Mechnical Engineering Sample Papers

1 Stokes theorem connects
A) a line integral and a surface integral
B) a surface integral and a volume integral
C) a line integral and a volume integral
D) gradient of a function and its surface integral
Answer : (A)

2 A solar collector receiving solar radiation at the rate of 0.6 k W/m2 transforms it to the internal energy of a fluid at an overall efficiency of 50%. The fluid heated to 350 K is used to run a heat engine which rejects heat at 313 K. If the heat engine is to deliver 2.5 kW power, the minimum area of the solar collector required would be
A) 8.33m2
B) 16.66m2
C) 39.68m2
D) 79.36m2
Answer : (D)

3 When the temperature of a solid metal increases,
A) strength of the metal decreaes but ductility increases
B) both strength and ductility of the metal decrease
C) both strength and ductility of the metal increase
D) strength of the metal increases but ductility decreases
Answer : (A)

4 A company produces two types of toys: P and Q. Production time of Q is twice that of P and the company has a maximum of 2000 time units per day. The supply of raw material is just sufficient to produce 1500 toys (of any type) per day. Toy type Q requires an electric switch which is available @ 600 pieces per day only. The company makes a profit of Rs. 3 and Rs. 5 on type P and Q respectively. For maximization of profits, the daily production quantities of P and Q toys should respectively be
A) 100, 500
B) 500, 1000
C) 800, 600
D) 1000, 1000
Answer : (C)

5 A spherical thermocouple junction of diameter 0.706 mm is to be used for the measurement of temperature of a gas stream. The convective heat transfer co-efficient on the bead surface is 400 W/m2K. Thermophysical properties of thermocouple material are k = 20 W/mK, C = 400 J/kg K and r = 8500 kg/m3. If the thermocouple initially tot 30°C is placed in a hot stream of 300°C, the time taken by the bead to reach 298°C, is
A) 2.35 s

B) 4.9 s
C) 14.7 s
D) 29.4 s
Answer : (B)

6 In a spring-mass system, the mass is 0.1 kg and the stiffness of the spring is 1 kN/m. By introducing a damper, the frequency of oscillation is found to be 90% of the original value. What is the damping coefficient of the damper?
A) 1.2 N.s/m
B) 3.4 N.s/m
C) 8.7 N.s/m
D) 12.0 N.s/m
Answer : (C)

7 In a machining operation, doubling the cutting speed reduces the tool life to 1/8 of the original value. The exponent n in Taylor
A) 1/8
B) 1/4
C) 1/3
D) 1/2
Answer : (C)

8 In a rolling process, sheet of 25 mm thickness is rolled to 20 mm thickness. Roll is of diameter 600 mm and it rotates at 100 rpm. The roll strip contact length will be
A) 5 mm
B) 39 mm
C) 78 mm
D) 120 mm
Answer : (A)

9 A soldering operation was work-sampled over two days (16 hours) during which an employee soldered 108 joints. Actual working time was 90% of the total time and the performance rating was estimated to be 120 percent. If the contract provides allowance of 20 percent of the total time available, the standard time for the operation would be
A) 8 min
B) 8.9 min
C) 10 min
D) 12 min
Answer : (D)

10 A welding operation is time-studied during which an operator was pace-rated as 120%. The operator took, on an average, 8 minutes for producing the weld-joint. If a total of 10% allowances are allowed for this operation, the expected standard production rate of the weld-joint (in units per 8 hour day) is
A) 45

B) 50
C) 55
D) 60
Answer : (A)

11 In PERT analysis a critical activity has
A) maximum Float
B) zero Float
C) maximum Cost
D) minimum Cost
Answer : (B)

12 Environment friendly refrigerant R134a is used in the new generation domestic refrigerators. Its chemical formula is
A) CH C1 F2
B) C2 C13 F3
C) C2 C12 F4
D) C2 H2 F4
Answer : (D)