Register Number:……..

KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)
2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.
3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U14MET204:Thermal Engineering and Fluid Mechanics

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. In thermal power plants, the deaerator is used mainly to [K_1]

   a) Remove air from condenser b) Increase firewater temperature

   c) Reduce steam pressure d) Remove dissolved gases from feed water

2. Which of the following power plants use heat recovery boilers (unfired) for steam generation?

   1. Combined cycle power plants. [K_2]

   2. All thermal power plants using coal.

   3. Nuclear power plants.

   4. Power plants using fluidized bed combustion

   Select the correct answer using the codes given below:

   a) 1 and 2 b) 3 and 4

   c) 1 and 3 d) 2 and 4

3. Where does mixing of fuel and air take place in case of diesel engine? [K_1]

a) Injection pump
b) Injector
c) Engine cylinder
d) Inlet manifold

4. Consider the following energies associated with a Pelton turbine: [K_2]

1. Mechanical energy
2. Kinetic energy
3. Potential energy

The correct sequence of energy conversion starting from the entry of fluid is

a) 1, 2 and 3
b) 2, 3 and 1
c) 3, 2 and 1
d) 1, 3 and 2

5. In winter air-conditioning the process is [K_1]

a) Heating, humidification and cooling
b) Heating, humidification and heating
c) Heating, dehumidification and heating
d) Cooling, humidification and heating

6. The correct sequence of the given components of a vapour compression refrigerator is [K_1]

a) Evaporator, compressor, condenser and throttle valve
b) Condenser, throttle valve, evaporator and compressor
c) Compressor, condenser and throttle valve and evaporator
d) Throttle valve, evaporator, compressor and condenser

7. Match List-I (Fluid properties) with List-II (Related terms) and select the correct answer using the codes given below the lists: [K_1]

List I	**List II**
A. Capillarity	1. Cavitation
B. Vapour pressure	2. Density of water
C. Viscosity	3. Shear forces
D. Specific gravity	4. Surface tension

	A	B	C	D
a)	1	4	2	3
b)	1	4	3	2
c)	4	1	2	3
d)	4	1	3	2

8. The following item consists of two statements, one labeled as the “Assertion (A)” and the other as “Reason (R)”. You are to examine those two statements carefully and select the answers to these items using the codes given below: [K_2]

Assertion (A) : Bernoulli's equation is an energy equation.

Reason (R) : Starting from Euler's equation ,one can arrive at Bernoulli's equation

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true and R is not a correct explanation of A

c) A is true but R is false

d) A is false but R is true

9. Centrifugal pumps have which of the following advantages? [K_1]

1. Low initial cost
2. Compact, occupying less floor space
3. Easy handling of highly viscous fluids

Select the correct answer using the codes given below:

a) 1, 2 and 3

b) 1 and 2 only

c) 1 and 3 only

d) 2 and 3 only

10. The following item consists of two statements, one labeled as the "Assertion (A)" and the other as "Reason (R)". You are to examine those two statements carefully and select the answers to these items using the codes given below: [K_2]

Assertion (A) : In a pipe line, the nature of the fluid flow depends entirely on the velocity.

Reason (R) : Reynolds number depends on the velocity, diameter of the pipe and kinematic viscosity of the fluid.

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true and R is not a correct explanation of A

c) A is true but R is false

d) A is false but R is true

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. List the advantages of the hydroelectric power plants. [K_1]
12. How the nuclear reactors are classified? [K_1]
13. What is the principle of impulse turbine? [K_1]
14. Differentiate between two stroke and four stroke engine. [K_2]
15. Define volumetric efficiency of a reciprocating compressor. [K_1]
16. Define COP of refrigeration. [K_1]
17. Compare viscous flow and turbulent flow with examples. [K_4]
18. Identify the assumptions which are made while deriving Bernoulli's equation. [K_1]
19. Classify the losses in pipes. [K_2]
20. What is priming? Why is it necessary? [K_1]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Draw a general layout of thermal power plant and explain the working of different circuits. [K_3]

22. Explain the construction and working principle of Cochran boilers with neat sketch. [K_2]

23. (i) With a neat diagram explain the construction and working of a Pelton wheel turbine. (7) [K_3]

    (ii) Describe the working principle of four stroke petrol engine. (7) [K_2]

24. (i) Compare between centrifugal and axial flow compressor. (4) [K_4]

    (ii) Explain the construction and working of Vapour compression refrigeration system with neat sketch. (10) [K_2]

25. (i) An oil film of thickness 10mm is used for lubrication between the two square parallel plates of size 0.9m x 0.9m each, in which the upper plate moves at 2m/s required a force of 100N to maintain this speed. Determine 1) Dynamic viscosity of the oil and 2) Kinematic viscosity of oil, if the specific gravity of the oil is 0.95. (7) [K_4]

    (ii) Derive Bernoulli's equation with assumptions & applications. (7) [K_2]

26. (i) Write short notes on hydraulic gradient and total energy line. (4) [K_1]

    (ii) The impeller of a centrifugal pump has external and internal diameters 500mm and 250mm respectively, width of outlet 50mm and running of 1200rpm. It works against a head of 48m. The velocity of flow through the impeller is constant and equal to 3.0m/s. The vanes are set back at an angle of 40^o at outlet. Determine (10) [K_2]

    i) Inlet vane angle

    ii) Work done by the impeller on water per second

    iii) Manometric efficiency

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