1  
b) P-3, Q-4, R-1, S-2  
C) P-3, Q-4, R-2, S-1  
D) P-4, Q-3, R-2, S-1
- Q.9 The highest level of automation is found in (CO-6)  
a) CNC machine tools  
b) Automatic transfer machines  
c) DNC machining system  
d) Machine tools with electro hydraulic positioning and control
- Q.10 Choose the robot component from the (2) 181755/171755/  
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- following. (CO-6)  
a) Micro computer b) Coaxial cable  
c) Arm d) Software

### SECTION-B

- Note:** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 Expand PLC. (CO-1)  
Q.12 Describe CNC. (CO-1)  
Q.13 Write full form of ATC. (CO-3)  
Q.14 Describe slide ways. (CO-1)  
Q.15 Describe transducer. (CO-5)  
Q.16 Write use of opto - interrupters. (CO-5)  
Q.17 What is point to point motion? (CO-6)  
Q.18 Give description of G01. (CO-7)  
Q.19 What is first law of robotics. (CO-6)  
Q.20 Define degree of freedom. (CO-6)

### SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Write the main advantages and disadvantages of CNC machines. (CO-1)  
Q.22 Differentiate between absolute and incremental coordinate system. (CO-2)  
Q.23 List the main requirements of slide ways in a CNC system. (CO-1)  
Q.24 Explain the types of slide ways used in CC machines. (CO-1)  
Q.25 Write the main guidelines to be followed in the management of a tool room. (CO-3)

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- Q.26 What are the main advantages of LVDT? (CO-6)  
Q.27 What is subroutine? Discuss its importance. (CO-7)  
Q.28 List the main activities performed by a programmer in making a part program. (CO-2)  
Q.29 Explain cutter radius compensation. (CO-7)  
Q.30 What are the common problems found in mechanical components of a CNC machines? (CO-5)  
Q.31 What is the use of oscilloscope in CNC machines? Give the name of its types. (CO-5)  
Q.32 Explain briefly on-line diagnostic. (CO-6)  
Q.33 What is FMS? What are its main components? (CO-6)  
Q.34 What is a robot? Explain in detail the various types of motions and joints in robots. (CO-6)  
Q.35 What are the main components of robot? Explain. (CO-6)

### SECTION-D

- Note:** Long Answer type question. Attempt any two questions. (2x10=20)
- Q.36 What are the input media that can be used to feed data or programs in NC machines? Write the advantages and disadvantages of each. (CO-1)  
Q.37 What are sensors? What are the main components, characteristics and factors considered in selecting a sensor? Explain the classification of sensors also. (CO-1)  
Q.38 Explain canned cycle with an example. (CO-2,07)
- Note :** Course Outcome (CO) mentioned in the question paper is for official purpose only

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### SECTION-A

- Note:** Multiple choice questions. All questions are compulsory (10x1=10)
- Q.1 Which of the following are not components of flexible Tooling:  
a) Tool magazine  
b) Tool changing mechanism  
c) Encoder  
d) Work holder
- Q.2 Part programming mistakes can be avoided in :  
a) NC machine tool b) CNC machine tool  
c) Both (a) and (b) d) None of the above
- Q.3 For increasing the productivity CNC system can be interfaced with:  
a) CAD/CAM b) DNC  
c) FMS d) All of these
- Q.4 In modern CNC machine tool the backlash has been eliminated by:  
a) Pre loaded ball screws  
b) Slider crank mechanism  
c) Rack and pinion  
d) Ratchet and pinion

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- Q.5 Which of the following code will give XY plane selection  
a) G17 b) G18  
c) G19 d) G20
- Q.6 M-codes are also known as :  
a) Model codes b) Spindle speed codes  
c) Machine codes d) Miscellaneous codes
- Q.7 Which is the Tool material property on the basis of cutting tool material  
a) Solid b) Brazed  
c) Diamond d) Inserted Bit
- Q.8 Problems in electrical components are :  
a) Cylinder b) Piston  
c) Valve d) Solenoids
- Q.9 Which of the following code is used in programming in absolute co-ordinates ?  
a) G90 b) G91  
c) G01 d) G02
- Q.10 \_\_\_\_\_ is not a type of NC program reader :  
a) Punched tape reader  
b) Laser tape reader  
c) Card reader  
d) Mechanical tape reader

### SECTION-B

- Note:** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 Name two input devices of CNC machine.
- Q.12 Expand ATC.

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- Q.13 Function of Tachometer.  
Q.14 A motor used in control with feedback is \_\_\_\_\_  
Q.15 Optical readers use \_\_\_\_\_ for light sensing.  
Q.16 The function of feedback system is to record the data from the sensor and compare it with output data. (True/ False).  
Q.17 The punch tape reader in CNC machine is \_\_\_\_\_  
Q.18 Expand CBN.  
Q.19 BCD stands for \_\_\_\_\_  
Q.20 Define transducer.

### SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Explain close loop control system.  
Q.22 Discuss any two swarf removal method in CNC machine.  
Q.23 What are the advantages of stepper motor ?  
Q.24 Distinguish between G-codes and M-codes  
Q.25 Explain the different fault finding techniques  
Q.26 Write a finishing cut program of step turning.  
Q.27 Differentiate between point to point and continuous path motion of a robot.  
Q.28 Describe the term G.T. Explain part families.  
Q.29 Define advantages and limitation of LVDT.  
Q.30 Write a short note on opto interrupt.  
Q.31 Define part programming.  
Q.32 Explain automated guided vehicles.  
Q.33 Write the components of FMS.

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- Q.34 Define five types of joints in robot  
Q.35 Explain work volume in robots.

### SECTION-D

- Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)
- Q.36 Explain working of CNC system with the help of block diagram.  
Q.37 Explain different types of automation along with advantages and limitations  
Q.38 What is a sensor ? Name different types of sensors. Explain any five.

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5th Sem. / Mechanical Engg./ Mech. (Prod.)/  
Mechatronics/ CAD/ CAM

Subject : Theory of Machines

Time : 3 Hrs.

M.M. : 100

### SECTION-A

**Note:** Objective type questions. All questions are compulsory (10x1=10)

- Q.1 When one of the links of a kinematic chain is fixed, the chain is known as \_\_\_\_\_. (CO-1)  
Q.2 Elliptical trammel is used for drawing \_\_\_\_\_. (CO-1)  
Q.3 \_\_\_\_\_ is the ratio of the pitch circle diameter to the number of teeth. (CO-4)  
Q.4 The difference between the maximum and minimum speeds during a cycle is called the \_\_\_\_\_. (CO-5)  
Q.5 Watt governor is a type of \_\_\_\_\_ governor. (CO-6)  
Q.6 The follower in which the contacting end is a roller is called as \_\_\_\_\_. (CO-7)  
Q.7 The interval of time taken by the motion to

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repeat itself is called a \_\_\_\_\_. (CO-9)

- Q.8 When the system vibrates under the influence of external force, the vibrations are said to be \_\_\_\_\_ vibrations. (CO-9)  
Q.9 When the particles of a shaft or disc moves in a circle about the axis of the shaft then the vibrations are said to be \_\_\_\_\_ vibrations. (CO-9)

- Q.10 Watt indicator mechanism is an inversion of \_\_\_\_\_. (CO-1)

### SECTION-B

**Note:** Very short answer type questions. Attempt any ten questions out of twelve questions. 10x2=20

- Q.11 Define resistant body. (CO-1)  
Q.12 Define lower pair. (CO-1)  
Q.13 State inversion of mechanism. (CO-1)  
Q.14 Define slip of belt. (CO-2)  
Q.15 Define addendum of a gear. (CO-4)  
Q.16 Define pressure angle of a gear. (CO-4)  
Q.17 Define centrifugal governor. (CO-6)  
Q.18 What do you understand by isochronism of a governor. (CO-6)

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- Q.19 State angle of dwell of a cam. (CO-7)  
Q.20 Define offset follower. (CO-7)  
Q.21 Name two types of cams. (CO-7)  
Q.22 Define frequency of vibrations. (CO-9)

### SECTION-C

**Note:** Short answer type questions. Attempt any five questions out of ten questions. 5x8=40

- Q.23 Define theory of machine and its branches. (CO-1)  
Q.24 Define kinematic chain and name types of kinematic chains. (CO-1)  
Q.25 Describe simple gear train with neat diagram. (CO-4)  
Q.26 Explain turning moment diagram for four stroke petrol engine. (CO-5)  
Q.27 Explain the principle of flywheel. (CO-5)  
Q.28 What do you understand by the hunting of a governor. (CO-6)  
Q.29 Discuss working of Watt's governor. (CO-6)  
Q.30 Define the cam. How it works? (CO-7)  
Q.31 Explain types of free vibrations. (CO-9)  
Q.32 Write note on vibration damping. (CO-9)

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### SECTION-D

**Note:** Long answer type questions. Attempt any three questions out of four questions. 3x10=30

- Q.33 Discuss in details any two inversions of a double slider crank chain mechanism with the help of neat sketches. (CO-1)  
Q.34 Drive an expression for the ratio of driving tensions for a flat belt drive. (CO-3)  
Q.35 Explain the construction and working of Hartnell governor with the help of neat diagram. (CO-6)  
Q.36 Draw the displacement diagram for a cam, rotating clockwise with simple harmonic motion to give a knife edge follower, at the end of a valve rod, motion describe below: (CO-7)  
a) To raise the valve through 50 mm during 120° rotation of cam.  
b) To keep the valve fully raised through next 30°.  
c) To lower the valve during next 60°.  
d) To keep the valve closed during rest of the revolution.

**Note :** Course outcome (CO) mentioned in the question paper is for official purpose only.

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## 5th Sem. / Mechanical Engg

## Subject : Theory of Machines

Time : 3 Hrs.

M.M. : 100

## SECTION-A

**Note:** Multiple choice Questions. All questions are compulsory  
(10x1=10)

(Course Outcome/CO)

- Q.1 The distance between the corresponding points on adjacent teeth measured on the pitch circle is called \_\_\_\_\_ (CO-3)  
 a) helical pitch      b) normal pitch  
 c) gear pitch      d) circular pitch
- Q.2 A simple mechanism has..... (CO-1)  
 a) 4 links      b) 2 links  
 c) 1 links      d) 3 links
- Q.3 Governor is used in automobile to..... (CO-4)  
 a) decrease the variation of speed  
 b) to control  $\delta N/\delta t$   
 c) to control  $\delta N$       d) none of the above
- Q.4 Crowning on pulleys helps..... (CO-2)  
 a) in increasing velocity ratio  
 b) in decreasing the slip of the belt  
 c) for automatic adjustment of belt position so that belt runs centrally  
 d) increase belt and pulley life

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- Q.5 Elements of pairs held together mechanically is known as..... (CO-1)  
 a) closed pair      b) open pair  
 c) mechanical pair      d) rolling pair
- Q.6 A circle passing through the pitch point with its centre at the centre of cam axis is known as..... (CO-7)  
 a) pitch circle      b) base circle  
 c) prime circle      d) rolling pair
- Q.7 A governor is said to be isochronous when equilibrium speed of all radii of rotation of the balls with in the working range (CO-4)  
 a) Is constant      b) Varies uniformly  
 c) Is not constant  
 d) None of the mentioned
- Q.8 When there is a reduction in amplitude over every cycle of vibration, then the body is said to have (CO-8)  
 a) free vibration      b) damped vibration  
 c) forced vibration  
 d) none of the mentioned
- Q.9 In order to balance the reciprocating masses, (CO-9)  
 a) Primary forces and couples must be balanced  
 b) Secondary forces and couples must be balanced  
 c) Both (a) and (b)  
 d) None of these
- Q.10 A ball and a socket forms a (CO-1)  
 a) Turning pair      b) Rolling pair  
 c) Screw pair      d) Spherical pair

## SECTION-B

**Note:** Objective type questions. All questions are compulsory.  
10x1=10

- Q.11 The driving gear and smaller of a pair of mated gears is called \_\_\_\_\_ (CO-3)
- Q.12 A mechanism is an assemblage of.... (CO-1)
- Q.13 Creep in belt drive is due to..... (CO-2)

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- Q.14 Kinematic link is also known as \_\_\_\_\_. (CO-1)
- Q.15 A cam with a roller follower would constitute following type of pair..... (CO-1)
- Q.16 \_\_\_\_\_ governor is also called a Dead weight type governor. (CO-6)
- Q.17 The vibrations caused in a body under the influence of external force, are known as \_\_\_\_\_ vibrations. (CO-7)
- Q.18 In balancing of single-cylinder engine, the rotating unbalance is \_\_\_\_\_ (complete/incomplete) (CO-8)
- Q.19 A higher pair has \_\_\_\_\_ type of contact. (CO-1)
- Q.20 \_\_\_\_\_ gear is used for connecting two coplanar and intersecting shafts. (CO-3)

## SECTION-C

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. 12x5=60

- Q.21 Classify belt drive. (CO-2)
- Q.22 Enumerate the different between flywheel and governors. (CO-6)
- Q.23 Write short note on transverse vibrations. (CO-7)
- Q.24 Explain the working of quick return mechanism. (CO-1)
- Q.25 What are inversions? Explain (CO-1)
- Q.26 What are slip and creep in pulleys? (CO-2)
- Q.27 Draw and discuss the Turning-moment diagram of a four stroke engine. (CO-5)
- Q.28 Explain the hunting and sensitiveness of governor. (CO-6)
- Q.29 Discuss harmful effects of vibrations. (CO-7)
- Q.30 Explain the hunting and sensitiveness of governor. (CO-1)
- Q.31 Two gears A & B having teeth of 100 and 200. If the gear A is rotating in clockwise direction at 26 RPM, what will

- be the speed and direction of gear B. (CO-3)
- Q.32 Explain the displacement diagram of CAM, with uniform acceleration (CO-5)
- Q.33 What is the role of centrifugal tension in Pulleys. Give its formula. (CO-2)
- Q.34 Draw labeled sketch of spur gear showing 5 items (CO-3)
- Q.35 Explain static balancing (CO-8)

## SECTION-D

**Note:** Long answer type questions. Attempt any two out of three questions. 2x10=20

- Q.36 Draw and explain different types of CAM and follower with simple line diagram. (CO-5)
- Q.37 An open belt transmits 2.5 KW of power. The linear velocity of the belt is 2.5 m/sec. The angle of lap on the smaller pulley is 165°. The Coefficient of friction is 0.3. Determine the change in power transmission if the initial tension in the belt is increased by 8% (CO-2)
- Q.38 A rotating mass  $m=220\text{kg}$  at radius,  $r=100\text{mm}$ , is to be balanced by two masses A and B at radius of 200mm each separated by a distance of 50 cm on both side of the mass. Calculate the values of A and B. (CO-8)

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### SECTION-A

- Note : Multiple choice questions. All questions are compulsory. (10x1=10)
- Q.1 In the higher pairs, there is (CO-1)  
a) A surface contact b) A line contact  
c) A sliding contact d) None of the above
- Q.2 A railway bridge is a (CO-1)  
a) Structure b) Mechanism  
c) Machine d) None of the above
- Q.3 The crowning height of the pulley is generally kept as (CO-7)  
a) 1/120 of pulley width  
b) 1/96 of pulley width  
c) 1/48 of pulley width  
d) 1/24 of pulley width
- Q.4 The pulley and belt in belt drive act as (CO-3)  
a) Cylindrical pair b) Rolling pair  
c) Turning pair d) None of the above

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- Q.5 The gears used to connect two intersecting co-planer shafts are (CO-3)  
a) Straight spur gear b) Straight bevel gears  
c) Spiral gears d) None of the above
- Q.6 The equation of rotation is (CO-5)  
a)  $T=Iw$  b)  $T=mk^2$   
c)  $T=rw$  d)  $T=la$
- Q.7 With the increases of governor speed (CO-6)  
a) Radius of rotation and height of governor increase.  
b) Radius of rotation and height of governor decrease.  
c) Radius of rotation decreases, but height of governor increases.  
d) Radius of rotation increases, but height of governor decreases.
- Q.8 According to the surface in contact, the follower are (CO-7)  
a) Knife edge follower b) Roller follower  
c) Flat faced follower d) All of the above
- Q.9 Unbalance in rotating part may be due to (CO-8)  
a) un-machined portion of casting  
b) lack of homogeneity in the material  
c) non symmetry of parts  
d) all of the above

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- Q.10 If the balls of a governor have same speed for all radii of rotation it is said to be. (CO-1)  
a) Isochronous b) Sensitive  
c) Stable d) Hunting

### SECTION-B

- Note : Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 Define inversion of mechanism. (CO-1)
- Q.12 What is addendum of a gear. (CO-4)
- Q.13 What is pressure angle of a gear. (CO-4)
- Q.14 Name two types of governors. (CO-6)
- Q.15 What do you understand by isochronisms of a governor. (CO-6)
- Q.16 State angle of dwell of a cam. (CO-7)
- Q.17 Name any two type of cams. (CO-7)
- Q.18 What is creep of belt. (CO-3)
- Q.19 What is coefficient of fluctuation of energy. (CO-5)
- Q.20 Define damped vibrations. (CO-9)

### SECTION-C

- Note : Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Define theory of machine and its branches. (CO-1)
- Q.22 Describe simple gear train with neat diagram. (CO-4)
- Q.23 Explain turning moment diagram for four stroke petrol engine. (CO-5)
- Q.24 Why is rim type of fly wheel preferred over disc type? (CO-5)
- Q.25 Discuss working of watt's Governor. (CO-6)

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- Q.26 Define the cam and its practical applications. (CO-7)
- Q.27 Explain different types of free vibrations. (CO-9)
- Q.28 Define any one application of four bar chain with the help of neat sketches. (CO-1)
- Q.29 What are the advantages of V-Belts over the Flat Belts. (CO-4)
- Q.30 Define sensitiveness of governor. (CO-6)
- Q.31 Differentiate between fly wheel and governor. (CO-6)
- Q.32 Classify the followers. (CO-7)
- Q.33 Differentiate between static balancing and dynamic balancing. (CO-8)
- Q.34 What are the causes of vibrations. (CO-1)
- Q.35 Calculate vertical height of a watt governor when it rotates at 60 rpm. Also find the change in vertical height when its speed increases to 75 rpm. (CO-4)

### SECTION-D

- Note : Long Answer type question. Attempt any two questions. (2x10=20)
- Q.36 Drive an expression for the ratio of driving tensions for a flat belt drive. (CO-3)
- Q.37 Explain the construction and working of Hartnell governor with the help of neat diagram. (CO-6)
- Q.38 An engine fly wheel has a mass of 6 tones and the radius of gyration is 1.75m. If the maximum and minimum speeds are 120 rpm and 115 rpm respectively. Find the maximum fluctuation of energy. (CO-4)

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Semester : 5 th

Branch :Mech, Prod, Mecatronics (4th Sem),  
CAD/CAM, Mech Engg (Fabrication Tech)

Mechanical Engg. (CAD/CAM Design & Robotics)

Time : 3Hrs. Subject:- Theory of Machines M.M. : 100

### SECTION-A

Note: Multiple choice questions. All questions are compulsory  
(10x1=10)

Q.1 For a kinematic chain which relation is true.

- a)  $L=2P-4$
- b)  $L=2P+4$
- c)  $L=P-4$
- d) None

Q.2 The value of contact ratio for gears is

- a) Less than unity
- b) More than unity
- c) Unity
- d) None

Q.3 Value of gears train is

- a) Always less than unity
- b) Always greater than unity
- c) Equal to reciprocal of speed ratio of gear train
- d) Equal to speed ratio of gear train

Q.4 Energy is stored in a flywheel by virtue of its

- a) Heavy mass
- b) Large diameter
- c) High speed
- d) Heavy mass and slow speed

Q.5 A hunting governor is

- a) More stable
- b) Less sensitive
- c) More sensitive
- d) None of the above

Q.6 The cam follower generally used in automobile industry is

- a) Knit energy follower
- b) Flat faced follower

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- Q.15 Hartnell governor is a ..... type of governor.  
Q.16 When several masses rotate in a single plane and the resultant of all the centrifugal forces is Zero, the system is said to be .....  
Q.17 What is resonance ?  
Q.18 Theory of machine is mainly divided into ..... and .....  
Q.19 Angle of contact on the ..... diameter pulley is used in the tension ratio equation for the open belt drive.  
Q.20 Working depth of two mating gears is two times of module. (True/False)

### SECTION-C

- Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Explain crank and slotted lever quick return motion mechanism.  
Q.22 Explain Scotch Yoke mechanism.  
Q.23 Explain clearly the terms slip and creep as applied to belt drives.  
Q.24 Obtain an expression for power transmitted by a belt, Also obtain the condition for the max power transmitted by a belt  
Q.25 Enumerate various advantages of epi-cyclic gear train.  
Q.26 Explain turning moment diagram for a four stroke cycle I.C engine.  
Q.27 Compare flywheel and a governor.  
Q.28 In a watt governor the length of each arm is 300 mm and they are pivoted on the axis of rotation. Determine the height of governor and radii of rotation of the balls when the speed of governor is 80 rpm

- c) Spherical face follower
- d) Roller follower

Q.7 In order to have a complete balance of the several revolving masses in different planes

- a) The resultant force must be zero
- b) The resultant couple must be zero
- c) Both the resultant force and couple must be zero
- d) None of the above

Q.8 Identify the wrong statement

- a) Vibration in machine may be due to loose fitting and lack of balance
- b) Free vibration leave external force applied at the ends
- c) Force vibration are independent of the natural frequency of vibrations
- d) A vibration system is said to be stable if the amplitude of vibration decreases with time

Q.9 At pitch point in a cam the pressure angle is

- a) Maximum
- b) Minimum
- c) Zero
- d)  $90^\circ$

Q.10 The links of the structure transmit

- a) Focus Only
- b) Motion only
- c) Focus & Motion
- d) None of the above

### SECTION-B

Note: Objective type questions. All questions are compulsory.  
(10x1=10)

Q.11 What is a structure?

Q.12 What are miter gears ?

Q.13 What is diametral pitch, module and their relationship with circular pitch ?

Q.14 Flywheel in a four stroke engine is heavier than in the two stroke engine of the same power. (True/False)

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Q.29 Explain the method of balancing for static unbalanced loads.

Q.30 How will you proceed to balance several rotation masses in different planes ?

Q.31 What are causes of vibrations?

Q.32 What are remedies of vibrations?

Q.33 Give relations between the circular pitch, diameter pitch and module of a gear wheel

Q.34 Discuss the effect of initial belt tensions on the maximum power transmitted by the belt

Q.35 Define follower of CAM and different type of followers.

### SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 For a V-belt drive, derive the expression for tensions ratio of tight side and slack side.

Q.37 Flywheel of steam engine has a radius of gyration of 1.5m and mass 3500 Kg. the starting torque of steam engine is 1500 NM and may be assumed constant. Determine angular acceleration and kinetic energy of flywheel after 10 second from the start.

Q.38 Explain the balancing of different masses A,B,C,D, rotating at R1, R2, R3,R4 radius respectively in different planes at a distance L1,L2,L3 from plane A.

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**5th Sem. / Mechanical Engg. / Mech. (Prod.)  
/T&D / CAD / CAM / F&F**

**Subject : Workshop Technology - III**

Time : 3 Hrs.

M.M. : 100

### **SECTION-A**

**Note:** Objective questions. All questions are compulsory  
(10x1=10)

**(Course Outcome/CO)**

Q.1 Conventional milling is also known as \_\_\_\_\_.  
(CO-2)

Q.2 A dividing head is also called \_\_\_\_\_. (CO-5)

Q.3 In \_\_\_\_\_ milling, the cutting forces are directed downward. (CO-1)

Q.4 A single threaded hob generates \_\_\_\_\_ tooth in one revolution. (CO-6)

Q.5 Process of grinding a flat surface in a horizontal position is called \_\_\_\_\_. (CO-4)

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- Q.6 Process of material removal in the form of small chips with the help of rotating abrasive wheel is known as \_\_\_\_\_. (CO-3)
- Q.7 The full form of ECM is \_\_\_\_\_. (CO-7)
- Q.8 The LASER stands for \_\_\_\_\_. (CO-7)
- Q.9 In, plasma are machining, the electrodes are made up of \_\_\_\_\_. (CO-7)
- Q.10 \_\_\_\_\_ is a common method of spraying. (CO-8)

### **SECTION-B**

**Note:** Very Short answer type questions. Attempt any ten parts  
10x2=20

Q.11 Define milling. (CO-1)

Q.12 What is the use of T-slot milling cutter? (CO-5)

Q.13 Which natural abrasives are mainly used in grinding wheel? (CO-4)

Q.14 Define grade in connection with grinding wheel.  
(CO-3)

Q.15 Define gear hobbing? (CO-6)

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Q.16 What are main elements of electrochemical machining plant? (CO-7)

Q.27 How do you select a grinding wheel? (CO-4)

Q.17 Give two applications of PAM. (CO-7)

Q.28 Explain types of gear hobbing. (CO-6)

Q.18 Define MRR in electric discharge machining.  
(CO-5)

Q.29 What are the disadvantages of laser beam machining? (CO-7)

Q.19 Define electroplating. (CO-8)

Q.30 Explain the working principle of EDM. (CO-7)

Q.20 Define roughness. (CO-9)

Q.31 Explain the process of powder metal method of metal spraying. (CO-8)

Q.21 Name any two milling machine accessories.  
(CO-5)

Q.32 Write purposes of finishing surfaces. (CO-9)

Q.22 Name the types of lapping machines. (CO-9)

### **SECTION-D**

**Note:** Short answer type questions. Attempt any five questions.  
5x8=40

**Note:** Long answer type questions. Attempt any three questions.  
3x10=30

Q.23 Classify the milling machines. (CO-5)

Q.33 Explain any five milling operations. (CO-2)

Q.24 Explain straddle milling. (CO-2)

Q.34 Explain centreless grinding and cylindrical grinding in details. (CO-4)

Q.25 Name the work holding devices used on milling machine. (CO-5)

Q.35 Explain the principle, working, advantages and disadvantages of laser beam machining. (CO-7)

Q.26 What are the different types of grinding wheel?  
(CO-3)

Q.36 Explain honing process and types of honing machines. (CO-9)

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**(Note:** Course outcome/CO is for office use only)  
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5th Sem. / Mech./ Prod./ T&D/ CAD/ CAM/ F&F  
Subject : Workshop Technology-III

Time : 3 Hrs. M.M. : 100

**SECTION-A**

**Note:** Multiple choice Questions. All questions are compulsory (10x1=10)

(Course Outcome/CO)

- Q.1 Shaping can be performed more effectively by \_\_\_\_ milling machine (CO-2)  
a) horizontal b) vertical  
c) can't say anything d) none of the mentioned
- Q.2 The use of coatings on milling cutters will increase the \_\_\_\_ of the tool. (CO-5)  
a) Surface hardness  
b) Corrosion resistance  
c) Surface finish d) Melting point
- Q.3 Gear shaping is related to..... (CO-6)  
a) Template b) Form, tooth process  
c) Hob d) Generating
- Q.4 As the number of threads on the hob increases, it's accuracy\_\_\_\_ (CO-6)  
a) increases b) decreases  
c) remains same d) can't say

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- Q.5 Grinding wheel is specified as "A46 K 5 B 17". Grain size of a wheel will be (CO-4)  
a) Coarse b) Medium  
c) Fine d) Very Fine
- Q.6 Most cylindrical grinding include a \_\_\_\_ to allow the forming of tapered piece. (CO-4)  
a) Grinding dog b) Swivel  
c) Center driver d) None of the above
- Q.7 Non-Traditional machine can also be called as (CO-7)  
a) Non-contact machining  
b) Contact Machining  
c) Partial contact machining  
d) Half contact machining
- Q.8 The method of immersing a material into a molten bath for coating is known as \_\_\_\_ (CO-8)  
a) Electroplating b) Cladding  
c) Hot dipping d) Cementation
- Q.9 Which of the following is a surface finishing operation? (CO-9)  
a) Drilling b) Honing  
c) Milling d) Turning
- Q.10 Which of the following process have the lowest metal removal rate? (CO-9)  
a) Drilling b) Reaming  
c) Milling d) Honing

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**SECTION-B**

**Note:** Objective type questions. All questions are compulsory. 10x1=10

- Q.11 Define conventional milling. (CO-2)  
Q.12 Define face of milling cutter. (CO-2)  
Q.13 Write application of hobbing. (CO-6)  
Q.14 Define gear shaving. (CO-6)  
Q.15 Define grinding. (CO-3)  
Q.16 Define truing of grinding wheel. (CO-4)  
Q.17 Define super finishing. (CO-9)  
Q.18 Define deburring (CO-8)  
Q.19 Give the two purposes of coolant in honing process. (CO-6)  
Q.20 Name a method used for measurement of surface roughness. (CO-9)

**SECTION-C**

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. 12x5=60

- Q.21 Give classification of milling machines based on different basis. (CO-2)  
Q.22 Explain the principle of working of a milling machine. (CO-2)  
Q.23 Explain straddle milling. (CO-2)  
Q.24 Write the names of different milling cutters describe anyone. (CO-5)  
Q.25 Explain the process of gear hobbing (CO-6)  
Q.26 Write a short on gear shaping. (CO-6)

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- Q.27 Explain mounting of grinding wheel. (CO-4)  
Q.28 What is the function of abrasives in a grinding wheel. Name any two types Of abrasives used in grinding wheels. (CO-4)  
Q.29 State the function of dielectric fluids used in EDM processes. (CO-7)
- Q.30 What are the main advantages and disadvantages of electrochemical machining. (CO-7)  
Q.31 Explain the process of Powder coating. (CO-8)  
Q.32 Give a few applications of metal spraying processes. (CO-8)  
Q.33 What is buffing process? Give purposes and applications of buffing process. (CO-9)  
Q.34 What is lapping process? Give types of lapping operations. (CO-9)  
Q.35 Give the main purposes of metal finishing process. (CO-9)

**SECTION-D**

**Note:** Long answer type questions. Attempt any two out of three questions. 2x10=20

- Q.36 Explain any five different operation performed on a milling machine with neat sketch. (CO-5)  
Q.37 Explain the principle of USM with neat sketch and write the four advantages & disadvantages. (CO-7)  
Q.38 Explain centre less grinding and cylindrical grinding in details. (CO-4)

**Note:** Course Outcome (CO) mentioned in the question paper is for official purpose only.

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### SECTION-A

- Note :** Multiple choice questions. All questions are compulsory. (10x1=10)
- Q.1 Removal of metal by feeding work against a rotating cutter is called. (CO-02)  
a) Shaping      b) Milling  
c) Turning      d) None of the above
- Q.2 Gears can be cut easily on. (CO-06)  
a) Lathe      b) Drilling  
c) Milling machine      d) None of the above
- Q.3 Which of the following is a gear finishing process? (CO-06)  
a) Lapping      b) Gear hobbing  
c) Gear shaping      d) All of the above
- Q.4 Grinding operation is used for. (CO-04)  
a) Dressing      b) Finishing  
c) Planning      d) None of the above
- Q.5 While specifying a wheel, grain size is indicated by. (CO-04)  
a) Numbers      b) Symbols  
c) Alphabets      d) None of the above

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- Q.6 Which machine needs jet of high temperature ionized gas? (CO-07)  
a) EBM      b) LBM  
c) EDM      d) PAM
- Q.7 The process of providing a thin layer of zinc coating on iron and steel is called. (CO-08)  
a) Electroplating      b) Cementation  
c) Metal cladding      d) Galvanising
- Q.8 In electro planting, the work piece act as. (CO-08)  
a) Anode      b) Cathode  
c) Neutral      d) None of the above
- Q.9 Which of the following material may be used for the body of lap? (CO-09)  
a) Lead      b) Copper  
c) Soft cast iron      d) All of the above
- Q.10 Ultrasonic machining is based upon. (CO-07)  
a) Uniform machining  
b) Uniform grinding  
c) Uniform heating  
d) Vibrational waves of high frequency

### SECTION-B

- Note :** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 What is ideal surface. (CO-09)
- Q.12 What is descaling. (CO-08)

- Q.13 The full form of USM. (CO-07)  
Q.14 What is grinding wheel. (CO-04)  
Q.15 Name different type of hobbing. (CO-06)  
Q.16 What is Module. (CO-06)  
Q.17 What is fillet. (CO-07)  
Q.18 Conventional milling is also known as \_\_\_\_\_. (CO-02)  
Q.19 What is gang milling. (CO-02)  
Q.20 What is milling cutter. (CO-02)

### SECTION-C

- Note :** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 What are the purposes of supplying abrasive slurry in ultra-sonic machine. (CO-07)  
Q.22 Write the application of laser beam machining. (CO-07)  
Q.23 Define surface grinding. (CO-04)  
Q.24 Explain balancing of grinding wheels. (CO-04)  
Q.25 Write the advantage of milling machine. (CO-02)  
Q.26 Define any two milling cutter. (CO-02)  
Q.27 Define the different type of gear. (CO-06)  
Q.28 Define gear shaping. (CO-06)  
Q.29 Explain galvanising with the help of neat sketch. (CO-08)

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- Q.30 Define the process of powder coating. (CO-08)  
Q.31 Write the application of polishing. (CO-09)  
Q.32 Define hand lapping. (CO-09)  
Q.33 Define surface roughness measurement method (CO-09)  
Q.34 Define offset milling machine. (CO-02)  
Q.35 Write the application honing process. (CO-07)

### SECTION-D

- Note :** Long Answer type question. Attempt any two questions. (2x10=20)
- Q.36 Explain any four milling operation. (CO-02)  
Q.37 Explain cylindrical grinding machine with the help of neat sketch. (CO-04)  
Q.38 Explain the principle and process of electric discharge machine. (CO-07)

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 Roll No. .... /121753/031753  
 Semester : 5 th  
 Branch : Mechanical/Prock, T&D, CNC, CAD, CAM  
 Found & Forg. Mech. Engg (Fabrication Tech)  
 Mechanical Engg. (CAD/CAM Design & Robotics)  
 Subject:- Working Technology-III

Time : 3Hrs. M.M. : 100

### SECTION-A

- Note:** Multiple choice questions. All questions are compulsory (10x1=10)
- Q.1 Specification of the wheel grain size is indicated by (CO3)  
 a) Numbers b) Symbols  
 c) Alphabets d) None of these
- Q.2 Radial distance between the addendum circle and pitch circle is called (CO2)  
 a) Addendum b) Basic circle  
 c) Face d) Flank
- Q.3 Which is not a chemical machining process (CO4)  
 a) Chemical milling b) Chemical engraving  
 c) Buffing d) Chemical blanking
- Q.4 The process metal removal which utilizes an ionized stream of a gas jet by an (CO4)  
 a) Plasma arc machining  
 b) Chemical machining  
 c) Abrasive jet machining  
 d) None of these
- Q.5 Milling cutter is a (CO1)  
 a) Single point cutting tool  
 b) Multi point cutting tool

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- c) Single bit cutting tool  
 d) None of the above
- Q.6 In a vertical milling machine the spindle axis is (CO1)  
 a) Horizontal b) Vertical  
 c) Inclined d) None of the above
- Q.7 The smaller of two mating gears is called (CO2)  
 a) Rack b) Pinion  
 c) Small gear d) Small wheel
- Q.8 ..... Operation is the process of improving cutting action of a grinding wheel (CO3)  
 a) Facing b) Dressing  
 c) Truing d) None of these
- Q.9 The tool used in electro-chemical machining acts as (CO4)  
 a) Anode b) Cathode  
 c) Any of above d) None of the above
- Q.10 The process of providing a thin layer of zinc coating on iron and steel is called (CO5)  
 a) Electroplating b) Cementation  
 c) Metal cladding d) Galvanizing

### SECTION-B

- Note:** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11 The spindle in a horizontal milling machine is (vertical/horizontal) (CO1)

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- Q.12 A dividing head is also known as \_\_\_\_\_ (CO1)  
 Q.13 Define module (CO2)  
 Q.14 Name different types of hobbling. (CO2)  
 Q.15 The process of grinding a flat surface in a horizontal position is called \_\_\_\_\_ (CO3)  
 Q.16 The full form of USM is (CO4)  
 Q.17 The dielectric fluid used in electric discharge machining should have high electric strength (True/False) (CO4)  
 Q.18 Two types of powder coating are \_\_\_\_\_ and (CO5)  
 Q.19 Anodizing coating is generally used for \_\_\_\_\_ (aluminum/copper) (CO5)  
 Q.20 Material removed in buffing is \_\_\_\_\_ (almost nil/high) (CO6)

### SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Comparison between conventional milling and climb milling (CO1)  
 Q.22 Name different types of milling cutters. (CO1)  
 Q.23 Define the following (CO2)  
 (a) Pitch circle (b) Addendum  
 (c) Fillet (d) Pitch point
- Q.24 Write the precautions in the production of gears. (CO2)
- Q.25 Write the advantages of Hobbing (CO2)

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- Q.26 Name different bonds used in manufacturing of grinding wheels. (Co3)  
 Q.27 Explain surface grinding (CO3)  
 Q.28 Write the properties of dielectric fluid used in electric discharge machining. (CO4)  
 Q.29 Write the applications of ultrasonic machining (CO4)  
 Q.30 Write the advantages of plasma arc machining (CO4)  
 Q.31 Why is surface treatment needed ? (CO5)  
 Q.32 What is galvanizing. Explain in short. (CO5)  
 Q.33 What is the purpose of finishing surfaces ? (CO6)  
 Q.34 Explain the process of honing ? (CO6)  
 Q.35 What is the polishing and write the purpose of polishing (CO6)

### SECTION-D

- Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)
- Q.36 Explain principle parts of a knee and column type milling machine with neat diagram (CO1)  
 Q.37 Explain any four gear finishing processes in detail (CO2)  
 Q.38 Explain the principle and process of electro chemical machining (CO4)

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**5th Sem. / Mechanical Engg.**

**Subject : Refrigeration and Air Conditioning**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Objectives questions. All questions are compulsory (10x1=10)

(Course Outcome/CO)

- Q.1 Write the SI unit of refrigeration effect. (CO-1)  
Q.2 Define refrigeration. (CO-1)  
Q.3 One TON of refrigeration is equal to \_\_\_\_\_ (CO-1)  
Q.4 C.O.P of domestic air conditioner as compared to that of domestic refrigerator is..... (CO-2)  
Q.5 Name the basic processes of vapour compression refrigeration system. (CO-2)  
Q.6 Why is ammonia used in food refrigeration. (CO-2)  
Q.7 Throttle valve are used in..... (CO-2)

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Q.8 Name the refrigerant used in window air conditioner is..... (CO-3)

Q.9 Air conditioning is used to..... (CO-8)

Q.10 Define Dry Air. (CO-6)

**SECTION-B**

**Note:** Very Short answer type questions. Attempt any ten parts 10x2=20

- Q.11 Define secondary refrigerants (CO-3)  
Q.12 Name any two primary refrigerants. (CO-3)  
Q.13 Define Electrolux refrigeration system. (CO-3)  
Q.14 Define Humidification. (CO-4)  
Q.15 Name two types of rotary compressor. (CO-5)  
Q.16 What is expansion valve? (CO-5)  
Q.17 Define screw compressor. (CO-5)  
Q.18 Define hand operated expansion valve. (CO-5)  
Q.19 Define humidity ratio (CO-6)  
Q.20 Define saturated air. (CO-6)  
Q.21 Define Dry bulb temperature. (CO-6)  
Q.22 What is Psychrometric chart? (CO-7)

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**SECTION-C**

**Note:** Short answer type questions. Attempt any five questions. 8x5=40

- Q.23 A refrigerating system operates on reversed Carnot cycle between temp. 25°C and -5°C Determine C.P.O of the system. (CO-1)  
Q.24 Write the principle of vapour compression refrigeration system. (CO-2)  
Q.25 What is the effect of superheating the suction vapour on the performance of a vapour compression system? (CO-2)  
Q.26 Write down the properties of an Ideal refrigerant. (CO-3)  
Q.27 Write down the principle of Absorption refrigeration system. (CO-4)  
Q.28 Name different types of cooling towers. (CO-5)  
Q.29 Explain humidification and dehumidification. (CO-6)  
Q.30 Explain blast cooling. (CO-8)  
Q.31 Explain Psychrometric Chart. (CO-7)  
Q.32 Explain Sensible cooling. (CO-6)

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**SECTION-D**

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.33 Explain actual vapour compression refrigeration cycle. (CO-2)  
Q.34 Classify compressor and explain working of any one type in detail with suitable diagram. (CO-5)  
Q.35 Explain split type air conditioning system with suitable diagram. (CO-7)  
Q.36 Write short note on following  
a) Azeotrope  
b) Pressure enthalpy chart.  
c) Cooling Tower

**(Note:** Course outcome/CO is for office use only)

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**5th Sem. / Mechanical Engineering****Subject : Refrigeration And Air Conditioning**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Multiple choice Questions. All questions are compulsory  
(10x1=10)

(Course Outcome/CO)

- Q.1 The CO-efficient of performance of a domestic Air conditioner is: (CO-1)  
a) Equal to 1      b) less than 1  
c) more than 1      d) None of these
- Q.2 In a vapour compression refrigeration system, the heat is rejected to the environment by: (CO-1)  
a) evaporator      b) condenser  
c) compressor      d) receiver
- Q.3 The Refrigerant commonly used in Domestic Electrolux refrigeration system is: (CO-2)  
a) water      b) ammonia  
c) Freon      d) carbon-dioxide
- Q.4 The cooling medium used in forced draft cooling tower is: (CO-1)  
a) air only      b) water only  
c) air and water      d) None of these
- Q.5 The ratio of actual mass of water vapour in unit mass of Dry air to the mass of water vapour in the

same mass and pressure of dry air when it is saturated at the same temperature is known as:

(CO-6)

- a) Degree of Saturation
- b) Absolute Humidity
- c) Relative Humidity
- d) Humidity

Q.6 The amount of Heat required to change the state of a substance without change in temperature is known as: (CO-3)

- a) Sensible Heat      b) Latent Heat
- c) Enthalpy      d) Specific Heat

Q.7 Full form of DBT is: (CO-3)

- a) Dry Bulb Temp.      b) Dew Bulb Temp.
- c) Delta Bar Temp.      d) Dry Bar Temp.

Q.8 ISEER stands for (CO-5)

- a) International seasonal energy efficiency ratio
- b) Indian seasonal energy efficiency ratio
- c) Indian social energy efficiency ratio
- d) None of These

Q.9 The cylinder colour code of R134a is: (CO-7)

- a) Black      b) Silver
- c) Sky Blue      d) white

Q.10 The inclined straight uniformly spaced lines parallel to wet bulb temperature lines draw upto the saturation curve on a psychrometric chart represents: (CO-3)

- a) Enthalpy or Total Heat lines
- b) Dry bulb temp. lines
- c) Relative Humidity lines
- d) Dew Point Temp lines

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**SECTION-B**

**Note:** Objective type questions. All questions are compulsory. 10x1=10

- Q.11 Define Air Conditioning (CO-1)  
Q.12 Define One Ton of Refrigeration? (CO-1)  
Q.13 What is the effect of super heating the refrigerant? (CO-2)  
Q.14 What is the chemical name of R-22? (CO-7)  
Q.15 What is the condenser pressure of R134a? (CO-7)  
Q.16 Name two types of air cooled condensers. (CO-5)  
Q.17 What are Inorganic Refrigerants? (CO-4)  
Q.18 Define the Term Psychrometer? (CO-3)  
Q.19 Define Inverter Technology. (CO-5)  
Q.20 Define Sensible heating. (CO-6)

**SECTION-C**

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. 12x5=60

- Q.21 Explain Dry Ice refrigeration. (CO-1)  
Q.22 Write five properties of R717. (CO-4)  
Q.23 Explain Simple vapour absorption Refrigeration system. (CO-2)  
Q.24 Explain the working of Rotary Compressor. (CO-5)  
Q.25 Write down the function and various types of Compressors. (CO-7)  
Q.26 Explain the working of over load protector. (CO-7)  
Q.27 Define Saturated air Specific Humidity. (CO-3)  
Q.28 Write down 10 applications of Refrigeration. (CO-7)  
Q.29 Explain Sensible Heat Factor. (CO-3)  
Q.30 What is Steam Jet Refrigeration? How does it work? (CO-2)  
Q.31 Explain Window Air Conditioning. (CO-7)

Q.32 The temperature of saturated air at atmospheric pressure is recorded as 25°C. Calculate; (CO-6)

- i) Specific Humidity
- ii) Enthalpy per KG of dry air

Q.33 Explain the working of Automatic expansion valve. (CO-4)

Q.34 Explain the effect of sub cooling and super heating. (CO-2)

Q.35 A machine working on Carnot cycle operates between 310K and 265K. (CO-1)

Determine the C.O.P when it is operated as

- i) A refrigerating machine,
- ii) A heat Pump,
- iii) A heat Engine.

**SECTION-D**

**Note:** Long answer type questions. Attempt any two out of three questions. 2x10=20

- Q.36 Explain with the help of neat diagram theory and working of reciprocating compressor (CO-7)  
Q.37 Explain with the help of neat diagram Actual vapour compression refrigeration system. (CO-2)  
Q.38 Explain with the help of neat diagram Central Air conditioning system. (CO-5)

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5th Sem / Mechanical Engineering  
Subject : Refrigeration & Air-Conditioning

**Time : 3 Hrs.** **M.M. : 100**

**SECTION-A**

**Note:** Multiple choice questions. All questions are compulsory. (10x1=10)

- Q.1 Air refrigeration cycle is used in

  - Commercial Refrigerators
  - Domestic refrigerators
  - Gas liquefaction
  - Air Conditioning

Q.2 The ratio of high temperature to low temperature for reversed carnot refrigerator is 1.25. The C.O.P. will be.

  - 2
  - 3
  - 4
  - 5

Q.3 The co-efficient of performance of a domestic Air Conditioner is

  - Equal to 1
  - Less than 1
  - More than 1
  - None of these

Q.4 Sub cooling is a process of cooling the refrigerant in vapour compression system.

  - After compression
  - Before compression
  - Before throttling
  - After throttling

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- Q.5 Which of the following belong to the inorganic group of refrigerants?

  - Propylene
  - Ethane
  - Carbon dioxide
  - Propane

Q.6 Which of the following refrigerant has the lowest freezing point?

  - R-12
  - R-22
  - R-717
  - R-134a

Q.7 Vapour absorption system makes use of

  - Kinetics energy
  - Potential energy
  - Mechanical energy
  - Heat energy

Q.8 The natural convection air - cooled condenser are used in

  - Domestic refrigerators
  - Water coolers
  - Room air conditioners
  - All of these

Q.9 In ice plant ,the material of pipes used with primary refrigerant ammonia is

  - Copper
  - Brass
  - Aluminium
  - Iron and Steel

Q.10 A split air-conditioner does not have provision for

  - Re-circulation of Air
  - Ventilation of Air
  - Cleaning of Air
  - Exhaust of Air

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SECTION-B

**Note:** Objective type questions. All questions are compulsory. (10x1=10)

- Q.11 Define refrigerated system.

Q.12 Define one ton of refrigeration.

Q.13 Write the full form of C.O.P.

Q.14 What is the chemical name of R-717?

Q.15 What is the chemical formula of R-718?

Q.16 Define the term of Psychrometry.

Q.17 Define latent heat.

Q.18 Define metabolic rate for a human body.

Q.19 Name two types of water cooled condensers

Q.20 Give full form of D.P.T.

SECTION-C

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21 Explain liquid gas refrigeration.

Q.22 Write a short note on steam jet refrigeration system.

Q.23 Classify refrigerant.

Q.24 Write the functions compressor.

Q.25 Write five properties of R-134a.

Q.26 Write the advantages of Air-Conditioner.

Q.27 Explain the working of reciprocating Compressor.

- Q.28 Explain, in brief, Dry Bulb Temperature.
  - Q.29 Explain split Air Conditioning.
  - Q.30 Write the at least ten application of refrigeration.
  - Q.31 Explain the working of thermostat switch.
  - Q.32 Define saturated air specific humidity.
  - Q.33 Write the functions of expansion valves.
  - Q.34 Write the advantages of solar power refrigeration system.
  - Q.35 Explain the principle of vapour absorption system.

SECTION-D

**Note:** Long Answer type question. Attempt any two questions out of three questions. (2x10=20)

- Q.36 Explain with help of neat diagram theory and working of rotary compressor.

Q.37 Explain the construction and working of domestic electrolux refrigeration system with the help of neat sketch.

Q.38 Explain the principle parts of a simple vapour compression refrigeration system.

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No. of Printed Pages : 4 181752/171752/  
Roll No. .... 121752/031752

Semester : 5 th  
Branch : Mechanical  
Refrigeration and Air conditioning

Time : 3Hrs. M.M. : 100

## **SECTION-A**

**Note:** Multiple choice questions. All questions are compulsory (10x1=10)

- Q.1 TR equals to : (CO-1)  
 a) KJ/min      b) KJm/h  
 c) Kg/min.      d) No units

Q.2 In vapour compression refrigeration system, the condition of refrigerant before entering the compressor is: (CO1)  
 a) Superheated vapour b) Wet vapour  
 c) Dry saturated liquid d) None

Q.3 The condensing medium used in evaporative condenser is (CO-1)  
 a) Water only      b) Air only  
 c) Both air and water d) None of these

Q.4 An ideal refrigerant should have (CO-8)  
 a) High latent heat      b) Low latent heat  
 c) High boiling point d) None of these

Q.5 The chemical name of R-717 is : (CO-8)  
 a) Ethylene      b) Ammonia  
 c) Propane      d) Methane

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SECTION-B

**Note:** Objective type questions. All questions are compulsory. (10x1=10)

- |      |   |        |
|------|---|--------|
| Q.11 | Define secondary refrigerant                                | (CO-8) |
| Q.12 | Define refrigerant effect                                   | (CO-1) |
| Q.13 | What is humidity ratio ?                                    | (CO-3) |
| Q.14 | Define dehumidification                                     | (CO-4) |
| Q.15 | What is air conditioning                                    | (CO-1) |
| Q.16 | Define WBT  | (CO-3) |
| Q.17 | Define DPT  | (CO-3) |
| Q.18 | Define sensible heating                                     | (CO-4) |
| Q.19 | What is overload protector                                  | (CO-1) |
| Q.20 | Give the relation between COP of refrigerator and heat pump | (CO-1) |

SECTION-C

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21** What is superheating ? Explain its effect on COP of a refrigeration system. (CO-1)

**Q.22** Write short note on R-22 (CO8)

**Q.23** Explain briefly gas throttling refrigeration (CO-1)

**Q.24** Explain parts of simple vapour compression system using a diagram (CO-1)

**Q.25** Explain heating and humidification process on a psychrometric chart (CO-4)

**Q.26** Differentiate between vapour compression and vapour absorption refrigeration system. (CO-1)

**Q.27** Briefly explain star rating (CO-5)

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- Q.6 R-500 is : (CO8)

  - a) Azeotrope
  - b) Halo carbon refrigerant
  - c) Inorganic refrigerant
  - d) None of these

Q.7 Subcooling is cooling of liquid refrigerant in vapour compression refrigeration system (CO3)

  - a) Before compression b) After compression
  - c) Before throttling d) None of these

Q.8 The difference between dry bulb temperature and wet bulb temperature is known as : (CO-3)

  - a) Dew point depression
  - b) Dry bulb depression
  - c) Wet bulb depression
  - d) None of these

Q.9 Fluid used in Electrolux refrigerator is : (CO-1)

  - a) Water, ammonia, Hydrogen
  - b) Ammonia, Hydrogen
  - c) Water, Hydrogen
  - d) None of these

Q.10 More is the bypass factor of cooling coil (CO-4)

  - a) Lesser will be its efficiency
  - b) More will be efficiency
  - c) does not depend on by pass factor
  - d) None of these

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SECTION-C

**Q.28** Briefly explain the principle of vapour absorption system. (CO-1)

- Q.29** What are primary refrigerants ? Give any two examples (CO-8)

**Q.30** What is the function of analyzer used in vapour absorption systems. (CO-1)

**Q.31** What is sensible heat factor (SHF.) Explain briefly (CO4)

**Q.32** Explain the importance of psychrometry (CO-3)

**Q.33** Differentiate between air cooled and water cooled condenser. (CO-1)

**Q.34** What is Dalton's law of partial pressure ? (CO-3)

**Q.35** Explain the term relative humidity (CO-3)

### **SECTION-D**

**Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

- Q.36** What is condenser? What are its essential requirements? Explain shell and coil condenser (CO-1)

**Q.37** Explain the working of solar power refrigeration system with the help of a diagram. (CO-1)

**Q.38** What are the various types of lines in psychrometric charts ? Name and show in term in the chart (CO-6)

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