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E-868

B.E. V Semester (Main & Re-Exam.)

Examination, December - 2018

I.C. Engine, Steam & Nuclear Power

Branch : Mech.

Time : Three Hours] *[Maximum Marks : 75*

[Minimum Marks : 30

Note : Attempt **all** questions of **Section-A**, **four** questions from **Section-B** and **three** questions from **Section-C**.

Section-A

(Objective Type Questions)

1. Nuclear reactor are used : 1.5×10=15

   (a) To produce heat for thermoelectric

   (b) To produce Fissionable material

   (c) To propel ships, submarines, aircrafts

   (d) All of these

2. A moderator generally used in nuclear power plants is :

   (a) Graphite (b) Concrete

   (c) Heavy water (d) Graphite and Concrete

P.T.O.

3. The predominant isotope of the naturally occuring element is :

(a) U_{235} (b) PU_{233}

(c) U_{238} (d) PU_{239}

4. The brake power of a diseal engine, keeping other parameters constant, can be increased by :

(a) Decreasing the density of intake air.

(b) Increasing the temperature of intake air.

(c) Increasing the pressure of intake air.

(d) Decreasing the pressure of intake air.

5. Theoretically, a four stroke cycle engine should develop _____ power as that of a two stroke cycle engine.

(a) Half (b) Same

(c) Double (d) Four times

6. The frictional power (F.P.) is given by :

(a) F.P. = B.P.–I.P. (b) F.P.=I.P.-B.P.

(c) F.P.=B.P./I.P. (d) F.P.=I.P./B.P.

7. In order to mix air and petrol in the required proportion and to supply it to the engine during suction stroke, this _____ is employed.

(a) Fuel pump (b) Injector

(c) Carburettor (d) None of these

8. The steam from steam generator of a nuclear power plant is best describe as :

(a) Super heated steam (b) Super critical steam

(c) Saturated dry steam (d) Saturated wet steam

9. The steam power plant is a bulk energy converter when fuel energy is converted to?

(a) Heat energy (b) Electrical energy

(c) Chemical energy (d) None of these mentioned

10. Which of the following is a good medium for constant temperature heating?

(a) Water (b) Steam

(c) Coolant (d) Diesel

Section-B

(Short Answer Type Questions)

6×4=24

1. Name and explain briefly various types of fuel injection systems.
2. What are two main types of cooling systems? Where these systems are used?
3. What is "nuclear fusion"? How does it differ from "nuclear fission?
4. Compare nuclear power station with steam power plant.
5. A simple Ranking cycle works between pressure 28 bar and 0.06 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption.
6. A 4-cylinder, 2-stroke IC engine has the following particulars : engine speed=3000 rpm, bore=120mm crank Radius=60mm, mechanical efficiency = 90% and the engine developes 75 bhp. Calculate the swept volume and mean effective pressure (MEP).

Section-C

(Long Answer Types Questions) $12 \times 3 = 36$

1. What is a nuclear reactor? How nuclear reactors are classified? Enumerate and explain essential components of nuclear reactor.
2. What is peted injection? What are its advantages & disadvantages? Explain continuous & Timed injection system.
3. What is steam turbine? How do they classify? Explain the working of any one steam turbine.
4. What is super charging? How is it achieved? What is the effect of super charging on the following parameters :
   (a) Power output
   (b) Mechanical efficiency
   (c) Fuel consumption.
5. The rating of a nuclear power plant for submarine is 5MW, overall efficiency is 30% the fuel is U^{235}. Find the amount of natural uranium needed to generate this power if the average energy released per fussion for this fuel is 190 Mev.