USN ☐☐☐☐☐☐☐☐☐☐   **18ME51**

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Management and 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 factor 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)**
   c.

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. Explain in brief different leadership styles. **(10 Marks)**
   b. Explain the essentials of a good sound control system. **(10 Marks)**

Module-3

5 a. Engineers are now expected not only to generate novel technological solutions but also to make skillful financial analysis of the effects of implementation. Discuss. **(06 Marks)**
   b. State and explain the law of supply is demand mentioning the factors influencing it. **(08 Marks)**
   c. Find the effective rate of interest for an actual rate of interest of 10% when compounded:
     (i) yearly   (ii) biannually   (iii) quarterly
     (iv) monthly   (v) daily   (vi) hourly **(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 45 year old person is planning for his retired life. He plans to direct Rs.30,000 from his bonus as investment every year for the next 15 years. The bank fives 12% interest rate compounded annually. Find the maturity value of his account when he is 60 years. **(04 Marks)**
   c. A person wants to gift a car to his daughter when she would turn 18 years, six years from now. He decides to put away money in her name during her next six birthdays. He wants to deposit Rs.25,000 in the year to go on increasing it by Rs.5000 every year for the next 6 years. If he estimates that a car would cost Rs. 5 lakhs when he wants to buy one, how much more money should be added to the maturity amount that he receives from the bank if it assumed at 11.5% compounded annually. **(08 Marks)**

Module-4

7 a. Two holiday cottages are under consideration. Compare the present worth of the cost of 24 year service, at an interest rate of 5% when neither cottage has a realizable cottage value.

	Cottage 1	Cottage 2
First cost	Rs.4500	Rs.10,000
Estimate life	12 years	24 years
Annual maintenance cost	Rs.1000	Rs.720

(10 Marks)

b. An investor can make three end of the year payments of Rs.15000 which are expected to generate receipts of Rs.10,000 at the end of the year 4 that will increase annually by Rs.2500 for the following 5 years. If the investor can earn a rate of return of 10% on the other 8 year investments in this alternative attractive? (10 Marks)

OR

8 a. Define the following terms: (i) MARR (ii) IRR (iii) ERR. What are the clues of IRR calculations? (10 Marks)

b. Rs.10 crores was generated by the management of an engineering college for the construction of its new mechanical science block. Annual maintenance of the block is estimated to be Rs.10 lakh. In addition Rs.12 lakh will be needed every 10 years for painting and Hoyer repairs. If the budget granted has to take care of perpetual maintenance, how much of the amount can be used for initial construction costs? Deposited funds can earn 6% rate of interest compounded annually. Assume that taxes and inflation do not come into picture. (10 Marks)

Module-5

9 a. List and explain five methods of depreciation. (10 Marks)

b. Discuss the various causes of depreciation. (05 Marks)

c. A high-tech bus was initially bought for Rs.50 lakhs. Its salvage value after 5 years of service would be 10 lakh. In its life time it can be driven for a distance of 10 lakhs kms in its 5th year of operation. If it has already traveled a total distance of 8 lakh kms, find the depreciation of the bus at the point. (05 Marks)

OR

10 a. Explain how selling price is determined for product with a block diagram. (06 Marks)

b. Computers purchased by a public utility cost Rs.7000 each, past records indicate that they have useful life of 5 years, after which they will be disposed off, with no salvage value. The company currently has capital of 7%. Determine the following by using straight line method.
   i) Depreciation charges per year
   ii) Depreciation reserve accumulated at the end of 3rd year.
   iii) Book value at the end of third year. (06 Marks)

c. The original assets of the company are Rs.5,80,000. The life of the plant is 9 years. If the scrap value of the time is expected to be 80,000. Calculate the depreciation at the end of each year by sum of the year method. (08 Marks)

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18ME52

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Design of Machine Elements – I

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of design data hand book is permitted.
3. Assume missing data.

Module-1

1 a. Discuss about the Design Process. **(05 Marks)**

   b. List different standards and design code. **(05 Marks)**

   c. The state of stress at a point in a strained material is as shown in Fig.1(c). Determine:
      i) Direction of the principal planes
      ii) The magnitude of principal stresses
      iii) The magnitude of the maximum shear stresses its direction. **(10 Marks)**
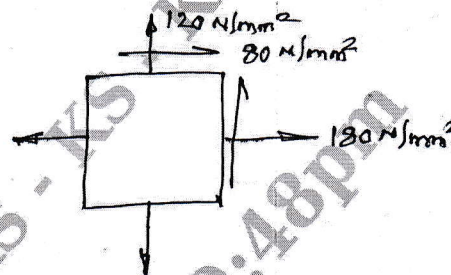
Fig.Q.1(c)

OR

2 a. Define stress concentration factor and discuss about the methods to reduce stress concentration factors. **(08 Marks)**

   b. Discuss about the following theories of failure:
      i) Maximum shear stress theory
      ii) Distortion energy theory. **(04 Marks)**

   c. A flat bar, shown in Fig.Q.2(c) is subjected to an axial load of 5×10^5N. Assuming the stress in the bar limited to 400N/mm², determine the thickness of the bar. **(08 Marks)**

Fig.Q.2(c)

Module-2

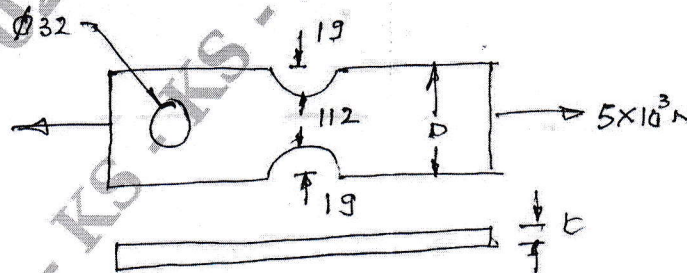3 a. Derive an equation for impact stress. When component is subjected to an axial load? **(06 Marks)**

   b. A beam of 300mm depth "I" section is resting on two supports 5m apart. It is loaded by a weight of 5000N falling through a height "h" and striking the beam at midpoint. Moment of inertia of the section is 9.6×10^7 mm, assuming $E = 21 \times 10^4$ N/mm^2. Investigate and suggest the permissible value "h" if the stress is limited to 130N/mm^2. **(10 Marks)**

   c. With a neat sketch, explain different types of varying stresses. **(04 Marks)**

OR

4 a. Discuss about the Solderberg equation for designing member subjected to fatigue loading. **(06 Marks)**

   b. A cold drawn steel rod of circular cross section is subjected to a variable bending moment of 565Nm to 1130Nm as the axial load varies from 430-ON to 13500N. The maximum bending moment occurs at the same instant as that of axial load is maximum. Determine the required diameter of the rod for FOS is 2. Neglect stress concentration and column effect. Take $\sigma u = 550$MPa, $\sigma y = 470$MPa endurance limit as 50% of the ultimate strength and size. Load and surface correction co-efficients as 0.85, 1 and 0.85 respectively. **(14 Marks)**

Module-3

5 A steel solid shaft. 1m long supported between two bearings has two gears keyed to it. The pinion having 40 teeth of 5mm module is located 200mm to the right of the left hand side bearing and receiver 20kW power at 1000rpm from a gear mounted directly below it. The another gear having 50 teeth of 8mm module is located at a distance of 400mm to the left of the right hand bearing and delivers power to another gear mounted directly behind it. The gears are 14½° involute tooth form. The shaft rotates clockwise as seen from the left bearing. If the shaft material selected has an ultimate strength of 500MPa and yield point of 310MPa, determine the necessary diameter of the shaft using combined shock and fatigue factor for bending and twisting as 2 and 1.5 respectively. Neglect the weight of gears. **(20 Marks)**

OR

6 a. With neat sketch, explain different types of keys. **(04 Marks)**

   b. A shaft is required to transmit 16kW at 500rpm. Select a suitable key of rectangular cross-section, if the hub length is 60mm. Take allowable shear and crushing stresses for material used as 72MPa and 140MPa respectively. **(06 Marks)**

   c. Design a rigid flange coupling to transmit 18kW at 1440rpm the allowable shear stress for CI flange is 4MPa. The shaft, key and Bolts are made of annealed steel having allowable shear stress of 93MPa. Allowable crushing stress for key is 186MPa. **(10 Marks)**

Module-4

7 a. Explain with neat sketch about the failures in rivets. **(06 Marks)**

   b. An air vessel of 1m diameter has longitudinal triple riveted lap-joint [zig-zag type), the maximum air pressure in the vessel is 2MPa. Design the riveted joint if the safe working stress in tension, shear and crushing are 125MPa, 90MPa and 165MPa. **(14 Marks)**

OR

8 a. A shaft of rectangular cross section is welded to a support by means of fillet welds, as shown in Fig.Q.8(a). Determine the size of the welds, if the permissible shear stress in the weld is limited to 75N/mm². **(10 Marks)**
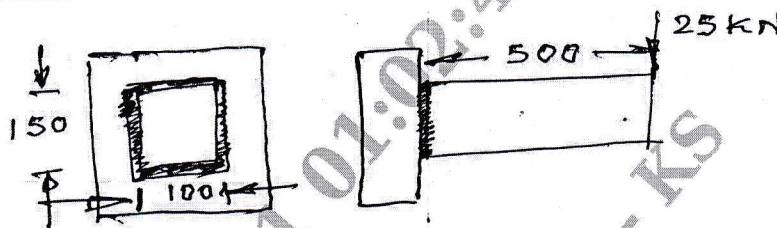
Fig.Q.8(a)

   b. A plate of 80mm wide and 10mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to a load of 50kN. Find the length of weld so that maximum stress does not exceed 50N/mm². Consider the joint under static loading and then under dynamic loading. **(10 Marks)**

Module-5

9 a. Explain self locking and over hauling in power screws. **(06 Marks)**
   b. Design a sleeve type cotter joint. Connected to a two tie rod, subjected to an axial pull of 60kN. The allowable stress of c-30 material used for the rod are $\sigma t = 65N/mm^2$, $\sigma c = 75N/mm^2$ and $t = 65N/mm^2$. Cast steel for the sleeve has the allowable stresses of $\sigma t = 70N/mm^2$, $\sigma c = 110N/mm^2$ and $t = 45N/mm^2$. **(14 Marks)**

OR

10 Design a screw jack with a lift of 300mm to lift a load of 50kN. **(20 Marks)**

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Dynamics of Machines

Time: 3 hrs.   Max. Marks: 100

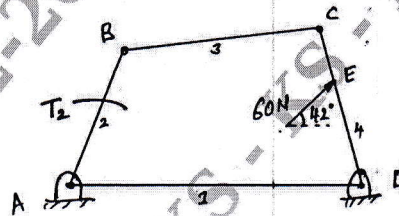**Note:** *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   For the static equilibrium of the four bar mechanism shown in Fig. Q1, determine the input torque T_2 on the link AB for a force of 60N acting on link CD. Dimensions are AB = 500mm, BC = 660 mm , CD = 560mm , Fixed link AD = 1000mm , DE = 373mm.   **(20 Marks)**

Fig. Q1

OR

2   a.   State the condition of equilibrium of a body subjected to a system of
         i) two force   ii) two forces and a torque.   **(06 Marks)**
    b.   In a vertical engine, the length of connecting rod is 4.5 times the crank. The mass of reciprocating parts is 120kg and the crank length is 220mm. The engine runs at 250 rpm. The load on the piston due to steam pressure is 25kN, when the crank has turned through an angle of 120^0 from the top dead centre. Determine   i) Net effective driving force on the piston   ii) Thrust on connecting rod   iii) Thrust on the bearings   iv) Turning moment on the crank shaft.   **(14 Marks)**

Module-2

3   a.   Explain Static and Dynamic balancing of rotating masses.   **(06 Marks)**
    b.   A shaft carries four masses of magnitude 200kg, 300kg, 240kg and 260kg with corresponding radii of rotation are 0.2m, 0.15m, 0.25m and 0.3m respectively. The angles between the successive masses are 45^0, 75^0 and 135^0 respectively. Find the magnitude and position of the balance mass required at a radius of 0.2m.   **(14 Marks)**

OR

4   The firing order in a six cylinder four stroke in – line engine is $1 - 4 - 2 - 6 - 3 - 5$. The piston stroke is 100mm and length of each connecting rod is 200mm. The pitch of the cylinder center lines are 100mm, 100mm, 150mm , 100mm and 100mm respectively. The reciprocating mass per cylinder is 1kg and the engine runs at 3000 rpm. Determine the unbalanced primary and secondary forces and couples, if any. Take central plane of the engine as reference plane.
                                                                              (20 Marks)

Module-3

5   a.   Define the following terms with respect to working of governors :
         i) Sensitiveness   ii) Isochronism   iii) Stability   iv) Controlling force.   **(08 Marks)**
    b.   In a Hartnell governor, the extreme radii of rotation of the balls are 40mm and 60mm and corresponding speeds are 210 rpm and 230rpm. The mass of each ball is 3kg. The ball and sleeve arms are equal. Determine   i) Spring loads at minimum and maximum speeds.
         ii) Stiffness of the spring   iii) Initial compression of the spring.   **(12 Marks)**

OR

6 a. Derive an expression for Gyroscopic Couple $C = I \, W \, W_p$ with usual notations. **(08 Marks)**

b. Each wheel of a motorcycle is of 600mm diameter and has a moment of inertial of $1.2 \, kg - m^2$. The total mass of the motorcycle and the rider is 180kg and combined centre of mass is 580mm above the ground level when motor cycle is upright. The moment of inertia of the rotating parts of engine is $0.2 kg - m^2$. The engine speed is 5 times the speed of the wheels and is in the same sense. When the motorcycle takes a turn of 35m radius at a speed of 54km/h, determine the Gyroscopic couple, Centrifugal couple and Balancing couple in terms of angle of heel θ. Hence determine angle of heel necessary. **(12 Marks)**

Module-4

7 a. Derive the equation for natural frequency of the spring mass system considering the mass of the spring into account. **(10 Marks)**

b. Find the natural frequency of the system shown in Fig. Q7(b), using Newton's method. **(10 Marks)**

Fig. Q7(b)

OR
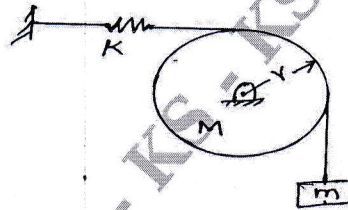
8 a. Define the following with respect to vibration : i) Natural frequency   ii) Resonance   iii) Damping factor   iv) Logarithmic decrement. **(08 Marks)**

b. A vibrating system consists of a mass of 50kg, a spring with a stiffness of 30kN/m and a damper. The damping provided is only 20% of the critical value. Determine
   i)   Damping factor   ii)   Critical damping coefficient
   iii) Natural frequency of damped vibration   iv)   Logarithmic decrement
   v)   Ratio of two consecutive amplitudes. **(12 Marks)**

Module-5

9 a. Derive an expression for magnification factor for a spring mass system with viscous damping subjected to harmonic force. **(10 Marks)**

b. A machine of mass 1000kg is acted upon by an external force 2450N at a frequency of 1500rpm. To reduce the effects of vibration, isolator of rubber having a static deflection of 2mm under the machine load and an estimated damping factor of 0.2 are used. Determine
   i)   Amplitude of vibration   ii)   Force transmitted to the foundation. **(10 Marks)**

OR

10 a. The support of a spring mass system is vibrating with an amplitude of 8mm and a frequency of 1100 cycles/min. If the mass is 0.8kg and the spring has a stiffness of 2000N/m, determine the amplitude of vibration of the mass. What is the amplitude of a damper with damping factor of 0.2 is introduced in the system? **(10 Marks)**

b. A rotor has a mass of 12kg and is mounted midway on a 24mm diameter horizontal shaft supported simply at the ends by two bearings. The bearings are 1m apart. The shaft rotates at 2400 rpm. If the centre of mass of the rotor is 0.11mm away from the geometric centre of the rotor due to manufacturing defect, find   i) the amplitude of the steady state vibration   ii) the dynamic force transmitted to the bearing. Take E = 200 GPa. **(10 Marks)**

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18ME54

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Turbo Machines

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1   a. Draw and explain the part of a general Turbo machine. **(06 Marks)**
    b. Distinguish between Turbo machines with positive displacement machines. **(06 Marks)**
    c. A turbine model of 1:10 develops 2kW under a head of 6m at 500rpm. Find the power developed by the prototype under a head of 40m. Also find the speed of the prototype and its specific speed. Assume the turbine efficiencies to remain same. **(08 Marks)**

OR

2   a. Define the static and stagnation state of fluid. **(04 Marks)**
    b. Define the following with the help of h-s diagram for power absorbing and power generating machine :
       i)   Total to total efficiency
       ii) Total to static efficiency
       iii) Static to total efficiency
       iv) Static to static efficiency **(08 Marks)**
    c. Show that the polytropic efficiency during expansion process is given by

$$\eta_p = \frac{\ell n(T_2 / T_1)}{\dfrac{\gamma - 1}{\gamma} \ell n(P_1 / P_2)}$$

(08 Marks)

Module-2

3   a. Define Utilization factor and degree of reaction. Also derive the relation between utilization factor and degree of reaction. **(10 Marks)**
    b. Show that for maximum utilization of axial flow turbine with reaction $= \dfrac{1}{4}$. The speed ration given by $U\!\!\Big/_{\!V_1} = \dfrac{2}{3} \cos\alpha_1$. Where U = Blade speed, V_1 = Inlet absolute velocity α_1 = Inlet Nozzle angle. **(10 Marks)**

OR

4   a. With necessary velocity triangles and assumption derive the expression for effect of blade discharge angle on energy transfer and degree of reaction for radial flow machines. **(10 Marks)**
    b. At a stage in a 50% Reaction axial flow machine running at 3000rpm, the blade mean diameter is 685mm. If the maximum utilization for the stage is 0.915. Calculate the absolute velocity at inlet and outlet and draw velocity triangles. Also find power output for flow rate of 15 Kg/s. **(10 Marks)**

Module-3

5   a. What is compounding of steam turbine? Explain method of compounding Impulse turbine. **(10 Marks)**
    b. The velocity of steam outflow from a Nozzle in a De-Laval turbine is 1200m/s, nozzle angle is 22°. The rotor blades are equiangular and rotational blade speed is 400m/s. Calculate:
       i) Blade angles   ii) Tangential force   iii) Power product if $vr_1 = vr_2$ iv) blading efficiency. **(10 Marks)**

OR

6 a. Derive the maximum blade efficiency equation for velocity compounded impulse steam Turbine (Curtis turbine) **(10 Marks)**

   b. In a Curtis steam turbine stage there are 2 row of moving blades with equiangular rotors. The steam enters 1st rotor with 29° each while second rotor with 32° each. The absolute velocity of steam enter the first rotor at 530 m/s. The friction factor is 0.9 in 1st rotor, 0.91 in stator and 0.93 in 2nd rotor. If final discharge is axial.
   Find i) Mean blade speed   ii) Power if $m_s = 3.2$ kg/s.   **(10 Marks)**

Module-4

7 a. Derive an expression for work done by pelton wheel with necessary velocity triangles. **(08 Marks)**

   b. A Pelton wheel is to be designed for the following specifications :
   Shaft power = 11772kW, Head = 380m, Speed = 750rmp, Overall efficiency = 86%, jet diameter not to exceed 1/6 of wheel diameter, Determine :
   i) Wheel diameter   ii) jet diameter   iii) Number of jets required, Take $C_v = 0.98$, $\phi = 0.46$. **(06 Marks)**

   c. A Kaplan turbine develops 24647.6kW power at an average head of 39m. Assuming a speed ratio of 2, flow ratio 0.6, diameter of boss equal to 0.35 times diameter of runner and an overall efficiency of 90%, calculate the diameter, speed and specific speed of turbine. **(06 Marks)**

OR

8 a. Explain the working of Francis turbine with help of sectional arrangement diagram. Also draw the velocity triangles of Francis turbine. **(12 Marks)**

   b. Explain the function of draft tubes. **(02 Marks)**

   c. With neat sketches, explain the applications of draft tubes. **(06 Marks)**

Module-5

9 a. Derive an expression for the minimum speed of staring a centrifugal pump. **(06 Marks)**

   b. Derive the expression for pressure rise in the centrifugal pump. **(08 Marks)**

   c. The impeller of a centrifugal pump has outer diameter 1.2m is used to lift water at a rate of 1800kg/s. The blade is making an angle of 150° with the direction of motion at outlet and speed is being 2000rpm. If the radial velocity flow is 2.5m/s. Find impeller power. **(06 Marks)**

OR

10 a. Explain the working principle of centrifugal compressor with neat sketch. **(10 Marks)**

   b. A centrifugal compressor compresses 30kg of air per second at a rotational speed of 15000rpm. The air enter the compressor axially and the conditions at exit sections are :
   radius = 0.3m, relative velocity of air at the tip is 100m/s at an exit angle of 80°. Find the torque and power required to drive the compressor and also the ideal head developed.
   Take $P_{01} = 1$ bar and $T_{01} = 300$K. **(10 Marks)**

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Fluid Power Engineering

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. State Pascal's law. Explain with a sketch its application to simple hydraulic jack. **(10 Marks)**
  b. Sketch and explain the structure of hydraulic control system. **(10 Marks)**

OR

2 a. With the aid of neat sketches explain the following :
   i) Suction line filtering
   ii) Pressure line filtering
   iii) Returns line filtering. **(10 Marks)**
  b. Explain briefly the desirable properties of hydraulic fluid. **(10 Marks)**

Module-2

3 a. Sketch and explain the construction and working of 'External Gear Pump' giving expressions for volumetric displacement and theoretical flow rate. **(10 Marks)**
  b. A vane pump has volumetric displacement of 82cm³. The diameter of rotor is 50mm and that of cam ring is 75mm. If the width of the vane rotor is 40mm. Find eccentricity, maximum eccentricity and maximum volumetric displacement possible. **(10 Marks)**

OR

4 a. Explain with a neat sketch of working of linear actuator with cushioning. **(10 Marks)**
  b. An 8cm diameter hydraulic cylinder has 4cm diameter rod. If the cylinder receives flow at 100 ℓpm and 12 MPa. Find :
   i) Maximum extension and retraction forces
   ii) Maximum extension and retraction velocities. **(10 Marks)**

Module-3

5 a. Explain the internal construction and working of 4/2 spool valve. Draw its symbolic representation. **(10 Marks)**
  b. With a neat sketch, explain pilot operated check valve. **(10 Marks)**

OR

6 a. Explain the meter-in method of speed control of hydraulic cylinder with neat circuit diagram. **(10 Marks)**
  b. With a neat circuit diagram explain regenerative circuit used in drilling machine application. **(10 Marks)**

Module-4

7 a. Sketch and explain the structure of pneumatic control system. **(10 Marks)**
  b. List the advantages and limitations of pneumatic power systems. **(10 Marks)**

OR

8   a.   What is FRL unit in pneumatic system? Explain its function with symbolic representation.

(10 Marks)

     b.   Explain with a pneumatic circuit how quick exhaust valve can be used to increase the actuation speed of a cylinder.   **(10 Marks)**

Module-5

9   a.   Explain direct control of double acting cylinder using 5 ports/2 position DC valve.

(10 Marks)

     b.   Explain 'supply air throttling' and 'exhaust air throttling' used in speed control of cylinders.

(10 Marks)

OR

10   a.   Explain a typical pneumatic circuit based on 'AND' logic function using two pressure valve.

(10 Marks)

     b.   Explain the working of a solenoid controlled pilot operated DCV.   **(10 Marks)**

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Operations Management

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Define operations management and explain briefly how the production systems are classified. **(10 Marks)**
   b. Explain briefly with a schematic model the functions within business organization and operation management. **(10 Marks)**

OR

2 a. What is decision making? Briefly explain the characteristics of operations decisions. **(10 Marks)**
   b. Explain Break even analysis with necessary equations, graph and assumptions **(10 Marks)**

Module-2

3 a. Define forecasting and explain briefly the steps involved in forecasting process. **(10 Marks)**
   b. Briefly explain the components of time series method with sketches. **(10 Marks)**

OR

4 a. Explain the following forecasting methods:
       (i)   Exponential smoothing.
       (ii) Linear regression. **(10 Marks)**
   b. A company adopts method of least squares to develop a linear trend equation for the data as shown in the table below:

Year (x)	1	2	3	4	5	6	7	8	9	10	11
Shipment in tones (y)	2	3	6	10	8	7	12	14	14	18	19

   Calculate the trend forecast for the year 12 and 20. **(10 Marks)**

Module-3

5 a. Define the following :
       (i)   Design capacity
       (ii) System capacity
       (iii) Capacity planning
       (iv) Facility layout. **(10 Marks)**
   b. Sketch and explain any two types of layouts. **(10 Marks)**

OR

6 a. What factors determines the types of layout used in an organization? **(05 Marks)**
   b. What are the determinants of effective capacity and briefly explain any two of them? **(05 Marks)**
   c. A metals processing firms wishes to install enough automatic moulders to produce 2,50,000 good castings per year. The moulding operation takes 1.5 minutes per casting, but its output is typically about 3% defective. How many moulders will required if each one is available for 2000 hours (of capacity) per year? **(10 Marks)**

Module-4

7 a. Define Aggregate planning and master scheduling. Explain the pure strategies used for aggregate planning in brief. **(10 Marks)**

b. A firm has developed the following demand forecast in units for a item which is influenced by seasonal factors. Suppose the firm estimates that it costs Rs 150/unit to increase production rate Rs 200/unit to decrease production rate Rs 50/unit/month to carry the inventory and Rs 100/unit subcontracted. Compare the costs incurred if the pure strategies are followed.

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug
Forecast Demand	270	220	470	670	450	270	200	370

(10 Marks)

OR

8 a. Discuss the general techniques of aggregate planning process with flow chart. **(08 Marks)**

b. State the functions of Master Scheduling. **(04 Marks)**

c. What are the objectives and importance of Aggregate planning? **(08 Marks)**

Module-5

9 a. What is a Material Requirement Planning? What are the various steps involved in the implementation of MRP? **(08 Marks)**

b. What are the benefits and limitations of MRP? **(06 Marks)**

c. Define CRP and BOM. **(06 Marks)**

OR

10 a. What is Supply Chain Management? What are its functions? **(08 Marks)**

b. Briefly explain Make or Buy decision. **(06 Marks)**

c. Explain the different approaches to SCM. **(06 Marks)**

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CBCS SCHEME

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Question Paper Version : B

Fifth Semester B.E Degree Examination, Jan./Feb. 2021
Environmental Studies
(COMMON TO ALL BRANCHES)

Time: 2 hrs.]   [Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the hundred questions, each question carries one mark.

2. Use only **Black ball point pen** for writing / darkening the circles.

3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**

4. Darkening two circles for the same question makes the answer invalid.

5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. The Environmental Protection Act 1986 deals with
    a) Water   b) Air   c) Soil   d) All of these

2. How to remove leachate from landfill?
    a) By gravity   b) By pumping from low points
    c) Both a and b   d) None of these

3. Ground water is a source of trouble at which place
    a) Plains   b) Slopes   c) Rivers   d) Lakes

4. The hot spots of biodiversity are characterized by
    e) Low endemicity and low threat of extinction
    f) Low endemicity and high threat of extinction
    g) High endemicity and low threat of extinction
    h) High intensity and threat of extinction

5. The world environment day is on
    a) 5th June   b) 3rd October   c) 25th December   d) 11th July

6. Fossil fuels are converted into energy by
    a) Burning   b) Cooling   c) Sublimation   d) Melting

7. Which place in India the tidal energy has been experimented?
    a) Goa   b) Karnataka   c) Kerala   d) Tamil Nadu

8. India has the largest share of
    a) Manganese   b) Mica   c) Copper   d) Diamond

9. Which of the following are major environmental issues involved in mining?
   a) Air pollution from dust
   b) Water pollution
   c) Soil degradation
   d) all of these

10. In an ecosystem the flow of energy is
    a) Bidirectional
    b) Cyclic
    c) Unidirectional
    d) Multidirectional

11. People who are exposed to radon in drinking of water may have risk of getting
    a) Cancer
    b) Typhoid
    c) Blue baby syndrome
    d) Cholera

12. Remote sensing uses which of the following waves in its procedure.
    a) Sonar waves
    b) Electromagnetic waves
    c) Gamma ray
    d) None of these

13. What is called for the practice of regulating forest resources to meet the society and industry while preserving forest health?
    a) Environmental Protection
    b) Sustainable forest management
    c) forest policy
    d) Unsustainable forest management

14. Soil erosion is prevented by
    a) Deforestation
    b) Afforestation
    c) Overgrazing
    d) Removal of vegetation

15. Which one of the following states is the leading produce of iron ore?
    a) Chhattisgarh
    b) Jharkhand
    c) Karnataka
    d) Madhya Pradesh

16. Prevention and Control of Air Pollution Act in India was passed
    a) 1970
    b) 1975
    c) 1981
    d) 1990

17. An important NGO involved in Global Environmental Protection.
    a) UNICEF
    b) Green Peace
    c) WHO
    d) CPCB

18. Which one of the following is a source of sulphur dioxide in atmosphere?
    a) Volcanoes
    b) Thermal power station
    c) H_2SO_4 manufacturing
    d) All of these

19. The important non-metallic resource is
    a) Petroleum
    b) Bauxite
    c) Sidertile
    d) None of these

20. Which of the following reservoirs contain most water?
    a) Atmosphere
    b) biosphere
    c) Ground water
    d) Lakes and rivers

21. World Summit on sustainable development was held at
    a) Johansberg in 2002
    b) Rio de Janerio in 1992
    c) Kyoto in 1994
    d) Stockhom in 2000

22. Ozone layer thickness is measured in
    a) PPM
    b) PPB
    c) Decibels
    d) Dobson units

23. Which of following related to GIS?
    a) Euclidean space
    b) Ramanujan space
    c) Pythagorean space
    d) None of these

24. Remote sensing techniques make use of the properties of following radiation by the sensed objects
   a) Electric waves
   b) Sound waves
   c) Electromagnetic waves
   d) Wind waves

25. What is the fullform of NGOs?
   a) Non Governmental Organization
   b) Null Governmental Organizations
   c) Nice Governmental Organization
   d) None of these

26. Which one of the following has maximum genetic diversity in India?
   a) Tea
   b) Teak
   c) Mango
   d) Wheat

27. The carbon "credit is permit" is permit representing the right to emit
   a) One tone of Carbon Dioxide
   b) 10 tonnes of Carbon Dioxide
   c) 5 tonnes of Carbon Dioxide
   d) 15 tonnes of Carbon Dioxide

28. What is the role of NGOs in natural resource management?
   a) Creating awareness among the public on current environmental issues and solution
   b) Being involved in the protection of human rights to a clean environment
   c) Data generation on natural resources time line and history
   d) Making profit from Government

29. The primary objective of ISO14001 is
   e) An internationally agreed standard sets out the requirements for an environmental manage system
   f) It helps organizations to improve their environmental performance through more efficient use of resources
   g) It helps organization for the reduction of waste gaining competitive advantage and trust of stakeholders
   h) All the above

30. Which one of the following in not a renewable exhaustible natural resource?
   a) Aquatic animals
   b) Wild life
   c) Soil fertility
   d) Minerals

31. Eco-toxicology is study of
   a) Chemical interaction of organism and environment
   b) Physical interactions of organism and environment
   c) Thermal interaction of organism and environment
   d) Biological interaction organism and environment

32. What is the 1st step in primary treatment plants?
   a) Fine screening
   b) Course screening
   c) Chlorination
   d) Oxidation

33. What are the sources of air pollutants in the atmosphere?
   a) Coal fired power station
   b) Vehicle exhaust
   c) Industries
   d) Coal

34. Which of the following chemicals damage the ozone layer?
   a) Polyvinyl chloride
   b) Chlorofluorocarbons
   c) DDT
   d) Hydroflurocarbons

35. Which of these energy source is renewable?
   a) Wind
   b) Nuclear
   c) Coal
   d) Oil

36. Which one of the following is a great achievement of the Chipko movement?
    a) More trees are planted
    b) Development in Himalayan region
    c) Successfully resisted deforestation
    d) Soil erosion gets declined

37. The percentage of forest cover in India is
    a) 14.69%
    b) 15.39%
    c) 19.39%
    d) 19.67%

38. GIS stands for
    a) Geographic Information System
    b) Generic Information System
    c) Geological Information System
    d) Geographic Information Sharing

39. The effect of Acid Rain is
    a) Reduces soil fertility
    b) Increases atmospheric temperature
    c) Causing respiratory problem
    d) Skin cancer

40. Environmental protection is reasonability of
    a) Government of India
    b) NGO
    c) Individual
    d) All of these

41. Excess fluoride in drinking water is likely to cause
    a) Blue babies
    b) Fluorosis
    c) Fever
    d) Cough and chill

42. All the following waste can be incinerated except
    a) Reactive Chemical Waste
    b) Vaccine
    c) Mutilated parts
    d) Discarded drugs

43. Which Vaccination should be given to workers who deals with biomedical waste?
    a) Hbs Ag
    b) Tetanus
    c) Rabies
    d) Both a and b

44. Nickel is released from
    a) Alloys
    b) Display
    c) Calculators
    d) Circuit boards

45. Which of the following solid wastes describes the term 'Municipal Solid Waste'?
    a) Toxic
    b) Hazardous
    c) Non toxic
    d) Non-hazardous

46. The blue baby syndrome is caused by the contamination of water due to
    a) Phosphates
    b) Sulphur
    c) Arsenic
    d) Nitrates

47. The organic material of solid waste will decompose
    a) By the flow of water
    b) By filtration
    c) By drying
    d) By the oxidation in presence of oxygen

48. The pH value of the acid rain water is
    a) 5.7
    b) 7.0
    c) 8.5
    d) 7.5

49. The global warming may bring about the following changes in atmosphere
    a) Increase in temperature of earth
    b) Drought
    c) direct impact on human health
    d) All of these

50. Which agency deals with the health effect that may occur from environmental exposure to toxic chemicals?
a) Environmental Protection Agency
b) The Center for Disease Control and Prevention
c) The Agency for Toxic Substances and Disease Registry
d) The Nuclear Regulatory Commission

51. The primary source of Green House Gases (GHG) is
a) Wind   b) Fossil fuel   c) Water   d) Green plants

52. The Kyoto protocol was adopted at the
a) Third conference of UNFCC in 1997
b) Convention on the trans boundary effects of industrial accidents
c) United nations framework convention on climate change in 1992
d) convention on Biological diversity

53. Which one of following is not a green house gas?
a) Water vapour   b) Oxygen   c) Methane   d) Carbon monoxide

54. E.T.S stands for
a) Emission Tracking system   b) Europe Trading System
c) Environmental Tracking System   d) Engine Tracking System

55. The primary cause of acid rain around the world is due to
a) Carbon dioxide   b) Sulphur dioxide   c) Carbon monoxide   d) Ozone

56. Ozone layer is present in
a) Troposphere   b) Stratosphere   c) Mesosphere   d) Thermosphere

57. Sustainable development means
a) Meeting present needs without compromising on future needs
b) Progress in human well beings
c) Balance between human needs and ability of earth to provide the resources
d) All the above

58. Which of the following element make e-waste hazardous in nature?
a) Lead   b) Glass   c) Plastic   d) Iron

59. What is the hazardous pollutant released from LED?
a) Arsenic   b) Barium   c) Cobalt   d) Cadmium

60. Cyotoxic and expired drugs are disposed off by
a) Dumping   b) Autoclave
c) Incineration   d) Chemical disinfection

61. COD is
a) Chemical Oxygen Demand
b) Measure of dissolved impurities in water
c) Amount of oxygen required to oxidize organic and organic impurities
d) All the above

62. Which of the following compounds may be toxic to human beings?
a) Amino acids   b) Polychlorinated biphenyl
c) Vitamins   d) Proteins

63. Many rivers polluted due to
    a) Heavy flux of sewage
    b) Industrial effluents
    c) Agricultural and domestic waste
    d) All of these

64. The sound intensity in measured in
    a) dB
    b) NB
    c) Horse power
    d) MB

65. Air Pollution from automobiles can be controlled by fitting
    a) Electrostatic precipitator
    b) Wet Scrubber
    c) Catalytic converter
    d) All of these

66. Sound above what level are considered hazardous noise pollution
    a) above 75 dB
    b) above 30 dB
    c) above 150 dB
    d) above 120 dB

67. Noise pollution at residential area
    a) 45 dB
    b) 80 dB
    c) 55 dB
    d) 90 dB

68. Which of the following is not a man-made hazard?
    a) Leakage of toxic waste
    b) Wars and civil strife
    c) Drought
    d) Environmental pollution

69. The Bhopal gas tragedy was caused due to
    a) Methyl isocyanate leakage
    b) Nitrous oxide leakage
    c) Acid rain
    d) Radioactive poisoning

70. The Kyoto protocol is
    a) The response to treat the climate change
    b) To reduce the emission of green house gases
    c) a and b
    d) To give permission to emit green house gases

71. Select the correct statement about biodiversity.
    a) The desert animals of Rajasthan and Gujrat have a very high of animal species as well as rare animals.
    b) Large scale planting of biodiversity cotton has no adverse effect on biodiversity
    c) Western Ghats have a very high degree of species richness and endemism
    d) Conservation biodiversity is just a fad pursued by developing countries

72. Global warming can be controlled by
    a) Reducing deforestation and cutting down the use of fossil fuel
    b) Reducing afforestation and increasing the use of fossil fuel
    c) Increasing the deforestation and increasing the growth of human population
    d) Increasing deforestation and increasing the use of fossil fuels

73. Bhopal Gas Disaster is a kind of
    a) Natural disaster
    b) Man-made disaster
    c) None of these
    d) Water leakage

74. The instrument which records earthquake wave is called
    a) Climograph
    b) Seismograph
    c) Hyther graph
    d) None of these

75. Which of the following diseases appeared as public health concern in the last quarter of 20th century?
    a) HIV
    b) Ebola virus
    c) Corona Virus
    d) All of these

76. The National Disaster Management Authority (NDMA) is headed by
    a) President of India
    b) Prime minister of India
    c) Governor of States
    d) Chief Minister of States

77. Cloud seeding is process of
    a) Adding chemical material to cloud to obtain precipitation
    b) To get more rainfall
    c) It is artificial process to get rainfall during drought
    d) All the above

78. Which of the following has been used to seed clouds?
    a) Silver iodide
    b) Silver chromate
    c) Sodium Chloride
    d) Potassium chromate

79. The scientist who experimented cloud seeding first time
    a) Isaac Newton
    b) Vincent Schaefer
    c) Rutherford
    d) C.V. Raman

80. Carbon trading deals
    a) Carbon emissions
    b) Acid rain
    c) Sulphur dioxide emissions
    d) None of these

81. Extensive planting of trees to increase forest cover is called
    a) Afforestation
    b) Deforrestation
    c) Agro forestation
    d) None of these

82. The percentage of geographical area of country under forest cover is
    a) 23%
    b) 43%
    c) 13%
    d) 33%

83. What is the permissible range of pH for drinking water as per Indian standards?
    a) 6 to 9
    b) 6.5 to 7.5
    c) 6 to 8.5
    d) 6.5 to 8.5

84. Forest rich area in Karnataka is found in
    a) Western Ghats
    b) Bandipur
    c) Nagarhole
    d) Mangalore

85. Major sources of fluoride is
    a) River water
    b) Tooth paste
    c) Ground water
    d) food products

86. The oceans are the largest storage of water on earth containing
    a) 95% of earths water
    b) 85% of earths water
    c) 97% earths water
    d) 75% of earths water

87. Solar energy is an ideal energy source because of
    a) Unlimited supply
    b) No air and water pollution
    c) No hazardous byproducts
    d) All of these

88. The only disadvantages of hydrogen energy source
    e) Takes more energy to produce hydrogen than the energy that could be obtained from it.
    f) Causes air and water pollution
    g) Releases toxic byproducts
    h) Hazardous effect due to risk of leakage

89. Wind energy generation depends on
    a) Directions of wind
    b) Velocity of wind
    c) Humidity
    d) All of these

90. 'OTEC' is an energy technology that converts
    a) Energy in large tides of ocean to generate electricity
    b) Energy in ocean waves to generate electricity
    c) Energy in ocean due to thermal gradient to generate electricity
    d) Energy in fast moving ocean currents to generate electricity

91. Which of the following is not the meaning of ecosystem?
    e) Unit where in all organisms live a healthy life
    f) A small unit that can be self sufficient
    g) Co-existence of diverse things by mutual adjustment
    h) A unit which includes all the organisms in a given area interacting with physical environment to from a natural unit of stability

92. The factors responsible for stable ecosystem are balance between
    a) Predators and prey   b) Vegetation, herbivores and carnivores
    c) Competing species and biotic factors   d) All of these

93. Which of it is not an example of ecosystem?
    a) Forest   b) Desert   c) Water   d) Grassland

94. E.I.A can be expanded as
    a) Environment and Industrial Act   b) Environment and Impact Activities
    c) Environmental Impact Assessment   d) Environmentally Important Activity

95. Earth day is held every year on
    a) 5th June   b) 23rd Nov   c) 22nd April   d) 26th Jan

96. Soil erosion removes surface soil which contains
    a) Organic matter   b) Plant nutrients   c) Both a and b   d) None of these

97. Mineral resources are
    a) Renewable   b) Non-renewable   c) Equally distributed   d) None of these

98. Fluoride though is an effective agent to prevent dental caries has a permissible limit of
    a) 0.5 mg/lit of water   b) 1.5 mg/lit of water
    c) 5 mg/lit of water   d) 1.0 mg/lit of water

99. Deforestation means
    a) Maintenance of forest for recreation
    b) Creating land for habitant of wild life
    c) Conversion of forest land to agricultural land homes etc
    d) Planting trees

100. Decrease of oxygen level in water mainly causes
    a) Fluorosis   b) Death of aquatic life
    c) Water purification   d) All of these

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