



ARKAJAIN
University
Jharkhand

7th Semester Examination –2021-22

Subject : Power Plant Engineering
Course : B.Tech (Mechanical)
Full Marks : 70

Roll No:

Time: 3 Hours.

Instructions to the Candidates:

- Read the question paper very carefully.
- Candidates are required to give their answers in their own words as far as practicable.
- 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)

1. The commercial sources of energy are
 - a. Solar, wind and biomass
 - b. Wood, animal wastes and agriculture wastes
 - c. Fossil fuels, hydropower and nuclear energy
 - d. None of the above
2. In India largest thermal power station is located at
 - a. Kota
 - b. Sarni
 - c. Chandrapur
 - d. Neyveli.
3. The commercial sources of energy are
 - a. Solar, wind and biomass
 - b. Wood, animal wastes and agriculture wastes
 - c. Fossil fuels, hydropower and nuclear energy
 - d. None of the above
1. The pressure at the furnace is minimum in case of
 - a. Forced draught system
 - b. Balanced draught system
 - c. Induced draught system
 - d. Natural draught system
4. The percentage O₂ by Weight in atmospheric air is
 - a. 18%
 - b. 23%
 - c. 77%
 - d. 79%
5. The percentage O₂ by volume in atmosphere air is
 - a. 21%
 - b. 23%
 - c. 77%
 - d. 79%
6. The proper indication of incomplete combustion is:
 - a. High CO content in flue gases at exit
 - b. High temperature of flue gases
 - c. High CO₂ content in flue gases at exit
 - d. The smoking exhaust from chimney

7. The main source of production of biogas is:
 a. Human waste b. Wet cow dung c. Wet livestock waste d. All above
8. India's first nuclear power plant was installed at:
 a. Tarapore b. Kota c. Kalpakkam d. None of the above
9. In fuel cell, the _____ energy is converted into electrical energy.
 a. Mechanical b. Chemical c. Heat d. Sound
10. Solar thermal power generation can be achieved by:
 a. Using focusing collector or heliostats c. Using flat plate collectors
 b. Using a solar pond d. Any of the above system
11. The energy radiated by sun on a bright sunny day is approximately:
 a. 700 W/m² b. 800 W/m² c. 1 kW/m² d. 2 kW/m²

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Describe the steps to be followed in in plant coal handling of coal.
2. What is fixed & operational cost of power plants?
3. Explain site selection for Nuclear, hydro and thermal Power Station.
4. Explain the importance of load curve and Load duration curve in detail.
5. What is a CANDU type reactor?
6. A peak load on the thermal power plant is 75MW. The loads having maximum demands of 35 MW, 20 MW, 15 MW and 18 MW are connected to the power plant. The capacity of the plant is 90 MW and annual load factor is 0.53. Calculate the average load on power plant, energy supplied per year, demand factor and diversity factor.

PART C

ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. Draw the Layout diagram of Hydro Power Plant and also explain the components and working of Hydro power plant.
2. Draw the general layout of thermal power plant and explain the working of different circuits.
3. Explain the various processes involved in coal and ash handling with neat sketches.
4. Draw and explain construction and working principle of Heavy Water Cooled Reactor (HWR) (or) CANDU Type Reactor?



7th Semester Examination -2021-22

Subject : CAD- CAM
Course : B.TECH (ME)
Full Marks : 70

Roll No :
Time : 3 Hours.

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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

1. The management of new product development strategy includes.
a. Customer centered development
b. Systematic product development
c. Team based development
d. All of above
2. Arrange the decision making process conceptually
A. Finding of the problem
B. Set priority to the criteria
C. Analysis of alternatives
a. GFEDCBA
D. Identification of decision criteria
E. Development of alternatives
F. Selection Implementation
b. CDEGABF
c. ABCDEFG
d. GACDBEF
3. Making decision on the basis of experience, feeling and accumulated judgment is called as
a. Decision making
b. Intuitive decision making
b. Structured problem
d. None of the above
4. Manager when plan, organize, lead and control are called decision makers.
a. True
b. False
5. Which of this is not mentioned in decision making matix?
a. Analytics
b. Behavioral
c. Directive
d. Performance management
6. Which of the following is not design attribute?
a. Part materials
b. Surface finishing
c. Tool path
d. Major dimension.

7. CAPP is called?
 - a. Computer aided product processing processing
 - b. Computer aided processing planning planning
 - c. Computer alternate product
 - d. Computer alternate process
8. _____ command is using for material addition on 2D sketch in NX software
 - a. ADD
 - b. PAD
 - c. Extrude
 - d. Draft
9. Touch align constrains are used in which environment of NX:
 - a. Modeling
 - b. Drafting
 - c. Simulation
 - d. Assembly
10. Which of the following device do not produce a hard copy?
 - a. .Impact printer's
 - b. Plotters
 - c. CRT terminals
 - d. Non-Impact Printer
11. The software that is used to control the computer's work flow, organize its data and perform housekeeping functions is known as:
 - a. Operating software
 - b. Application software
 - c. Graphics software
 - d. Programming software
12. The software that is used to provide the users with various functions to perform geometric modelling and construction is known as:
 - a. Operating Software
 - b. Application software
 - c. Graphics Software
 - d. Programing Software

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Discuss with suitable Examples various application area of CAD
2. Using flow diagram explain process planning in industry.
3. How Design/Concept generation does helps PLM?
4. Define CAPP and Draw CAPP Framework.
5. Define Manual Process Planning with neat diagram
6. Define Transformation and Define Graphics Primitives.

PART C

ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. The position vector of point P (25, 15) is rotated clockwise in x y plane by an angle Θ (30°) such that the point P occupies position Q .The co-ordinate x, y of Q is?
 - a. Define Absolute and Relative Positioning?
2. Describe each Transformation with a 3-D example: i) Translation, ii) Rotation, iii) Scaling, iv) Shearing.
 - a. What is CNC system? How it is different from NC system
3. What is an NC machine? Write are the major specifications of a 3 axis CNC milling machine.
4. Define Manual Process planning with neat diagram



7th Semester Examination –2021-22

Subject : Production planning & cost estimating Roll No :
Course : B.Tech (Mechanical) Time : 3 Hours.
Full Marks : 70

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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

- Two important capability factors to be considered for tool selection are:
a. Dimensional and geometric accuracy required c. Surface finish specifications
b. Cutting Force & Cutting Speed d. (A) & (B)
- The machine Selection involves the following four stages in sequential order. i) Operational analysis ii) first-cut selection iii) Capability Analysis iv) Power or Force Analysis.
a. ii-iv-iii-i b. ii-iv-i-iii c. iv-i-iii-ii d. iv-i-ii-iii
- The important process parameters to be calculated for each operation during process planning
a. Cutting speed b. Feed rate c. Depth of cut d. All the above
- The relative speed between the tool and the work piece
a. Cutting speed b. Feed rate c. Depth of cut d. All the above
- The thickness of the layer of metal removed in one cut or pass, measured in a direction perpendicular to the machined surface.
a. Cutting speed b. Feed rate c. Depth of cut d. All the above
- The work holding device which Locate and hold the work piece for a specific operation is called as.
a. Fixture b. Jig c.(a) & (b) d. None of the above
- The Basic elements of jigs and fixtures are
a. Clamping elements c. Locating elements
b. Tool guiding and setting elements d. All the above

8. Find the odd man out
 a. Tapping fixture b. Plate Fixtures c. Angle plate Fixtures d. Vice – jaw Fixtures
9. The important process parameters to be calculated for each operation during process planning
 a. Cutting speed b. Feed rate c. Depth of cut d. All the above
10. The relative speed between the tool and the work piece
 a. Cutting speed b. Feed rate c. Depth of cut d. All the above
11. The speed at which the cutting tool penetrate the work piece
 a. Cutting speed b. Feed rate c. Depth of cut d. All the above
12. Find the odd man out
 a. Tapping fixture b. Plate Fixtures c. Angle plate Fixtures d. Vice – jaw Fixtures

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

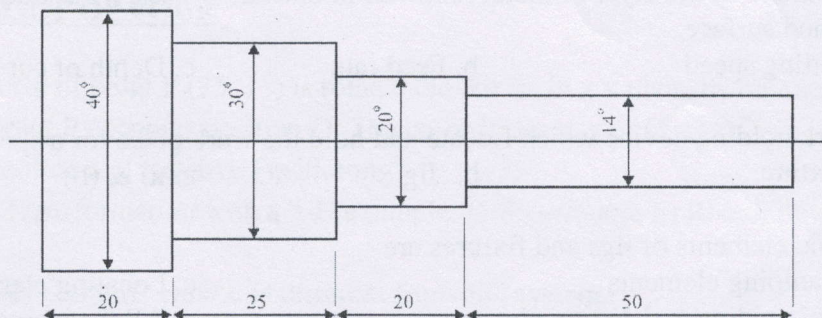
1. Illustrate the formula to calculate the machining times for turning and boring. How do you estimate the time required for forging?
2. Classify the three basic functions of Jig. What are the basic principles of jig and fixture design can be categorized
3. Explain the various methods for calculating depreciation cost with an example.
 In a manual operation, observed time for a cycle of operation is 0.5 minute and the rating factor as observed by the time study engineer is 125%. All allowances put together is 15% of N.T. (Normal Time). Estimate the Standard Time.
4. Give the methods of costing. List the types of estimates.
5. Categorize the main factors to be considered for work holding device. List the factors Considered for selecting Process parameter.
6. Describe the few allowances in estimation with suitable justification

PART C

ANSWER ANY TWO OUT OF FOUR

(15x2=30)

1. List the objectives of process planning. Show the two approaches to Process Planning in the context of CAPP (Computer Aided Process Planning)? Explain them clearly.
2. Calculate the net weight and gross weight for the component shown in fig below
 Density of material used is 7.86 gm/cc. Also calculate (i) Length of 14 mm dia bar required to forge one component. (ii) Cost of forging/piece if :
 Material cost = Rs. 80 per kg Labour cost = Rs. 5 per piece Overheads = 150 percent of labour cost





Subject: Renewable Energy Systems
Course: B.TECH (Mechanical)
Full Marks: 70

Roll No.....

Time: 3 Hours.

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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

1. Based on usability, Energy Resources are classified into _____.
a) Primary, secondary and tertiary resources
b) Primary and secondary resources
c) Primary, secondary, intermediate and tertiary resources
d) Primary, intermediate and secondary resources
2. Which of the following is not a type of primary resource?
a) Crude Oil b) Coal c) Hydrogen Energy d) Sunlight
3. 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
4. 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
5. 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
6. 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
7. Percentage of the total greenhouse gas emissions is due to Hydropower plants.
a) True b) False

8. Which Uranium isotope is used in nuclear power plants?
a) U-235 b) U-234 c) U-215 d) U-218
9. Based on the following statements, choose the correct option.
Statement I: The technology for harnessing fossil fuels is well developed.
Statement II: Fossil fuels are a cheap source of energy.
a) Statement -I is true, Statement -II is true and Statement -II is the correct explanation of Statement -I
b) Statement-I is true, Statement -II is true and Statement -II is not the correct explanation of Statement-II
c) Statement -I is true and Statement -II is false
d) Statement -I is false and Statement -II is true
10. 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
11. What is aperture area in a solar collector?
a) Area of the system
b) Area in the receiver that receives the solar radiation
c) Area occupied by the system after installation
d) Cross-sectional area of the receiver
12. Aperture area of a solar collector is roughly equal to _____.
a) Coolant area b) Generator area c) Absorber area d) System area

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Explain the setup for wind mills with neat sketch.
2. Elaborate the future prospects of solar energy in Indian market.
3. Explain solar pond and solar heater with diagram.
4. Differentiate between impulse and reaction turbine.
5. What is correlation between energy and sustainable development?
6. What is difference between beam radiation and diffused radiation?

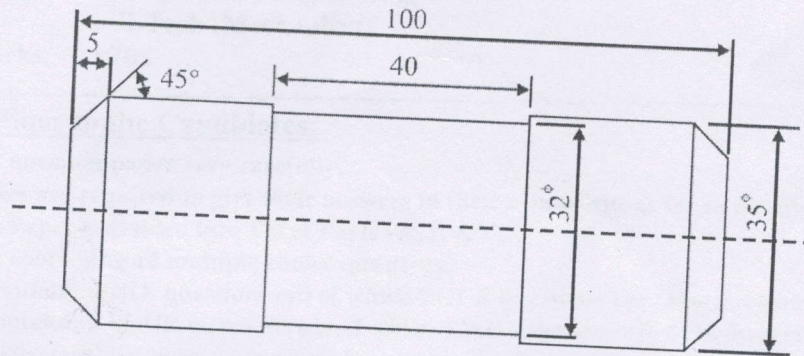
PART C

ANSWER ANY TWO OUT OF FOUR

(2 x15=30)

1. Explain the working principle, applications, advantages and disadvantages of solar dryers with neat diagram.
 - a) Differentiate between conventional and non-conventional sources of energy.
2. b) Classify different types of solar panel. Explain
3. Describe the factors for site selection for solar power plant.
4. Explain the different types of instruments used for solar radiation measurement.

3. List the major factors to be considered for selecting cutting velocity for machining operations?
 A mild steel bar 100 mm long and 38 mm in diameter is turned to 35 mm dia. and was again turned to a diameter of 32 mm over a length of 40 mm as shown in the Fig. The bar was machined at both the ends to give a chamfer of $45^\circ \times 5$ mm after facing. Calculate the machining time. Assume cutting speed of 60 m/min and feed 0.4 mm/rev. The depth of cut is not to exceed 3 mm in any operation.



4. What is break even analysis?

Calculate the total cost of CI (Cast Iron) cap shown in Fig. from the following Data:

Cost of molten iron at cupola spout	= Rs. 30 per kg
Process scrap	= 17 percent of net wt. of casting
Process scrap return value	= Rs. 5 per kg
Administrative overhead charges	= Rs. 2 per kg of metal poured.
Density of material used	= 7.2 gms/cc

The other expenditure details are:

Process	Time/ piece	Labour charges per hr.	Shop overheads per hr.
Moulding and pouring	10 min	Rs. 30	Rs. 30
Casting removal, gate cutting etc.	4 min	Rs. 10	Rs. 30
Fettling and inspection	6 min	Rs. 10	Rs. 30

