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5E1321

Roll No. _____ [Total No. of Pages : 2

5E1321

B.Tech. V Semester (Main) Examination, Nov. - 2019
ESC Mechanical Engg.
5ME3-01 Mechatronic Systems
(Common For ME,AE)

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(5×2=10)**

1. Describe the key elements of the Mechatronics system.
2. Consider an Electrical resistance strain gauge with a resistance of 100Ω and a gauge factor of 2.0. What is the change in resistance of the gauge when it is subjected to a strain of 0.001?
3. During a temperature measurement using bimetallic strips, an aluminium rod of 12 m length at 28°C expands. Calculate the expansion when the temperature changes from 0°C to 120°C? Assume the thermal expansion coefficient for aluminium as $25\times10^{-6}/^{o}C$.
4. Explain with diagram the working of PVDF tactile sensor.
5. Compare physical components of hydraulic and pneumatic system along with advantages and disadvantages?

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions **(4×10=40)**

1. Name and explain any two examples of sequential control systems.
2. Consider a parallel rectangular plate air - spaced capacitor of 30×20 cm^2 and the distance between the plates is 1.2 mm. If the relative permittivity for air is 1.006. Calculate the displacement sensitivity of the device by neglecting the displacement of the central plate. Assume permittivity of the plates as 8.854×10^{12} F/m.

3. Develop an op - amp circuit that can provide an output related to the input voltage by $V_0 = 5.5V_1+10V_2+4$.

4. A negative feed back closed - loop system was subjected to 10 V and the system has a forward gain of 2 and feedback gain of 0.5. Determine (a) the output voltage (b) the error voltage. It is given that G(s) = 2, H(s) = 0.5 and R(s) = 10V.

5. Explain the principle of the brushless D.C. permanent magnet motor.

6. Describe in detail with diagrams, various pressure sensors and temperature sensors.

Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions **(2×15=30)**

1. Derive the relationship between the height h_1,h_2 and time for the hydraulic system shown in Figure 1 given below. Neglect inertance.

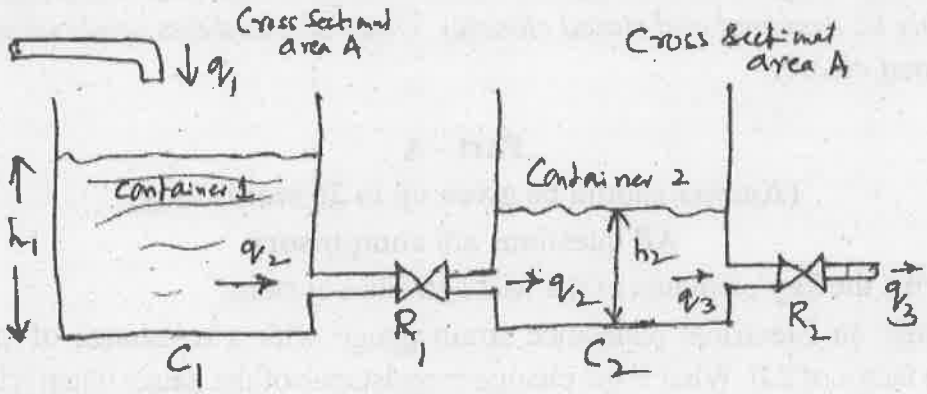

Figure 1

2. Explain the factors influence to design the Mechatronics system with one practical Example.

3. a) Explain for a microprocessor, the roles of **(4)**

   i) Accumulator

   ii) Status

   iii) Memory address

   iv) Program counter registers

   b) Draw a block diagram of a basic micro controller and explain the function of each subsystem. **(6)**

   c) What are various electrical Actuators Describe any four of them. **(5)**

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5E1322

Roll No. _____ [Total No. of Pages : 3

5E1322

B.Tech. V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME4-02 : Heat Transfer
(Common For ME,AE)

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** question out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

1. Heat Transfer Data Book

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. What is heat transfer?
2. Convective heat transfer depends on which factors?
3. Explain Newton's law of cooling.
4. Write formula for radiation heat transfer between two surfaces.
5. Classify heat exchangers.
6. Write formula of LMTD for counter flow heat exchanger.
7. Construct the pool boiling curve.
8. What is drop wise condensation?
9. Construct the black body.
10. What is shape factor?

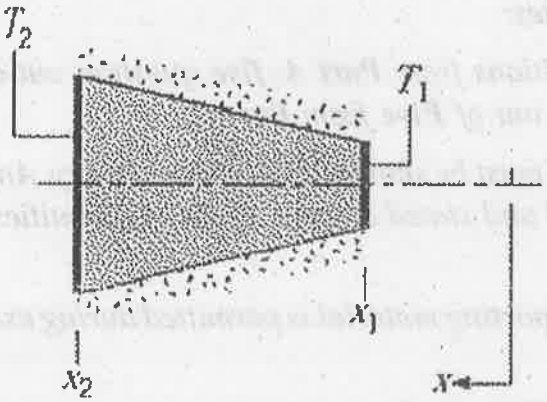
Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. Explain the basic principle of the conduction, convection and radiation.

2. The diagram shows a conical section fabricated from Pyroceram (k = 3.46 W/m K). It is of circular cross section with the diameter D = ax, where a = 0.25. The small end is at x_1 = 50 mm and the large end at x_2 = 250 mm. The end temperature are T_1 = 400 K and T_2 = 600 K, while the lateral surface is well insulated.



   a) Derive an expression for the temperature distribution T(x) in symbolic form, assuming one - dimensional conditions. Sketch the temperature distribution.

   b) Calculate the heat rate q_x through the cone.

3. Derive an expression and explain the critical radius of insulation for a long cylinder.

4. A person sits in a room with surrounding air at 26°C and convection coefficient over the body surface is 6 W/m²K. The walls in the room are at 5°C as the outside temperature is below freezing. If the body temperature is 37°C, determine the heat losses by convection and radiation. Assume F = 1.0 for radiation. Consider a surface area of 0.8m².

5. Define Nusselt, Reynold's Prandtl and Stanton number. Explain their significance in forced convection.

6. What is fin? Derive an expression of fin efficiency for an extended rectangular fin.

7. State and explain Planck's distribution law of radiation.

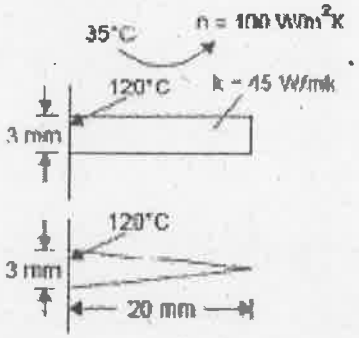
Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

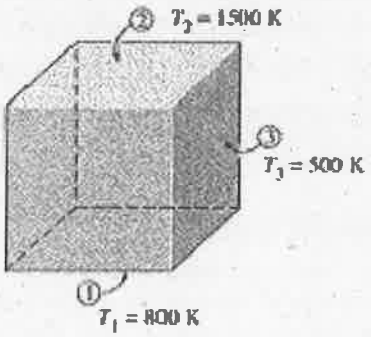
Attempt any **Four** questions **(4×15=60)**

1. Derive an expression of conduction equation for the cylindrical coordinates.
2. Determine the heat flow for
   (i) rectangular fins and
   (ii) triangular fin of 20 mm length and 3 mm base thickness.

   Thermal conductivity = 45 W/mK. Convection coefficient = 100 W/m^{2}K, base temperature = 120°C surrounding fluid temperature = 35°C. Determine also the fin effectiveness (using the charts).



3. Derive an expression for effectiveness of counter flow heat exchanger and show its temperature distribution.
4. Explain the film wise and drop wise condensation with neat sketch.
5. Consider the 5 m× 5 m × 5 m cubical furnace (shown in Figure), whose surfaces closely approximate black surfaces. The base, top, and side surfaces of the furnace are maintained at uniform temperatures of 800 K, 1500 K, and 500 K, respectively. Determine :
   a) the net rate of radiation heat transfer between the base and the side surfaces,
   b) the net rate of radiation heat transfer between the base and the top surface, and
   c) the net radiation heat transfer from the base surface.



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5E1323

Roll No. _____ [Total No. of Pages : 2

5E1323

B.Tech. V Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME4-03: Manufacturing Technology
Common For ME, AE

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

Answer should be given up to **25** words only. **All** questions are **compulsory.** **(10×2=20)**

1. How are the cutting tools classified?
2. What are the popular tool designation systems in common use?
3. What is built - up - edge (BUE)?
4. What are the conditions for using zero rake angle during metal cutting operation?
5. What is Machinability Index?
6. What are the main factors which influence the tool life?
7. Why lathe beds are made of cast iron?
8. Draw neat sketch of a twist drill.
9. Which materials are used in the manufacturing of grinding wheels?
10. Why trueing and dressing are necessary in grinding wheels?

PART - B

Analytical/Problem solving questions. Attempt any **Five** questions. **(5×8=40)**

1. Derive expressions for the cutting ratio. Also draw Merchant's Circle Diagram and show forces and angles acting on the cutting tool and different parameters involved in metal cutting.
2. What are the types of cutting tool wear patterns observed in single point cutting tools? How do they affect the metal cutting performance?

3. A HSS tool is used for turning operation. The tool life is one hour when turning at 30 m/min, but reduces to 2 min. if cutting speed is doubled. Find the suitable RPM for turning a 300 mm diameter rod so that tool life is 30 min.
4. What is the difference between a capstan and turret lathe? Explain with the help of suitable sketches.
5. Define the terms cutting speed and feed as applied to milling operations. How do you calculate the cutting speed of a milling cutter?
6. Compare grinding, honing and lapping operations.
7. What are the high velocity forming methods? Explain each method in detail.

PART - C

Descriptive/Analytical/Problem Solving/Design questions. Attempt any Four questions. **(4×15=60)**

1. In an orthogonal cutting operation on a material with the shear yield strength of 250 N/mm^2 the following data is obtained Rake angle = 15^0. Uncut chip thickness = 0.25 mm, Width of chip = 2 mm. Chip thickness ratio = 0.46, friction angle = 40^0 deg. Determine the shear angle, cutting force component and resultant force on the tool.
2. While machining steel with zero rake angle prove the following expression where 'r' is chip reduction coefficient. P_c is specific cutting power and τ_s is shear strength of material.

$$\frac{\tau_s}{P_c} = \frac{r(1-\mu r)}{1+r^2}$$

3. Explain the basis for the selection of a specific cutting fluid for a given application. Take the example of turning, milling and grinding, and suggest the type of cutting fluid used.
4. What is the marking system followed in case of grinding wheels? Explain the individual elements of the marking system from the standpoint of the functioning of the wheel.
5. Describe step by step process of gear cutting by gear hobbing process with suitable figures.

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5E1324

Roll No. _____ [Total No. of Pages : 4

5E1324

B.Tech. V Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME4-04 Design of Machine Elements I
Common For ME, AE

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. What are the economic aspects form the selection of material?
2. What is meant by Aesthetic consideration in design?
3. Define the term interchange ability and standardization.
4. Which theories of failure are applicable for shaft?
5. What are the methods of reducing stress concentration?
6. Define the terms lever and the displacement ratio.
7. What is the critical speed of shaft?
8. What is the purpose of rubber bush in pin type flexible coupling?
9. What is meant by bolts of uniform strength?
10. How will you designate the ISO metric coarse thread?

Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. Explain the various mechanical properties of engineering materials.

2. Explain the design considerations of casting process used in manufacturing?

3. Design the cotter against the failure under bending and express the bending stress induced.

4. The standard cross section for a flat key, which is fitted on a 50 mm diameter shaft, is 16×10mm. The key is transmitting 475 N-m torque from the shaft to the hub. The key is made of commercial steel ($S_{yt} = S_{yc} = 230$ N/mm^2). Determine the length of the key, if the FOS is 3.

5. A laminated leaf spring is to carry a load of 3400 N with a deflection of about 31 mm. The spring must be supported at ends, the distance between the supports being 650 mm and is loaded at the centre. Allow a maximum stress of 420 N/mm^2. Take $E = 2\times10^5$. Find

   a) The stress which will be induced if the load comes down with a shock, deflecting the spring 75 mm.

   b) The magnitude of impact energy which the spring will absorb in this case.

6. The cylinder of a stationary engine is 0.12 m in diameter and is held to the crank case by M12×1.75 c, nickel steel bolts having core diameter 9.853 mm. the maximum gas pressure in the cylinder is 3.5 N/mm^2. Assume the ultimate strength of this steel to be 800 N/mm^2 and the yield stress to be 600 N/mm^2. Determine the number of bolts required. Take FOS = 2.

7. What is self - locking of the power screw? What is the condition for self locking?

Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. It is required to design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are coaxial and a small amount of angular movement between their axes is permissible. On strength basis, the material of two rods and pin is selected as plain carbon steel of Grade 30C8 (S_{yt} = 400 N/mm^2), a higher FOS of 5 is assumed in present design. Design the joint and specify the dimensions of its component.

2. A right angled bell - crank lever is to designed to raise a load of 5 kN at the short arm end. The length of short and long arm is 100 and 450 mm respectively. The lever and pins are made of steel 30C8 (S_{yt} = 400 N/mm^2) and the FOS is 5. The permissible bearing pressure on the pin is 10 N/mm^2. The lever has rectangular cross - section and ratio of width to thickness is 1.25:1. Calculate

   i) Diameter and length of fulcrum pin;

   ii) Shear stress in the pin

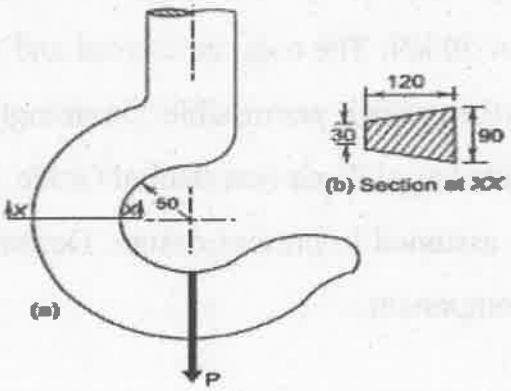
   iii) Dimensions of the boss of the lever at the fulcrum

   iv) Dimension of the cross section of the lever

   Assume that the arm of bending moment on the lever extend up to the axis of the fulcrum.

3. Explain the designing of shaft according to A.S.M.E. code.

4. A crane hook having an approximate trapezoidal cross section is shown in figure. It is made of plain carbon steel 45C8 (S_{yt} = 380 N/mm^2) and factor of safety is 3.5. Determine the load carrying capacity of the hook.



5. Write a short notes on

i. Ergonomics

ii. Allowable stress

iii. Stiffness of spring

iv. Beam Column

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5E1325

Roll No. _____ [Total No. of Pages : 2

5E1325

B.Tech. V Semester (Main) Examination, November - 2019
PCC/PEC Mechanical Engg.
5ME4-05 Principles of Management
Common for ME, AE

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(5×2=10)**

1. Explain management with its significance in the current century.
2. Give the example of different levels of management in any organization.
3. Differentiate appraisal and rewards.
4. What is human factors? Give an example describing its relationship with motivation.
5. What is productivity? Describe its importance with respect to worker and organization.

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions **(4×10=40)**

1. Describe the contributions of any two management thinkers :
   a) Kautilya.
   b) Taylor.
   c) C.K. Prahlad.
   d) Peter Drucker.
   e) Henry fayol.

2. Calculate the number of relationship for two subordinates. Also draw the relationship diagram showing the relationship between superior manager subordinate.
3. Explain the role of manager in human resource management and selection.
4. Classify various motivational theories and explain the Maslow's hierarchy of needs with diagram.
5. Define controlling with its classification for a physical system.
6. Explain the process of communication followed in the organization.

Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions **(2×15=30)**

1. Describe the management practice used by any two of the renowned persons with respect to the various functions of management :
   a) Dhirubhai Ambani,
   b) Ratan Tata,
   c) Bill Gates,
   d) Narayan Murthy
2. What is organization structure? Describe its effect with respect to any two companies.
3. What is leadership? How a leader will lead the organization, justify with suitable example of profile of any to leaders.

Roll No. _____ [Total No. of Pages : 3

5E1326

5E1326

B.Tech. V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME5-11: Steam Engineering
(Common For ME, AE)

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly) Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

1. Steam table *2. Mollier chart*

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. Classify different steam boilers. **(2)**
2. Write any two difference between natural and forced circulation boilers. **(2)**
3. Differentiate among induced and forced draught. **(2)**
4. What is cogeneration? **(2)**
5. Explain nozzle and diffuser efficiency. **(2)**
6. Define "degree of reaction". **(2)**
7. Differentiate between impulse and reaction steam turbines. **(2)**
8. What is the function of economizer in a steam power plant. **(2)**
9. What do you understand by "heat rate" and write its unit? **(2)**
10. What do you mean by reheating of steam? **(2)**

PART- B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. Write the advantages of high pressure boilers. Explain the working of Lamont boiler with neat sketch. **(8)**
2. Find the condition of maximum blade efficiency and also maximum efficiency in a single stage impulse steam turbine. **(8)**
3. Steam at 14 bar and 300°C enters a nozzle and is expanded to 6 bar isentropically. Is the nozzle convergent or convergent - divergent? Find the throat and exit area if flow rate is 1 kg/s. **(8)**
4. A steam power plant uses the following cycle :

   Steam at turbine inlet - 150 bar and 550°C.

   Reheat at 40 bar to 550°C and condenser at 0.1 bar.

   Using the Mollier chart and assuming ideal processes, find

   i) Quality at turbine exit

   ii) Cycle efficiency **(8)**
5. Explain the regenerative feed heating cycle with neat sketch and show its T-S diagram. **(8)**
6. What is compounding of impulse turbine? Explain pressure compounding with neat sketch. **(8)**
7. Explain the binary vapour cycle with neat sketch and also plot its T-S diagram. **(8)**

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. a) Steam issues from the nozzles of a De Laval turbine with a velocity of 1200 m/s. The nozzle angle is 20°, the mean blade velocity is 400 m/s, the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine is 900 kg per hour. Calculate :

   i) The blade angles

   ii) The axial thrust

   iii) The tangential force on the blades

   iv) The power developed

   v) The blade efficiency.

   Assume blade velocity coefficient K = 0.8. **(10)**

   b) Explain Throttle control governing with neat sketch. **(5)**

2. a) The following particulars refers to a stage of parson's steam turbine comprising one ring of fixed blades and one ring of moving blades. **(10)**

Mean diameter of blade ring = 70 cm, R.P.M. = 3000.

Steam velocity at exit form blades = 160 m/s,

Blade outlet angle = 20°, Steam flow through the blades = 7 kg/s.

Draw the velocity diagram and find the following :

i) Blade inlet angle

ii) Tangential force on the ring of moving blade

iii) Power developed in stage

iv) Maximum blade efficiency

b) Sketch and explain Pass out turbine. **(5)**

3. a) Steam at 30 bar, 400°C is expanded in a steam turbine to 0.1 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. **(10)**

i) Assuming ideal processes, find net work and thermal efficiency per kg of steam.

ii) If the turbine and pump each have 85% efficiency, find the percentage reduction in the net work and thermal efficiency.

b) Explain the phenomenon of fluidized bed combustion with neat sketch. **(5)**

4. a) What is critical pressure? Derive the expression for critical pressure in case of steam nozzles. Also explain its physical significance. **(10)**

b) Explain the effects of friction on performance of steam nozzles. **(5)**

5. Write a short notes on any **three** of the following (each **5** marks)

i. Condensers

ii. Size of blades for impulse - reaction turbine

iii. Feed water heaters

iv. Momentum energy equation for flow through steam nozzles. **(15)**

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5E1327

Roll No. _____ [Total No. of Pages : 2

5E1327

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME5-12 Automobile Engineering
(Common For ME, AE)

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. List the various loads that acts on a frame. **(2)**

2. What are the functions of a clutch? **(2)**

3. List out the functions of propeller shaft. **(2)**

4. What is meant by bleeding in braking system? **(2)**

5. What is over steering and under steering? **(2)**

6. Define camber angle and its effects on steering. **(2)**

7. What is meant by term tread and its function? **(2)**

8. What are the various loads on automobile air conditioning system? **(2)**

9. Name the safety divices used in automobile. **(2)**

10. Define cornering force. **(2)**

PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. Explain briefly the chassis construction with a suitable diagram. **(4+4=8)**
2. Explain in brief the operations of disc brake and drum brake system. Write its advantages and disadvantages. **(3+3+2=8)**
3. Explain the working of differential of an automobile with neat sketch. **(4+4=8)**
4. Discuss the working and salient features of Hotehkiss drive with a neat diagram. **(5+3=8)**
5. Explain the working of telescopic type of shock absorber with a neat sketch. **(4+4=8)**
6. Explain the working of Global positioning system in automobile in detail. **(8)**
7. Calculate the maximum power that a clutch can transmit without slipping based on constant pressure theory. **(8)**

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. Name the types of gear boxes used in automobile. Describe the working and construction of a synchromesh gear box with a neat diagram. **(2+4+4+5=15)**
2. What is the difference between convention steering and power steering. Explain the working of power steering system with a neat sketch. **(3+7+5=15)**
3. Explain the construction and working of lead acid battery with a neat diagram. Write different methods of testing it **(5+5+3+2=15)**
4. Describe the working of the air conditioning system of an automobile with a neat diagram. Write in brief the possible faults and their remedies in air conditioning system. **(7+5+3=15)**
5. Explain the construction and working of torque convertor with a neat sketch. Write its advantages over conventional gear box. **(4+5+4+2=15)**

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5E1328

Roll No. _____ [Total No. of Pages : 2

5E1328

B.Tech. V Semester (Main) Examination, Nov. - 2019
PCC/PEC Mechanical Engg.
5ME5-13 Non Destructive Evaluation and Testing
(Common For ME, AE)

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. Differentiate between destructive and non - destructive testing.
2. What are the major advantages of acoustic emission testing over other techniques?
3. What are the limitations of magnetic particle inspection?
4. What is the piezoelectric effect?
5. Explain Geometrical unsharpness.
6. Explain the basic principle of Thermography and its applications.
7. What is the most common method for demagnetising small test pieces? Explain in brief.
8. What is sensitivity in eddy current testing?
9. Describe Kaiser - felicity theory.
10. Draw neat sketch of X-ray generation in Radiography Testing.

PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. Explain near zone, far zone and transition zone in Ultrasonic Testing.

2. What is inductance and impedance plane in eddy current testing?
3. Specify any three ways to control the exposure when working with radiography sources.
4. Write short note on
   a) Digital radiography
   b) Neutron radiography
5. Differentiate among pulse echo, through transmission and angle beam technique.
6. What is the procedure of X Ray film processing? Explain in brief.
7. Briefly describe about Faraday's law and Lenz's law. Also explain about various types of probes used in eddy current testing.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. Draw neat sketch of Normal, TR and Angle probes and standard test block used for ultrasonic testing.
2. What is the working principle of magnetic particle inspection? What type of light is used for fluorescent magnetic particle indications Briefly discuss the different magnetization techniques.
3. Explain the working principle of radiography with sketch. Differentiate between X-ray and Gamma ray radiography.
4. Define leak and leak rate. Explain in brief the leak testing of heat exchanger tubes in a boiler and underground oil pipe line.
5. Write the short note on :
   a) Borescope
   b) Endoscope
   c) Flexiscope
   d) Electron beam Holography.