Hall Ticket Number :										

R-11/R-13

Code: 1GA51

III B.Tech. I Semester Supplementary Examinations November 2016

Managerial Economics and Financial Analysis

(Common to CE, ME and ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. Define Managerial Economics. Explain the relationship of managerial economics with other fields of study. 14M
2. What do you understand by Demand function? Explain about the determinants of Demand. 14M
3. From the following data calculate
   a. P/V Ratio
   b. Profit when sales are Rs 5,00,000
   c. New Break-Even Point, if the selling price is reduced by 20%
   Fixed expenses Rs. 1,00,000
   Break even point Rs. 2,50,000 14M
4. How is price determined under competitive conditions? 14M
5. "Joint stock company form of organisation is better than Partnership", explain. 14M
6. Given the following information for two project proposals. Rank them by applying the criteria of
   a. Payback method
   b. ARR

Year	Proposal 1 Cash Inflows in Rupees	Proposal 2 Cash Inflows in Rupees
1	11,750	13,500
2	12,250	12,500
3	12,500	12,250
4	13,500	11,750

14M

7. From the following transactions prepare journal entries and post them in the appropriate Ledger accounts, in the books of AVINASH&CO.
   2008, May 1 Commenced Business with Rs 1,00,000
   May 5 Purchased goods from Rahul&Co Rs10,000
   May 7 Sold goods worth Rs20,000
   May 10 Salaries paid Rs1,500
   May 11 Purchased Stationery worth Rs1,000
   May 15 Bought furniture worth Rs20,000
   May 18 Cash deposited into bank Rs9,000
   May 20 Paid wages Rs5,000
   May 24 Cash withdrawn from bank Rs3,000
   May 28 Paid rent by cheque Rs1,800 14M

8. Following is the summarised Balance sheet of Verizon Company Ltd as on 31st December 2015.

Balance sheet as on 31stDecember 2015

Liabilities	Rs	Assets	Rs
Equity Share Capital	2,50,000	Goodwill	20,000
6% Preference Share Capital	1,50,000	Land & Buildings	2,50,000
Reserves & Surplus	20,000	Machinery	1,75,000
5%Debentures	1,00,000	Furniture	10,000
Profit & Loss	15,000	Stock	90,000
Sundry Creditors	28,000	Debtors	21,000
Bills Payable	12,000	Cash at Bank	5,000
		Patents	4,000
	5,75,000		**5,75,000**

Additional Information: Total sales Rs4,00,000; in that 20% of which is made on credit. Gross Profit is Rs 80,000 and Net Profit is Rs20,000.

Comment on the Financial condition of the Verizon Company Ltd by calculating

a. Current Ratio b. Quick Ratio c. Debt-equity Ratio

d. Gross Profit Ratio e.Net Profit Ratio f. Stock turnover ratio 14M

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Hall Ticket Number :										

R-11/R-13

Code: 1G551

III B.Tech. I Semester Supplementary Examinations November 2016

Thermal Engineering II

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any ***five*** questions
All Questions carry equal marks (14 Marks each)
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1. a) With a neat schematic diagram explain the working principle of reheat Rankine cycle. 7M
   b) A Rankine cycle works between 40 bar and 0.2 bar with saturated steam at turbine inlet. Determine cycle efficiency, ratio of pump work and turbine work. 7M
2. a) With a neat sketch explain the working principle of La-Mont boiler. 8M
   b) Compare boiler mounting and accessories. 6M
3. a) 5400 kg of steam is produced per hour at a pressure of 7.5 bar in a boiler with feed water at 41.5^{o}C. The dryness fraction of steam at exit is 0.98. The amount of coal burnt per hour is 670 kg of calorific value 31000 kJ/kg. Determine:
   i) Boiler efficiency **ii**) Equivalent evaporation. 10M
   b) State the drawbacks of a chimney and write the methods of creating artificial draught. 4M
4. a) Steam at a pressure of 10.5 bar and 0.95 dry is expanded through a convergent divergent nozzle. The pressure of steam leaving the nozzle is 0.85 bar. Find the velocity of steam at the throat for maximum discharge take n = 1.135. Also, find the area at the exit and steam discharge if the throat area is 1.2 cm^2. Assume flow is isentropic and there are no friction losses. 10M
   b) Define meta stable flow in a steam nozzle. 4M
5. a) Steam enters the blade row of an impulse turbine with a velocity of 500 m/sec, at an angle of 30° to the plane of rotation of the blades. The mean blade speed is 280 m/sec. the blade angle on the exit side is 35°. The blade friction coefficient is 12%. Determine: (**i**) blade angle at inlet (**ii**) work done per kg of steam (**iii**) diagram efficiency (**iv**) axial thrust per kg of steam per second. 7M
   b) Explain with the sketches the velocity and pressure compounding in steam turbines. 7M
6. a) With a neat sketch explain the principle of operation of a reaction turbine. Sketch the inlet and outlet velocity triangles of a reaction turbine and indicate all velocities. 10M
   b) Write short notes on governing of reaction turbines. 4M
7. a) With suitable sketches explain the working principle of various condensers. 8M
   b) State the principle of cooling tower and mention the factors affecting cooling of water in a cooling tower. 6M
8. a) With neat sketch explain the various components of a reciprocating steam engine. 8M
   b) Explain the deviations in an actual indicator diagram of a steam engine in comparison with theoretical diagram. 6M

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Hall Ticket Number :										

R-11/R-13

Code: 1G552

III B.Tech. I Semester Supplementary Examinations November 2016

Dynamics of Machinery

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions
All questions carry equal marks (**14 Marks** each)

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1. Find the angle of inclination with respect to the vertical of a two wheeler negotiating a turn. Given: combined mass of the vehicle with rider is 250kg. Moment of inertia of the engine flywheel 0.30kg-m^2, Moment of inertia of each road wheel 1kg-m^2, speed of the engine flywheel 5 times that of road wheels and in the same direction; height of centre of gravity of rider with vehicle 0.60m, two wheeler speed 90km/hr, wheel radius 0.30m and radius of turn 50m. 14M

2. a) Explain the terms: friction circle and friction axis? 4M

   b) A square threaded bolt of root diameter 22.5 mm and pitch 5mm is tightened by Screwing a nut whose mean diameter of bearing surface is 50mm. If coefficient of friction for nut and bolt is 0.1 and for nut and bearing surface 0.16, find the force required at the end of a spanner 500 mm long when the load on the bolt is 10 kN? 10M

3. a) Distinguish between Brakes and Dynamometers? 4M

   b) A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and 200 mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm2. If the coefficient of friction is 0.3, determine the power transmitted by a clutch at a speed 2500 r.p.m. 10M

4. A horizontal cross compound steam engine develops 300 kW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within ± 0.5 % of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 meters? 14M

5. a) Define governor and give the classification of governers? 4M

   b) A porter governor has equal arms each 250mm long and pivoted on the axis of rotation. Each ball has a mass of 5kg and the mass of central load on the sleeve is 25 kg. The radius of rotation of the ball is 150mm when the governor begins to lift and 200mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of speed of the governor. 10M

6. a) What do you understand by static and dynamic balancing? 4M

   b) A,B,C and D are four masses carried by a rotating shaft at radii 100 mm,125 mm,200 mm and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg
   respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance?

7. a) Write short notes on primary and secondary balancing? 4M

   b) The following data refer to two cylinder locomotive with cranks at 90°:
   Reciprocating mass per cylinder = 300 kg; Crank radius = 0.3 m; Driving wheel Diameter =1.8 m; Distance between cylinder centre lines = 0.65m; Distance between the driving wheel central planes = 1.55m. Determine 1.The fraction of the reciprocating masses to be balanced, if the hammer blow is not to exceed 46 kN at 96.5 kmph. 2. The variation in tractive effort and 3.The maximum swaying couple. 10M

8. Shaft of diameter 40mm and 2.5m long has a mass of 15kg/m. It is simply supported at ends and carries three masses 90kg, 140kg, 60kg at 0.8m, 1.5m, 2m respectively from the left support. Find the frequency of transverse vibration by using dunkerley's method. Take E= 200G N/m^2 14M

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Hall Ticket Number :										

R-11/R-13

Code: 1G553

III B.Tech. I Semester Supplementary Examinations November 2016

Machine Tools

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions
All questions carry equal marks (**14 marks** each)

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1. a) Briefly explain various factors affecting the tool life. 6M
   b) With a neat sketch, explain the nomenclature of a single point cutting tool. 8M

2. a) How will you specify a lathe? 6M
   b) With a neat sketch, explain different types of work holding devices used in lathe. 8M

3. a) Differentiate shaper, slotter and planner machines. 6M
   b) Explain the construction and working of a push type shaper with a neat sketch. 8M

4. a) List out various operations performed in a drilling machine with simple sketches. 6M
   b) Explain the construction and working of Jig Boring machine. 8M

5. a) Explain the construction and working of a horizontal milling machine. 6M
   b) With a neat diagram, explain various types of milling cutters and state its uses. 8M

6. a) How grinding wheels are specified as per the IS marking system? Explain. 6M
   b) State the importance of bonding materials in grinding wheel? Explain different types of bonding materials. 8M

7. a) Explain how honing operation is performed in a cylindrical surface? 6M
   b) Explain the construction of a horizontal pull type broaching machine. 8M

8. a) Classify different types of jigs. 6M
   b) What are the factors to be considered while designing a jig? 8M

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Hall Ticket Number :										

R-11/R-13

Code: 1G554

III B.Tech. I Semester Supplementary Examinations November 2016

Design of Machine Elements-I

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions

All Questions carry equal marks (**14 Marks** each)

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1. a) Discuss the different phases involved in design with examples. 7M

   b) What are the considerations in design engineering? 4M

   c) State the significance of preferred numbers with an example. 3M

2. A circular bar is to withstand a bending moment of $10\ kN-m$ and a torque of $30\ kN-m$. Determine the diameter of the bar if the yield strength of the material is $250\ Mpa$ and a factor of safety 2. Use
   a. Maximum normal strain theory
   b. Distortion energy theory
   c. Maximum shear stress theory. 14M

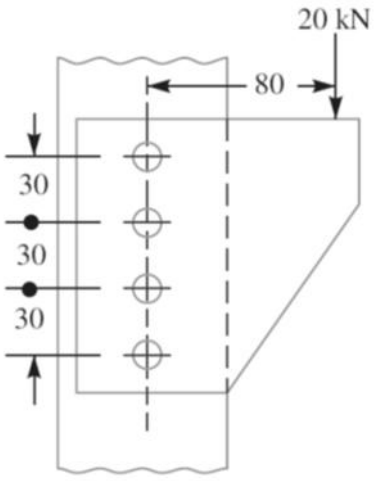
3. a) Discuss the causes for stress concentration. 3M

   b) Discuss the procedure for obtaining the $S-N$ curve of a material. 3M

   c) Develop the equations for soderberg, goodman and gerber criterion. 8M

4. a) What are the basic types of screw fastenings? Discuss with neat diagrams. 4M

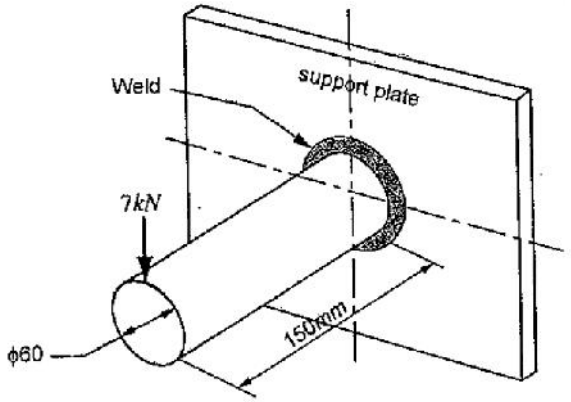
   b) A bracket is supported by means of 4 rivets of same size, as shown in Fig. Determine the diameter of the rivet if the maximum shear stress is $120\ MP$.



All dimensions in mm. 10M

5. a) State the advantages and dis-advantages of welded joints compared to riveted joints. 4M

   b) A circular shaft, 60 ges and ameter, is welded to a support plate by means of a fillet weld as mm in di shown in fig. Determine the size of weld, if the permissible shear stress in the weld is limited to $85 MP$. 10M



6. A knuckle joint is required to withstand a tensile load of 25 kN. Design the joint if the permissible stresses are: $\pm_t = 56 Mpa$, $\tau = 56 Mpa$ and $\pm_c = 70 Mpa.$ 14M

7. a) State ASME code for design of shafts. 4M

   b) A solid shaft is to transmit 1000 shafts. 20 r.p.m. Find the shaft diameter if the design shear stress is 80 kW at 1 N/mm^2 . If the shaft is made hollow with internal diameter is 0.6 times the outside diameter, find the % of saving in material. 10M

8. Design a cast i cti coupling to connect two shafts in order to transmit 7.5 on prote ve flange kW at 72 0 $r.p.m.$ The following permissible stresses may be used : Permissible shear stress for shaft, bolt and key material = $33 MP$

   Permissible crushing stress for bolt and key material = $60 MP$

   Permissible shear stress for the cast iron = $15 MP$ 14M

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Hall Ticket Number :										

R-11/R-13

Code: 1G555

III B.Tech. I Semester Supplementary Examinations November 2016

Heat Transfer

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions
All questions carry equal marks (14 Marks each)
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1. a) Write down the mathematical expressions for the laws governing different modes of heat transfer. Give the physical significance of variables involved in each expression. 5M

   b) Derive the three dimensional general heat conduction equation in Cartesian Coordinate. Deduce the Laplace equation from it. 9M

2. a) An aluminum fin (k=200 W/m ºC) of 3 mm thick and 7.5 cm long protrudes from a wall. The base is maintained at 300ºC, and the ambient temperature is 50ºC with h=10 W/m^2 ºC. Calculate the heat loss from the fin per unit depth of material. 5M

   b) Air flows at 120ºC in a thin walled stainless-steel tube (k=18 W/m ºC) with h=65 W/m^2 ºC. The inside diameter of the tube is 2.5 cm and the wall thickness is 0.4 mm. The tube is exposed to an environment with h=6.5 W/m^2 ºC and T_∞=15ºC. Calculate the overall heat transfer coefficient, and the heat loss per meter length. What thickness of an insulation having k=40 W/m ºC should be added to reduce the heat loss by 90%? 9M

3. a) Write down the expression for 1D, transient heat conduction with generation. Give the physical significance of Biot number and Fourier number for transient heat conduction. 5M

   b) A person is found dead at 5 pm in a room whose temperature is 20ºC. The temperature of the body is measured to be 25ºC when found, and the heat transfer coefficient is estimated as h=8 W/m^2 ºC. The properties of the body may be taken as that of water at room temperature. The human body can be modelled as a cylinder of 30 cm diameter, 1.7 m long. Estimate the time of death of the person. (Hint: Human body contains 72% water by mass, normal body temperature is 37ºC) 9M

4. a) Write down the general form of Continuity equation used for convection. Using this equation derive the expression for 'y' variation of velocity, if the velocity variation along 'x' direction is U = x^2y+y^2x. 5M

   b) Explain with suitable example, the convective heat transfer mechanism. List out the importance of five non-dimensional parameters used for convection. How Buckingham π Theorem is applied in deriving these non-dimensional parameters? 9M

5. a) Water at 30ºC flows across a pipe (outer diameter is 10 cm) at 50ºC with a velocity of 0.6 m/s. Determine the convective heat transfer coefficient using suitable correlation. 5M

   b) A square channel of side 15 mm and length 2 m carries water at a velocity of 6 m/s. The mean temperature of water along the length of the channel is found to be 30°C, while the inner channel surface temperature is 70°C. Calculate the heat transfer coefficient from the channel wall to water, using $Nu = 0.021 (Re)^{0.08} (Pr)^{0.43}$. Take equivalent diameter as characteristic length of the channel. The thermo-physical properties of water at 30°C is as follows, $\rho = 995.7$ kg/m^3, $k = 0.6175$ W/mK, Kinematic viscosity $= 0.805 \times 10^{-6}$ m^2/s and $C_P = 4.187$ kJ/kgK. 9M

6. a) What do you mean by condensation? Give the fundamental difference between dropwise and film wise condensation. Illustrate with reason, which is the more effective mechanism of heat transfer? 5M

   b) How the mechanism of evaporation is different from boiling? Draw the boiling curve and identify the different boiling regimes. Also, explain the characteristics of each regime. 9M

7. a) Derive an expression for Logarithmic mean temperature difference (LMTD) for Parallel flow heat exchanger. 5M

   b) A counter flow, concentric tube heat exchanger is used to cool the lubricating oil for a large industrial gas turbine engine. The flow rate of cooling water through the inner tube ($D_i = 25$ mm) is 0.2 kg/s, while the flow rate of oil through the outer annulus ($D_o = 45$ mm) is 0.1 kg/s. The oil and water enter at temperatures of 100ºC and 30ºC respectively. What should be the length of the tube, if the outlet temperature of oil is to be 60ºC? Take overall heat transfer co-efficient based on inner diameter as 250 W/m^{2}K. 9M

8. a) What does view factor represent? How can you determine the view factor F_{12} when the view factor F_{21} and the surface areas are available? When is the view factor from a surface to itself not zero? 5M

   b) Two very large parallel plates are maintained at uniform temperatures of 1000 K and 800 K respectively. Each plate has an emissivity of 0.2 respectively. It is desired to reduce the net rate of radiation heat transfer between the two plates to one-fifth (1/5), by placing thin aluminum sheets with an emissivity of 0.15 on both sides between the plates. Determine the number of sheets needed to be inserted. 9M

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