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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 1

Even Semester: 2018-19

Course Code: MEC 101

Course Name: Elements of Mechanical Engineering

Programme & Sem: B.Tech (Chemistry cycle) & II Semester

Date: 05 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

(i) **All questions are compulsory.**

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Write two advantages and two disadvantages of Non Renewable Energy resources.
2. Write two advantages and two disadvantages of a boiler working under low pressure, naturally circulated, multi tubular fire tubed with VERTICAL drum axis.
3. a) Convert 90° C temperature to Fahrenheit scale
b) What is the maximum and minimum value of dryness fraction?

Part B

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. Explain all the four laws of thermodynamics with neat diagram and mathematical equation if applicable.
5. Define pressure with different units. Also explain the three different types of pressure and draw a schematic diagram highlighting all the different types of pressure.

Part C

Answer the Question. Question carries **twelve** marks. (1Qx12M=12)

6. What are boiler mounting and accessories? Explain any five boiler mountings and five boiler accessories in details.



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 2

Even Semester: 2018-19

Course Code: MEC 101

Course Name: Elements of Mechanical Engineering

Program & Sem: B.Tech & II Sem (Chemistry Cycle)

Date: 16 April 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) **All questions are mandatory.**
- (ii) **Non-programmable scientific calculators are permitted.**

Part A

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

1. Briefly describe the working of a 4 stroke IC engine (Otto cycle) using an indicator diagram.
2. Give any 6 differences between a 2 stroke and a 4 stroke IC engine.

Part B

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

3. A 4-stroke engine has a piston diameter 250mm and stroke 400mm. The mean effective pressure is 4 bar and speed of crankshaft is 500 rpm. The diameter of the brake drum is 1000mm and the effective brake load is 400N. Find the indicated power, brake power and friction power. (8M)
4. (a) Describe the Pressure-Volume variation in steam across the blades of a steam turbine (both impulse and reaction turbine). (6M)
(b) What is a nozzle? Give the principle governing the flow of fluid in a nozzle. (2M)

Part C

Answer the Question. The Question carries **twelve** marks. (1Qx12M=12)

5. Describe a high head, tangential flow, impulse water turbine in detail. Give its working principle and various components with suitable schematic sketches.



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

SUMMER TERM / MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019

Date: 23 July 2019

Course Code: MEC 101

Time: 2 Hours

Course Name: Elements of Mechanical Engineering

Max Marks: 80

Program & Sem: B.Tech (PET) & III Sem (2016 Batch)

Weightage: 40%

Instructions:

- (i) Answer the question to the point.
 - (ii) All the questions must be answered, no choice is provided.
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Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Define COP and define 1 ton of Refrigeration with formula and units
2. Explain belt drive terminologies with a neat and labelled sketch
3. Write down any five differences between up milling and down milling.
4. Explain the different types of flames produced in oxy acetylene welding with neat sketch

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (3Qx10M=30)

5. Differentiate any five points between Soldering and Brazing?
6. List and explain various properties of a good refrigerant.
7. Explain Electric arc welding with working principle and a neat sketch?

Part C

Answer **both** the Questions. **Each** question carries **fifteen** marks. (2Qx15M=30)

8. Explain any five Drilling operations, with labelled sketches for each operation.
9. With a neat labelled sketch, explain the construction and working of a Vapor compression refrigeration system



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION JULY 2019

Semester: Make up July 2019

Date: 23 July 2019

Course Code: MEC 101

Time: 3 Hours

Course Name: Elements of Mechanical Engineering

Max Marks: 80

Program & Sem: B.Tech & II Sem (2018 Batch)

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 Parts, Answer all question from each part
- (iii) Draw sketches neatly and use Pencil for sketches

Part A

Answer **all** Questions. **Each** question carries **one** marks.

(20Qx1M=20M)

1.

A. Babcock and Wilcox boiler is _____ pressure type of boiler

- 1) Low
- 2) High
- 3) Medium
- 4) None

B. Filler material used in Brazing process is called as _____

- 1) Solder
- 2) Spelter
- 3) Weld
- 4) Slag

C. Generation of steam is faster in _____

- 1) Water tube boiler
- 2) Fire tube boiler
- 3) Both a) and b)
- 4) None of the above

D. Compression ratio of I.C. Engines is _____

- 1) The ratio of volumes of air in cylinder before compression stroke and after compression stroke
- 2) Volume displaced by piston per stroke and clearance volume in cylinder
- 3) Ratio of pressure after compression and before compression
- 4) Swept volume/cylinder volume

E. In which of the following cases Potential Energy is converted to Mechanical Energy?

- 1) Solar Energy
- 2) Wind Energy
- 3) Hydel Energy
- 4) Nuclear Energy

F. Unit of Pressure is

- 1) Pascal
- 2) N/m²
- 3) Both a and b
- 4) Kelvin

G. In which of the following drives, there is no slip

- 1) Open belt drive
- 2) Crossed belt drive
- 3) Rope drive
- 4) Chain drive

H. The relative coefficient of performance is

- 1) Actual COP/theoretical COP
- 2) Theoretical COP/actual COP
- 3) Actual COP x theoretical COP
- 4) 1-actual COP x theoretical COP

I. Refrigeration in aero planes usually employs the following refrigerant

- 1) Co₂
- 2) Freon-11
- 3) Air
- 4) None of the above.

J. In which flame oxygen is in the same proportion?

- 1) Neutral flame
- 2) Oxidizing flame
- 3) Carburizing flame
- 4) none of the above

K. Nuclear Energy is a _____ energy source

- 1) Conventional, non-renewable
- 2) Non-Conventional, non-renewable
- 3) Conventional, renewable
- 4) Non-Conventional, renewable

L. Steam may exist in the form or state of

- 1) Wet Condition
- 2) Dry Condition
- 3) Superheated Condition
- 4) All of the above

M. Pyrometer instrument is used for measuring

- 1) Temperature
- 2) Volume
- 3) Pressure
- 4) None of the above

N. Lancashire boiler is a _____ of boiler

- 1) Stationary fire tube
- 2) Horizontal type
- 3) Natural circulation
- 4) All of the above

O. Maximum pressure applicable for Babcock and Wilcox boiler is

- 1) 40 bar
- 2) 20 bar
- 3) 15 bar
- 4) 50 bar

P. In which of the following drives, there is no slip

- 1) Open belt drive
- 2) V belt drive
- 3) Rope drive
- 4) Chain drive

Q. In a refrigeration system, the expansion device is connected between the

- 1) Compressor and condenser
- 2) Condenser and evaporator
- 3) Evaporator and compressor
- 4) None of the above

R. By first law of thermodynamics

- 1) $Q = \Delta E - W$
- 2) $Q = \Delta E + W$
- 3) $Q = -\Delta E - W$
- 4) $Q = -\Delta E + W$

S. Which of the following is not representing number of cylinders of a multi cylinder vehicle?

- 1) 2
- 2) 5
- 3) 7
- 4) 6

T. Evaporative capacity of Lancashire Boiler is

- 1) 8000 kg steam/hour
- 2) 9000 kg steam/hour
- 3) 8500 kg steam/hour
- 4) 9500 kg steam/hour

Part B

Answer **all** Questions. **Each** question carries **five** marks.

(6Qx5M=30M)

2. Differentiate between Soldering and Brazing.
3. Sketch Open cycle and Closed cycle gas turbine
4. List and explain any 4 boiler Mountings
5. With neat sketch explain working principle of Vapor Compression Refrigeration cycle
6. Define a) Bore b) Clearance volume c) Compression Ratio
7. Explain Open belt drive and Cross belt drive mechanism with sketch.

Part C

Answer **all** Questions. **Each** question carries **ten** marks.

(3Qx10M=30M)

8. With neat sketch explain the working principle of Oxy Acetylene gas welding Process.
Explain the characteristics of flame obtained during the process.
9. Explain the following with neat sketch.
 - a) Reaming b) Counter sinking c) Tapping e) Up milling f) Slot milling
10. Enumerate the properties of a good refrigerant used in refrigeration process



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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Even Semester: 2018-19

Course Code: MEC 101

Course Name: Elements of Mechanical Engineering

Program & Sem: B.Tech & II Semester

Date: 24 May 2019

Time: 3 Hours

Max Marks: 80

Weightage: 40%

Instructions:

- (i) The question paper consists of 3 parts (A,B and C).
- (ii) Read the questions carefully and answer accordingly.
- (iii) All Questions are compulsory.
- (iv) Non-Programmable and scientific calculator are permitted.

Part A

Answer **all** the Questions. Each question carries **two** marks.

(10Qx2M=20M)

1.
 - i. Match the following with the terminologies involved in their parts
 - a. Petrol Engine
 - b. Diesel Engine
 - A. Spark plug
 - B. Fuel Injector
 - C. Compressor
 - D. Economizer
 - ii. Fill in the blanks:
1 ton of refrigeration is equal to _____ kW.
 - iii. Which of the following are boiler accessories?
 - a. Economizer, steam stop valve, fusible plug
 - b. Feed pump, safety valve, steam separator
 - c. Air Preheater, Economiser, Super heater
 - d. Economiser, Super Heater, Pressure Gauge
 - iv. Which of the following is a multi-tubular boiler:
 - a. Cornish
 - b. Babcock and Wilcox
 - c. Cochran
 - d. Both b) and c)
 - v. By first law of thermodynamics,
 - a. $Q = \Delta E - W$
 - b. $Q = \Delta E + W$
 - c. $Q = -\Delta E - W$
 - d. $Q = -\Delta E + W$
 - vi. Unit of efficiency is
 - a. Kg
 - b. Metre
 - c. Mathematical percentage
 - d. Litre
 - vii. Heat can be converted to work completely. (True/False)

- viii. 1MPa = 100 Pa. (True/False)
- ix. Which among the following is not a renewable source of energy?
- Solar energy
 - Uranium energy
 - Hydro-power
 - Geothermal energy
- x. In which of the following drives, there is no slip
- Open belt drive
 - V belt drive
 - Rope drive
 - Chain drive

Part B

Answer **all** the Questions. **Each** question carries **five** marks.

5 x 6M
(6Qx5M=30M)

- Differentiate giving five points between brazing and welding.
- Define a refrigerant and list important properties of refrigerant.
- Explain electric arc welding with a neat sketch.
- With a neat sketch, explain any two drilling operations.
- With a neat sketch, explain the parts of an IC Engine.

Part C

Answer **all** the Questions. **Each** question carries **ten** marks.

(3Qx10M=30M)

- Draw a neat sketch and explain the working of Vapor Absorption Refrigeration System.
- Explain with a neat sketch the working principle of Oxy-Acetylene Welding and draw the three flames possible in this welding.
- A. Draw a neat sketch of a belt drive explaining all the terminologies involved in it. (4M)
B. Differentiate by 4 points between open belt drive & closed belt drive. (4M)
C. Give two advantages of V-belt drive over flat belt drives. (2M)