JGi ARKAJAIN University Jharkhand

13/12/22 45

7th Semester End Term Examination: Dec - 2022.

Subject : Process Planning and Cost Estimation
Course : B.Tech [ME] **Roll No: .....**
Full Marks : 70 **Time : 3 Hours.**

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; Don't Write On The 1st Page Backside.
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 12 multiple choice questions.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
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PART – A

Multiple Choice Questions [12x1=12]

1i) How does marketing team study customers and products for the generation of ideas?
a) Surveys b) Focus Groups
c) Interviews d) All of the mentioned

ii) Prime Cost does not include
a) Direct Material Cost b) Direct Labour Cost
c) Production Overheads d) Direct Expenses

iii) Properties of workpiece materials are
a) Geometric features of the part b) Production rate and quantity
c) Process selection consideration d) All of the mentioned

iv) With the use of Jigs and fixture
a) Labour cost decreases b) Labour cost increases
c) Labour cost remains unchanged d) None of the mentioned

v) Which of these is a part of process planning?
a) Evaluation and prioritizing opportunities b) Identification of opportunities
c) Allocation of resources and time determination d) Finalizing process

vi) Production Cost is the sum of

a) Direct Material Cost and Direct Labour Cost
b) Prime cost and Profit
c) Prime cost and Production Overheads
d) Total Cost and other overheads

vii) The output of Design Interpretation not include

a) Selling price of product
b) Dimensional tolerance of product
d) Sequence of operation needed
d) Surface quality of product

viii) Designs are periodically modified to

a) Improve product performance
b) Strive for zero-based rejection and waste
c) Make products easier and faster to manufacture
d) All of the mentioned

ix) Which is a process parameter in milling

a) RPM speed of tool
b) Feed rate/teeth
c) Depth of cut
d) All of the mentioned

x) If the depth of cut (d1) is 10mm, then find the value of the diameter of the drill (d2)

a) 5
b) 10
c) 20
d) none of the mentioned

xi) Which of the following machine is primarily intended for producing flat surfaces?

a) Shaper
b) Drilling
c) Lathe
d) None of the mentioned

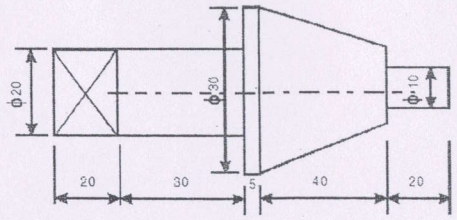
xii) What is the necessary condition for turning?

a) Material of work piece should be harder than the cutting tool
b) Cutting tool should be harder than the material of work piece
c) Hardness of the cutting tool and material of piece should be same
d) None of the mentioned

PART – B

Answer any FOUR out of SIX [4x7=28]

2. What are the important inputs and outputs in a manufacturing System?
3. What are the Components of Total Cost in a manufacturing Company? Show in Component chart and also explain how to estimate different cost involved.
4. Make list of types of welding Process. Also enlist process parameters in Arc Welding.
5. How to estimate machining time in shaper? Find the time required on shaper to complete one cut on a plate 600 mm X 900 mm, if the cutting speed is 9 m/min and feed rate is 0.3 mm/stroke. Consider clearance on each side 25mm and stroke ratio as 2/3.
6. Estimate the weight and cost of casting as shown in figure. Assume density of steel as 7.85 gm/cm^3 and cost of steel as Rs. 80/kg.

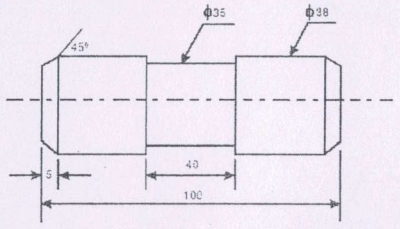


7. Make a list of factors to be considered during cost estimation for forging operation. Explain briefly about each factors.

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Enlist Different process Parameters is Metal Cutting Process and also write their mathematical formula.
9. Explain Design to Manufacturing cycle in process planning. Take help of flow chart to explain the process.
10. The BOLD CONSTRUCTION has decided to purchase Dia50 x 100mm bolt in place of in-house making it. The SHEARING BOLT Co. will provide in Rs. 26.0 per unit for a minimum batch of 7000. Take decision weather BOLD CONSTRUCTION should manufacture or buy the bolt, If BOLD CONSTRUCTION manufacture the same bolt, the cost associated are given below:
    Dia 60 high carbon steel round bar – Rs. 90.8/m
    Machinist's hourly rate - Rs. 82
    Machine Set-up time - 3hrs 24 Mints
    Machining time per unit - 6 Mints
    Cut preparation for Batch - 93 Hrs
    Batch Size - 7000
    Production Overheads - 265 % of Machining Hour rate
    All other Overheads - 25% of Production Cost
    (Assume Suitable data if required)
11. Make a list of design interpretation for the part shown. Also write sequence of operations and prepare a process plan table for the part.



ARKAJAIN University
Jharkhand

7th Semester End Term Examination: Dec - 2022.

Subject : Power Plant Engineering
Course : B.TECH [ME] **Roll No: .....**
Full Marks : 70 **Time : 3 Hours.**

Instructions to the Candidates:

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PART – A

Multiple Choice Questions [12x1=12]

1 i) Which of the following is incorrect for Rankine vapor power cycle?

a) It has two reversible adiabatic and two reversible isobaric process.

b) Its efficiency is dependent on mean temperature of addition and temperature of heat rejection.

c) Constant pressure heat rejection takes place in the turbine.

d) The efficiency of Rankine cycle can be increased by increasing the degree of superheat at constant pressure.

ii) Steam flow is controlled by using:

A. Drum level sensor
B. Feedwater flow sensor
C. Steam flow sensor
D. All of these

a) Plant B
b) Plant A
c) Plant C
d) Plant A and B

iii) One kg steam sample contains 0.4 kg water vapor. Its dryness fraction is
a) 0.4 b) 0.6
c) 0.4/1.4 d) 0.4 × 0.6

iv) The following in (are) ash handling system(s).
a) Hydraulic system b) Pneumatic system
c) Steam jet system d) All of these

v) At ideal condition of vapor power cycle heat rejection at reversible constant pressure occurs at
a) Turbine b) Pump
c) Condenser d) Boiler

vi) Volume of 1 kg of dry steam is known as:
a) Total volume b) Saturated volume
c) Specific volume d) None of these

vii) If enthalpy of steam at the entry and exit of steam turbine is respectively 3000 kJ/kg and 2000 kJ/kg, if pump work is ignored, what will be the specific steam consumption?
a) 3.60 kg/kW.hr b) 3.60 kg/kW.s
c) 0.360 kg/kW.s d) Insufficient data

viii) Work ratio is the ratio of
a) Network/turbine work b) Turbine work/ compressor work
c) Network / compressor d) Compressor work/ network

ix) Inter-cooling results in
a) Improved work ratio b) Lower work ratio
c) Unaffected work ratio d) Improved work ratio initially which is lowered subsequently

x) Which of the following is not the component of nuclear power plant
a) Steam generator b) Steam turbine
c) Nuclear reactor d) Penstock

xi) A solar thermal collector
a) Collects the solar energy and reflects it back b) Absorbs the solar radiation and dissipates it to the ambient
c) Collects and converts the solar energy into electrical energy d) Collects and converts the solar energy into thermal energy and delivers it to the nextstage of the system

xii) The function of coolant is to
a) Extract heat from reactor b) slow down neutrons
c) Control the reaction d) reflect the neutrons

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Give classifications of different power plant. What are the methods used for improving the efficiency of a gas turbine plant?
3. What are the different types of dust collectors used? Explain the analysis of pollution from thermal power plants.
4. Derive an expression for air standard efficiency of Brayton cycle in terms of: (i) Compression ratio and (ii) the pressure ratio.
5. What are the applications of diesel electric power plants? What are the components present in the diesel electric power plants?
6. Describe hazards of nuclear radiation. Explain construction and working of nuclear power plant with diagram.
7. What are the advantages and limitations of tidal power plant? What are the different types of Tidal power plants

PART – C

Answer any TWO out of FOUR [2x15=30]

8. In an air-standard regenerative gas turbine cycle the pressure ratio is 4.5. Air enters the compressor at 1 bar, 300K and leaves at 490 K. The maximum temperature in the cycle is 1000K. Calculate the cycle, given that the efficiency of the refrigerator and the adiabatic efficiency of the turbine are each 80%. Assume for air, the ratio of specific heat is 1.4.
9. Air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 20°C. The pressure of air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air to fuel ratio is 90:1. Calorific value of the fuel is 42,000 kJ/kg. If the flow rate of air is 3 kg/s, find (i) power developed (ii) thermal efficiency of the cycle.
10. A gas turbine unit has a pressure ratio of 5:1 and maximum cycle temperature of 710°C. The isentropic efficiencies of the compressor and turbine are 0.80 and 0.82 respectively. Calculate the power output in kilowatt of an electric generator geared to turbine when the air enters the compressor at 15°C at rate of 16 kg/s. Take Cp= 1.005 kJ/kg K and γ=1.4 for compression process and take Cp=1.11kJ/kg K and γ=1.333 for the expansion process.
11. Explain the working of a typical CANDU nuclear reactor power plant, with the help of neat diagram.

ARKAJAIN University
Jharkhand

7th Semester End Term Examination: Dec - 2022

Subject : **Renewable Energy**
Course : **B.TECH. (ME)** **Roll No: .....**
Full Marks : **70** **Time** : **3 Hours.**

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PART – A

Multiple Choice Questions [12x1=12]

i) What is a solar collector?

a) A system to collect heat by absorbing sunlight
b) A system to collect rainwater using sunlight
c) A system to collect electricity by using sunlight
d) A device to reflect sunlight back

ii) What is a heat pipe?

a) A heat-transfer device
b) A pipe made of heat
c) A pipe that consists of heat
d) A heat pumping device

iii) Which energy forms can biomass be converted to?

a) Electrical and light
b) Light and chemical
c) Electrical and heat
d) Heat and light

iv)Which Oxides of Nitrogen are generated by burning of fossil fuel?

a) NO and NO2
b) NO2, NO3, and N2O5
c) N2O5 and N2O3
d) NO3 and N2O5

v) Percentage of the total greenhouse gas emissions is due to Hydropower plants.

a) True
b) False

vi) Which Uranium isotope is used in nuclear power plants?

a) U-235 b) U-234

c) U-215 d) U-21

vii) What does heat value indicate?

a) Amount of energy consumed by biomass to produce energy

b) Amount of energy required to process biomass to produce energy

c) Amount of energy required as heat by the organisms

d) Amount of energy that is available in the fuel

viii) Renewable energy-based power plants have _____

a) Negligible fuel cost b) Low energy availability

c) Negligible production capacity d) Fuel storage tanks

ix) The ratio of energy received from a raw energy source to energy spent to obtain the raw energy source is called as _____.

a) Consumption ratio b) Fuel ratio

c) Energy yield ratio d) Joule ratio

x) Energy Resources which are being used for many decades are known as _____

a) Conventional energy sources b) Non-conventional energy sources

c) Primary energy sources d) Fuel cells

xi) Which of the statements is correct about Solar Energy?

a) It is a renewable and conventional source of energy

b) It is a non-renewable and non-conventional source of energy

c) It is a renewable and non-conventional source of energy

d) It is a non-renewable source of energy

xii) Which of the following is not used as food for humans?

a) Sugars b) Glucose

c) Cellulosic matter d) Fat

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Explain the setup for wind mills with neat sketch.
3. Explain Photovoltaic Cell. Define solar constant and wind turbine.
4. Define Bio-fuel. Classify them briefly.
5. Differentiate between impulse and reaction turbine.
6. What is correlation between energy and sustainable development?
7. What is difference between beam radiation and diffused radiation?

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Explain the working principle, applications, advantages and disadvantages of solar dryers with neat diagram.
9. a) Differentiate between conventional and non-conventional sources of energy.
   b) Discuss the advantages and dis advantages of renewable energy sources
10. Describe the factors for site selection for solar power plant.