CBCS SCHEME

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Management and Engineering Economics

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
      2. Use of Interest factors table is permitted.

Module-1

1 a. Define meaning of Management and explain characteristics of Management. **(06 Marks)**
   b. Discuss different Levels of Management. **(06 Marks)**
   c. Briefly explain the early management approaches. **(08 Marks)**

OR

2 a. Discuss the importance and purpose of planning process. **(10 Marks)**
   b. With the help of block diagram, explain Hierarchy of plans. **(10 Marks)**

Module-2

3 a. List and explain in brief the Principles of Organization. **(14 Marks)**
   b. Discuss the need of Committees in an organization with classification. **(06 Marks)**

OR

4 a. Discuss the three types of leadership styles mentioning their advantages and disadvantages. **(10 Marks)**
   b. With the aid of block diagram, explain Maslow's Hierarchy of Needs theory. **(10 Marks)**

Module-3

5 a. Engineers are now expected not only to generate novel technological solution but also to make skillfull financial analysis of the effects of implementation – discuss. **(06 Marks)**
   b. State and explain the law of supply and demand mentioning the factors influencing it. **(08 Marks)**
   c. Determine the effective interest rate for a nominal annual rate of 6% that is compounded:
      (i) Semi-annually   (ii) Quarterly   (iii) Monthly   (iv) Daily **(06 Marks)**

OR

6 a. Explain time value of money assuming amount of your choice and draw the cash flow diagram. **(08 Marks)**
   b. A person wishes to have a future sum of Rs.1,00,000 for his son's education after 10 years from now. What is the single payment that he should deposit now so that he gets desired amount after 10 years? The bank gives 15% interest rate compounded annually. **(04 Marks)**
   c. A celebrity is at the height of his career. He wants to invest Rs.10 lakhs from the end of this year and follow it up with 9 lakhs, 8 lakhs and so on for the next five years, when his income would go on diminishing. Find the maturity amount 6 years later if a film producer agrees to pay him 15% rate of interest, compounded annually. **(08 Marks)**

Module-4

7 a. An engineer has two bids for an elevator to be installed in a new building. The details of the bids for the elevators are as follows:

Bid	Engineer's estimates		
	Initial cost (Rs.)	Service life (years)	Annual Operations & Maintenance Cost (Rs.)
Alpha Elevator Inc.	4,50,000	15	27,000
Beta Elevator Inc.	5,40,000	15	28,500

Determine which bid should be accepted, based on the present worth method of comparison assuming 15% interest rate, compounded annually. **(10 Marks)**

b. A person owns a corner plot. He must decide which of the several alternatives to select in trying to obtain a desirable return on his investment. After much study and calculation, he decides that two best alternatives are given in the following table:

Particulars	Alternative I	Alternative II
First cost (Rs.)	20,00,000	36,00,000
Annual property taxes (Rs.)	80,000	1,50,000
Annual Income (Rs.)	8,00,000	9,80,000
Life of building (years)	20	20
Salvage Value (Rs.)	0	0

Evaluate the alternatives based on the Future Worth Method at i = 12%. **(10 Marks)**

OR

8   a. Define the following terms: (i) MARR   (ii) IRR   (iii) ERR   **(05 Marks)**
   b. What are the clues for IRR calculations? **(05 Marks)**
   c. Farmhouse can be purchased for Rs.90,000 and the expected resale value after 20 years is Rs.60,000. If the annual rental income is Rs.11,800 and expenses Rs.4700, what will be the rate of return earned on this farmhouse? **(10 Marks)**

Module-5

9   a. Explain how selling price is determined for a product with a block diagram. **(06 Marks)**
   b. The expenditure incurred in manufacturing a machine is as follows:

   1.   Material consumed   Rs.55,00,000
   2.   Indirect factory wages   Rs.8,00,000
   3.   Director's fee   Rs.3,00,000
   4.   Advertisement   Rs.1,00,000
   5.   Net profit   Rs.1,20,000
   6.   Depreciation on sales department car   Rs.11,000
   7.   Printing & Stationary   Rs.2500
   8.   Depreciation of plant   Rs.45,000
   9.   Direct wages   Rs.6,50,000
   10. Factory rent   Rs.60,000
   11. Telephone & postage charges   Rs.15,000
   12. Gas & Electricity   Rs.50,000
   13. Office salaries   Rs.2,10,000
   14. Office rent   Rs.50,000
   15. Showroom rent   Rs.1,50,000
   16. Salesman commission   Rs.26,500
   17. Sales dept. car expenses   Rs.15,000

   Estimate the selling price. **(14 Marks)**

OR

10 a. List and explain five methods of depreciation. **(10 Marks)**
   b. Discuss the various causes of depreciation. **(05 Marks)**
   c. A company has purchased an equipment whose first cost is Rs.1,00,000 with an estimated life of Eight years. The estimated salvage value of the equipment at the end of its life time is Rs.20,000. Determine the depreciation charge and book value at the end of various (eight) years using straight line method of depreciation. **(05 Marks)**

* * * * *

USN | 1 | K | S | L | 7 | M | G | 0 | 6 | 7 |

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Dynamics of Machinery

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Enumerate the concept of static equilibrium of a body subjected to a system of (i) Two forces (ii) Three forces (iii) Member with two forces and a torque **(06 Marks)**

     b. A four bar mechanism is shown in Fig.Q1(b), which is acted upon by a force $P = 100 \underline{|120°}$ N on link CD. The dimensions of various link are AB = 40 mm, BC = 60 mm, CD = 50 mm, DA = 30 mm and DE = 20 mm. Determine the magnitude and direction of input torque T_2 on link AB for static equilibrium of the mechanism.
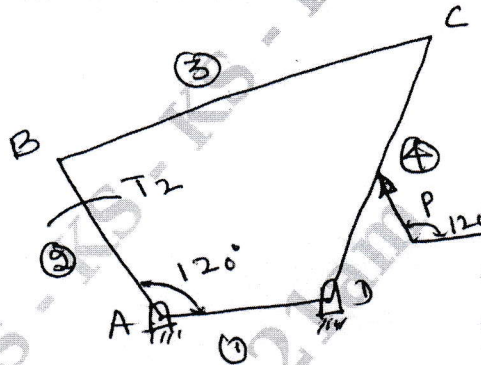

Fig.Q1(b)   **(14 Marks)**

OR

2 a. Explain the D'Alembert's principle and discuss on its significance. **(04 Marks)**

     b. In a vertical double acting engine, the connecting rod is 4.5 times the crank. Stroke of the piston is 400 mm and the mass of the reciprocating parts is 100 kg. The engine runs at 250 rpm. If the net load on the piston due to steam pressure is 25 kN, when the crank has turned through an angle of 120° from top dead centre. Determine :

         (i) Net force on the piston
         (ii) Thrust in the connecting rod along connecting rod
         (iii) Thrust on the sides of cylinder walls
         (iv) Crank pin effort
         (v) Thrust on crank shaft bearing
         (vi) Turning moment on the crank shaft   **(16 Marks)**

Module-2

3 a. Discuss on the concept of static and dynamic balancing. **(04 Marks)**

     b. Four masses A, B, C and D are completely balanced. Masses C and D make angles of 90° and 210° respectively with B in the same sense. The plane containing B and C are 300 mm apart. Masses A, B, C and D can be assumed to be concentrated at radii of 360 mm, 480 mm, 240 mm and 300 mm respectively. The massed B, C and D are 15 kg, 25 kg and 20 kg respectively. Determine:

         (i) Mass A and its angular position
         (ii) Position of planes A and D.   **(16 Marks)**

OR

4 A four crank engine has two outer cranks set at 120° to each other and their reciprocating masses are 400 kg each. The distance between the planes of rotation of adjacent cranks are 450 mm, 750 mm and 600 mm. If the engine is to be incomplete primary balance, find the reciprocating mass and the relative angular position for each of the inner cranks. If the length of each crank is 300 mm, length of each connecting rod is 1.2 m and the speed of rotation is 240 rpm, what is the maximum secondary unbalanced force? **(20 Marks)**

Module-3

5 a. Explain the following term relative governors:
   (i) Stability
   (ii) Sensitiveness
   (iii) Isochromism
   (iv) Hunting **(04 Marks)**

   b. The arms of a porter governor are each 250 mm long and pivoted on the governor axis. The mass of each ball is 5 kg and the mass of central sleeve is 30 kg. The radius of rotation of the balls is 150 mm, when the sleeve begins to rise and reaches a value of 200 mm for maximum speed. Determine the range of the Governor. If the friction at the sleeve is equivalent of 20 N of load at the Sleeve. Determine how the speed range is modified. **(16 Marks)**

OR

6 a. With neat sketches, enumerate on the effect of Gyroscopic couple on the steering, pitching and rolling of a ship. **(09 Marks)**

   b. A ship is propelled by a rotor of mass of 2000 kg rotates at a speed of 2400 rpm. The radius of gyration of rotor is 0.4 m and spins clockwise direction, when viewed from bow (Front) end. Find the gyroscopic couple and its effect when
   (i) The ship takes left turn at a radius of 350 m with a speed of 35 kmph.
   (ii) The ship pitches with the bow rising at angular velocity of 1 rad/sec.
   (iii) The ship rolls at an angular velocity of 0.15 rad/sec. **(11 Marks)**

Module-4

7 a. Define the following terms:
   (i) Simple Harmonic Motion
   (ii) Resonance
   (iii) Natural frequency
   (iv) Phase difference **(08 Marks)**

   b. Add the following harmonic motions analytically and check the solution graphically:
   $$x_1 = 4\cos(\omega t + 10°) \quad \text{and} \quad x_2 = 6\sin(\omega t + 60°)$$ **(12 Marks)**

OR

8 a. Explain the energy method of finding natural frequency of spring-mass system. **(10 Marks)**
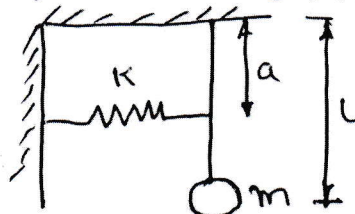   b. Find the natural frequency of the system shown in Fig.Q8(b).

Fig.Q8(b) **(10 Marks)**

Module-5

9 a. Set up a differential equation for a spring mass damper system and obtain complete solution for a under damped system. **(10 Marks)**

   b. The measurement on a mechanical vibrating system shows that the mass of 10 kg and that the spring can be combined to give an equal spring stiffness of 5 N/mm. If the vibrating system have a dashpot attached which exerts a force of 40 N when the mass have a unit velocity of 1 m/sec. Determine:
   (i)   Critical damping coefficient
   (ii) Damping factor
   (iii) Logarithmic decrement
   (iv) Ratio of any two consecutive amplitude **(10 Marks)**

OR

10 a. Derive an expression for magnification factor or amplitude ratio for spring mass system with viscous damping subjected to Harmonic force. **(10 Marks)**

    b. A mass of 100 kg has been mounted on a spring dash pot system having stiffness of 19,600 N/m and damping coefficient 100 N-S/m. The mass acted upon by a harmonic force of 39 N at the undamped natural frequency of the system. Find:
    (i)   Amplitude of vibration of the mass
    (ii) Phase difference between the force and displacement
    (iii) Force transmissibility ratio **(10 Marks)**

* * * * *

USN | | | | | | | | | |

17ME53

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Turbomachines

Time: 3 hrs.
Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Define Turbomachine. With neat sketch, explain the parts of Turbomachine.   (04 Marks)
    b. Define specific speed of pump. Derive an expression for the same in terms of discharge speed and head.   (06 Marks)
    c. A Fransis turbine model is built to scale 1:5 the data for the model is P = 4kW, N = 3500rpm H = 2m and prototype H = 6m. Assume that the overall efficiency of the model as 70%. Calculate: i) Speed of the prototype   ii) Power of the prototype. Use Moody's equation.   (10 Marks)

OR

2   a. Define Polytropic Efficiency of turbine. Show that the Polytropic Efficiency during Expansion process is given by $\eta_p = \dfrac{\ln \dfrac{T_2}{T_1}}{\dfrac{\gamma - 1}{\gamma} \ln \dfrac{P_2}{P_1}}$ (10 Marks)

    b. In a three stage turbine the pressure ratio of each stage is 2 and stage efficiency is 0.75. Calculate overall efficiency and reheat factor.   (10 Marks)

Module-2

3   a. Derive alternate form of Euler's turbine equation and explain the significance of each energy component.   (10 Marks)
    b. At a 50% reaction stage axial flow turbine the mean blade diameter is 0.6mts. The maximum utilization factor is 0.85 and steam flow rate is 12kg/sec. Calculate the inlet and outlet absolute velocities and power developed if the speed is 2500rpm.   (10 Marks)

OR

4   a. In a turbomachine prove that the maximum utilization factor is given by $\in_{max} = \dfrac{2\phi \cos \alpha_1}{1 + 2\phi R \cos \alpha_1}$ where ϕ = speed ration, R = degree of reaction, α_1 = nozzle angle.   (10 Marks)

    b. Draw the velocity triangles at inlet and outlet of an axial flow compressor from the following data. Degree of reaction 0.5 inlet blade angle 45°. Axial velocity of flow which is constant throughout 120m/sec, speed of rotation 6500rpm, radius of rotation 20cm, blade speed of inlet is equal to blade speed at outlet. Calculate angles at inlet and outlet. Also calculate power needed to handle 1.5kg/s of air.   (10 Marks)

Module-3

5   a. Why compounding of steam turbine necessary? Describe the velocity compounding of steam turbine with neat sketch.   (08 Marks)
    b. Show that for a two row Curtis steam turbine stage in the absence of friction for axial discharge at exit under maximum utilization condition $U / V_1 = \dfrac{\cos \alpha_1}{4}$ where U = blade speed V_1 = absolute velocity at inlet α_1 = nozzle angle at inlet.   (12 Marks)

OR

6   a.   Define degree of reaction for reaction turbine and derive an expression for the some for 50% reaction turbine. **(10 Marks)**

    b.   In a Parson's turbine, the axial velocity of flow of steam is 0.5 times the mean blade speed. The outlet angle of the blade is 20° diameter of the blade ring is 1.3m and rotational speed 3000rpm. Determine inlet blade angles, power developed for steam flow of 65kg/sec and isentropic enthalpy drop, if the stage efficiency is 80%. **(10 Marks)**

Module-4

7   a.   Show that the specific speed of Pelton wheel is given by $n_s = 206.63 \dfrac{\sqrt{n}}{m}$ where n = number of jets used for the flow, m = wheel diameter to jet diameter ratio. Assume the jet velocity coefficient as 0.97 speed ratio as 0.45 and efficiency of the turbine as 0.89. **(08 Marks)**

    b.   A double overhung Pelton wheel unit is to produce 30000 kW of a generator under an effective head 300m at the base of the nozzle. Find the size of the jet. Mean diameter of the runner speed and specific speed of each Pelton turbine. Assume generator η = 93% Pelton wheel η = 0.85 speed ratio = 0.46 jet velocity co-coefficient = 0.97 and jet ratio = 12. **(12 Marks)**

OR

8   a.   Draw a neat sketch of Francis turbine. Explain the function of draft tube. Also draw the typical velocity triangles of Fransis turbine. **(08 Marks)**

    b.   A Kaplan turbine working under head of 20m develops 11772kW of shaft power. The outer diameter of the runner is 3.5m and hub diameter is 1.75m. The guide blade angle of the extreme edge of the runner is 35°. The hydraulic and overall efficiencies of the turbine are 88% and 84% respectively. If the velocity of whirl is zero at outlet, determine: i) Runner vane angle at the inlet and outlet at the extreme edge of the runner   ii) Speed of turbine. **(12 Marks)**

Module-5

9   a.   Show that the pressure rise in the impeller of a centrifugal pump when the frictional and other losses in the impeller are neglected is given by $\Delta p = \dfrac{\rho}{2}\left[Vf_1^2 + U_2^2 - Vf_2^2 \cosec^2\beta_2\right]$.

    Vf_1 and Vf_2 are velocity of flow at inlet and outlet of the impeller U_2 = tangential speed of impeller at exit, β_2 = exit blade angle. **(10 Marks)**

    b.   A centrifugal pump is running at 1000 rpm. The outlet vane angle of the impeller is 45° and the velocity of flow of the outlet is 2.5m/sec. The discharge through the pump is 0.2m³/sec. When the pump is working against a head of 20m. If the monometric efficiency is 80% draw the outlet velocity diagram and calculate : i) The diameter of the impeller at the outlet ii) width of impeller at the outlet. **(10 Marks)**

OR

10 a.   With reference to centrifugal air compressor, explain the following:
    i) PreWhirl   ii) Surging   iii) Slip factor   iv) Choking. **(10 Marks)**

    b.   A centrifugal compressor runs at a speed of 15000rpm and delivers air at 30kg/sec, exit radius is 0.35m, relative velocity and vane angles at exit are 100m/s and 75° respectively. Assuming axial inlet and inlet stagnation temperature and pressure as 300K and 1 bar respectively, calculate: i) Torque   ii) The power required to drive compressor iii) The ideal head developed   iv) The workdone   v) The exit total pressure $(c_p)_{air}$ = 1.005kJ/kgK. **(10 Marks)**

* * * * *

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Design of Machine Elements – I

Time: 3 hrs.   Max. Marks: 100

Note:1. *Answer FIVE full questions, choosing one full question from each module.*
2. *Use of design data hand book permitted.*

Module-1

1 a. With flow diagram, explain the phases of design.   **(05 Marks)**
   b. List and explain the factors to be considered for selection of material for a machine component.   **(05 Marks)**
   c. A point in a structural member is subjected to plane stress as shown in Fig. Q1 (c). Determine the following :
   (i)   Normal and tangential stress on a plane inclined at 45°.
   (ii) Principal stresses and directions.
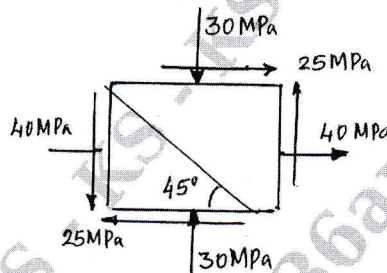   (iii) Maximum shear stress.   **(10 Marks)**

Fig. Q1 (c)

OR

2 a. What is stress concentration? Explain with neat sketches any three methods to reduce stress concentration in machine elements.   **(05 Marks)**
   b. A round shaft made of Grey Cast Iron FG200 with $\sigma_{ut} = 200$ MPa, is subjected to a bending moment of 15 N.m is as shown in Fig. Q2 (b). The theoretical stress concentration factor at fillet is 1.5. Determine the diameter 'd' and max stress at the fillet.   **(05 Marks)**
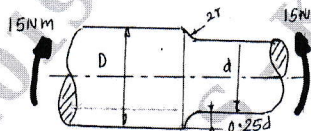

Fig. Q2 (b)

   c. A 50 mm steel rod supports a 9 kN load in addition to this a torsional moment of 100 N.m is applied on it as shown in Fig. Q2 (c). Determine the maximum tensile and maximum shear stresses.   **(10 Marks)**
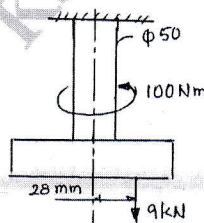

Fig. Q2 (c)

Module-2

3 a. Explain with sketches, the different types of varying stresses.   **(05 Marks)**
   b. Derive Soderberg equation for designing members subjected to fatigue loading. **(05 Marks)**

c. A steel cantilever beam is 200 mm long. It is subjected to an axial load varies from 150 N (compression) to 450 N (tension) and a transverse load at its free and which varies from 80 N (up) to 120 N (down). The Cantilever beam is of circular cross section having a diameter of 2 d for the first 50 mm and diameter 'd' for the remaining length. Determine its diameter using the following data. Use Soderberg equation.
   Factor of safety = 2 ; Yield stress = 330 MPa; Endurance limit = 300 MPa
   Stress concentration factor = 1.44 for bending,
                                 1.64 for axial loading,
   load correction factor = 0.7 for axial loading
                            1 for bending
   Size correction factor = 0.85; Notch sensitivity = 0.9
   Surface correction factor = 0.9   **(10 Marks)**

OR

4 a. Derive an expression for impact stress induced in a member subjected to axial load.
                                                                              (05 Marks)

   b. Design a rod of solid circular cross section of length 200 mm (placed vertical) to sustain an axial compressive load of 1000 N, that falls on it from a height of 10 mm. The material selected has a design stress of 80 N/mm^2 and Young's modulus = 2.1×10^5 N/mm^2.
                                                                              (05 Marks)

   c. A mass of 500 kg is being lowered by means of a steel wire rope having cross sectional area 250 mm^2. The velocity of the weight is 0.5 m/s, when the length of the extended rope is 20 m, the sheave gets stuck up. Determine the stress induced in the rope due to sudden stoppage of the sheave. Neglect friction. Take E = 190 GPa.   **(10 Marks)**

Module-3

5 A commercial steel shaft with allowable shear stress 40 MPa. With shock factors for bending and twisting is 1.5 and 1 respectively. The length of the shaft between bearings is 600 mm, carries a pulley of 400 mm dia meter having weight 400 N, mounted in middle of the shaft. Shaft receives 40 kW at 600 rpm by a flat belt drive. Power from motor shaft is transmitted through another pulley of diameter 600 mm weighing 600 N overhanging the right hand bearing by 200 mm. The belt drives on pulleys are right angles to each other. Take ratios of belt tensions as 3, determine the diameter of the shaft. Use ASME code for shaft design.   **(20 Marks)**

OR

6 a. Design a protected type CI flange coupling for a steel shaft transmitting 30 kW at 200 rpm. The allowable shear stress in the shaft and key materials 40 MPa. The maximum torque transmitted is 20% greater than full load torque. The allowable shear stress in the bolt is 60 MPa and allowable shear stress in the flange is 40 MPa.   **(10 Marks)**

   b. Design a socket and spigot type of cotter joint to connect two rods subjected to steady axial pull of 100 kN. The material used for socket end, spigot end and cotter is cast steel with $\sigma_y = 328.6$ MPa, take FoS as 4 for tension, 6 for shear and 3 for crushing based on tensile yield strength.   **(10 Marks)**

Module-4

7 a. Design a triple riveted longitudinal double strap butt joint with unequal strap for a boiler. The inside diameter of the longest course of the drum is 1.3 m. The joint is to be designed for a steam pressure of 2.4 N/mm^2. The working stresses to be used are $\sigma_t = 77$ MPa for plate material in tension, $\tau = 62$ MPa for rivet material in shear, $\sigma_c = 120$ MPa for rivet material in compression. Assume joint efficiency as 81%.   **(10 Marks)**

b. Determine the size of rivets required for the bracket shown in Fig. Q7 (b). Take permissible shear stress for the rivet material as 100 MPa. **(10 Marks)**
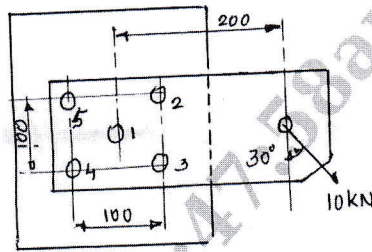

Fig. Q7 (b)

OR

8 a. The following Fig. Q8 (a) shows connections of eccentrically loaded welded joint. The allowable shear stress in the fillet weld using MS bar electrodes can be taken as 80 N/mm^2, find the thickness of the plate. **(10 Marks)**
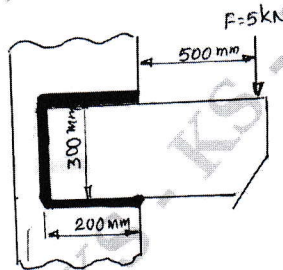

Fig. Q8 (a)

b. A shaft of rectangular cross section is welded to a support by means of fillet welds as shown in Fig. Q8 (b). Determine the size of the weld if the permissible shear stress in the weld material is 75 MPa. **(10 Marks)**
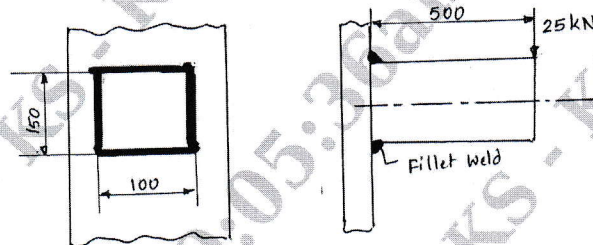

Fig. Q8 (b)

Module-5

9 a. A cylinder head is fastened to the cylinder of a compressor using 6 bolts of M20 size. Bolt material is C20 steel. The maximum fluid pressure is 3.5 MPa, cylinder diameter is 75 mm. A soft gasket is used. Assuming the initial tension required in each bolt is 40 kN, determine the factor of safety. **(10 Marks)**

b. In a hand vice, the screw has double start Acme thread of 25 mm internal diameter and 4 mm pitch. If the length of the lever is 300 mm; the maximum force that can be applied at the end of the lever is 250 N. Determine the force with which the job is held between the jaws of the vice. Take co-efficient of friction at the thread is 0.14, angle of thread $2\theta = 29°$. Neglect collar friction. **(10 Marks)**

OR

10 a. Explain self locking and overhauling. Derive an expression for torque required to lift the load on square threaded screw. **(10 Marks)**

b. A single threaded power screw of 25 mm diameter with a pitch of 5 mm, a vertical load on the screw reaches a maximum load of 500 N. The co-efficients of friction are 0.05 for the collar and 0.08 for the screw. The frictional diameter of the collar is 30 mm. Find the torque required to rise and lower the load. Also find the efficiency of the power screw. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | 1 | K | S | 1 | 7 | M | E | 0 | 9 | 3 | 17ME554

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Non-Traditional Machining

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. Define Non-Traditional Machining. What are the need for N.T.M process. Explain briefly.
                                                                                (06 Marks)
     b. What are the comparison between conventional and non-conventional machining. **(06 Marks)**
     c. What are the various aspects to be considered before selecting a N.T.M process? Discuss
         briefly.   **(08 Marks)**

OR

2   a. Give classification of N.T.M process.   **(06 Marks)**
     b. What are the specific advantages, limitations and applications of non-traditional machining
         processes?   **(10 Marks)**
     c. Enumerate the physical parameters of the Non-traditional machining process.   **(04 Marks)**

Module-2

3   a. With the help of neat sketch, explain working principle of ultrasonic machining process.
                                                                                (10 Marks)
     b. Explain with neat diagrams, process parameters in USM.   **(06 Marks)**
     c. What are the process characteristics of USM? Explain briefly.   **(04 Marks)**

OR

4   a. Explain with neat sketch, working principle of Abrasive Jet machining and also give
         advantages and applications of A.J.M process.   **(10 Marks)**
     b. With the help of neat sketch, explain water jet machining process and also give advantages
         and disadvantages of W.J.M.   **(10 Marks)**

Module-3

5   a. With a neat sketch, explain the working principle of ECM process.   **(10 Marks)**
     b. Explain with a neat sketch, Electro Chemical Grinding (ECG).   **(06 Marks)**
     c. What are the process parameters of ECM? Explain briefly.   **(04 Marks)**

OR

6   a. Explain the following in Chemical Machining Process :
         i) Maskants   ii) Etchants.   **(06 Marks)**
     b. Sketch and explain Electro Chemical Honing (ECH).   **(06 Marks)**
     c. Explain with neat sketches of chemical blanking and Chemical Milling process. **(08 Marks)**

Module-4

7   a. With the help of a neat diagram, working principle of Electrical Discharge Machining
         process.   **(08 Marks)**
     b. Explain with neat sketch, the travelling wire EDM process.   **(06 Marks)**
     c. Mention various dielectric flow pattern of EDM process. Explain any two with sketches.
                                                                                (06 Marks)

OR

8 a. Explain with neat diagram, construction and working principle of Plasma Arc Machining (PAM). **(10 Marks)**

   b. What are the process parameters of PAM? Explain briefly. **(05 Marks)**

   c. What are the safety precautions in PAM? Explain. **(05 Marks)**

Module-5

9 a. Explain with neat sketch, working principle of Laser Beam Machining process (LBM). **(08 Marks)**

   b. What are the advantages, limitations and applications of LBM? **(06 Marks)**

   c. What are the process parameters and characteristics of LBM? **(06 Marks)**

OR

10 a. Explain with the help of a neat diagram, Operation Principle of Electron Beam Machining (EBM). **(10 Marks)**

   b. What are the advantages , limitations and applications of EBM process? **(06 Marks)**

   c. Explain need for EBM and mechanism of metal removal of EBM process. **(04 Marks)**

* * * * *

CBCS SCHEME

USN | 1 | K | S | 1 | 7 | M | E | 0 | 2 | 8 |

17ME562

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Energy and Environment

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Discuss word energy scenario, with respect to production and consumption using relevant statistics. **(10 Marks)**
   b. Explain primary energy demand in India by fuel with sector wise comparison. **(10 Marks)**

OR

2 a. Outline with brief explanation the factors effects the India's energy development. **(10 Marks)**
   b. Explain:
   (i) The Rajiv Gandhi Grameena Vidyutikaran Yojana (RGGVY)
   (ii) Deen Dayal Upadhyana Grama Jyoti Yojana (DDUDJY)
   (iii) Energy Production in India – Coal (only) **(10 Marks)**

Module-2

3 a. A power plant of 200 MW installed capacity has following particulars:
   Capital cost = Rs.16,000/KW installed
   Interest and Depreciation = 12%
   Annual load factor = 60%
   Annual capacity factor = 54%
   Annual Running Charges = Rs.200 × 10^6
   Energy consumed by power plant auxiliaries = 6%
   Calculate the cost of power generation per KWh. **(10 Marks)**
   b. Explain:
   (i) Objective of Energy Management
   (ii) Audit
   (iii) Sample Report Content of Energy Audit **(10 Marks)**

OR

4 a. Discuss 10 steps methodology for detailed Energy Audit. **(10 Marks)**
   b. With a neat diagram, explain:
   (i) Hydrostorage (pumped storage)
   (ii) Fly wheel **(10 Marks)**

Module-3

5 a. Discuss how oxygen cycle is utilized in the eco system. **(10 Marks)**
   b. Discuss:
   (i) Food
   (ii) Food web
   (iii) Ecological pyramid **(10 Marks)**

OR

6 a. Discuss how carbon cycle is utilized in the eco system. (10 Marks)
   b. Described grassland eco system. What are its types? (10 Marks)

Module-4

7 a. Enumerate the water pollution causes and its effects. Mention control measures that can be initiated for mitigating the same. (10 Marks)
   b. Discuss Solid Waste Management Techniques (SWMT). (10 Marks)

OR

8 a. Discuss the role of an individuals in prevention of pollutions. (10 Marks)
   b. Elaborates the causes, effects and control measures of:
     (i) Soil pollution
     (ii) Noise pollutions (10 Marks)

Module-5

9 a. Discuss any two case studies related to pollution of environment in detail. (10 Marks)
   b. Explain sources of Air Pollution. (10 Marks)

OR

10 Write short notes on:
   a. Global warming (05 Marks)
   b. Acid Rain (05 Marks)
   c. Ozone layer depletion (05 Marks)
   d. Forest Conservation Act (05 Marks)

* * * * *