Manufacturing planning: review exam

AN 300 Review Exam 2 I. Forecasting Forecast Errors: MAD, Bias * (1) Forecasts are usually wrong. Errors are inevitable and must be expected. (2) Every forecast should include an estimate of error. (3) Forecasts are more accurate for families or groups. (4) Forecasts are more accurate for nearer time periods. Anything that can be done to reduce lead-time will improve forecast accuracy. * Bias indicates the directional tendency of FE <------> MAD indicates the magnitude of FE (Weighted) Moving Averages The Exponential Smoothing Method; Linear Combination * Another special case of Weighted Moving Average * F t = F t-1 + Î± (X t-1 - F t-1) II. Aggregate Production Planning Production Planning strategies: Level, Chase, and Combination * Level: constant workforce & same amount of product in each time period of the plan * Chase: produce exactly what is needed to satisfy demand during each period * Combination: combo of Level & Chase approaches while developing the aggregate plan Decision Variables in Production Planning * (1) Production, (2) Inventory, & (3) Workforce * Secondary DV's Overtime, Undertime, Hiring, Layoff, Backorders, Subcontracting, etc Production Planning Methods: (Solution Methods) * Non-Optimal Solutions (1) Non-quantitative Haggling, (2) Tableau and Graphical Methods, (3) Constant Turnover Ratio, (4) Adjust last year's plan, (5) Others * Optimal Solutions (1) Transportation Model, (2) Linear Program [LP], (3) Linear Decision Rule [LDR], (4) Search Decision Rule [SDR], (5) Parametric Production Planning [PPP], (6) Management Coefficient Model, (7) Others * Near-Optimal Solutions Linear Programming for Production Planning; The Inventory Balance Equality * The HMMS Model III. Inventory Management Hierarchical Production Planning Systems; MRP and MRP II * MRP = Material Requirements Planning & MRP II = Manufacturing Resource Planning The key

inputs to an MRP system; The key outputs (functions) of an MRP system * The MRP logic; from Gross Requirements to Planned Order Releases DRP: Distribution Requirements Planning * Applying MRP logic to Distribution systems Inventory Management: Independent Demand vs. Dependent Demand * Independent Demand demand that you CAN'T CONTROL or accurately predict in terms of how much of a final product you're going to need on hand * Dependent Demand based on how much of a final good you're going to NEED and can accurately predict because you know how many componenets you'll need to produce the final product Economic Order Quantity (EOQ) Reorder Point (ROP) Three basic assumptions of the EOQ Model; Relaxing the Assumptions IV. Production Activity Control The Vicious Circle of Leadtime Inflation How to BREAK the Vicious Circle Input/Output Control * Designed to balance the input rate in hours with the output rate * The input rate is controlled by the release of orders to the shop floor. The output rate is controlled by increasing or decreasing the capacity of a work centre. * Input (Rate) must be LESS THAN OR EQUAL TO the Output (Rate) * To control input and output, a plan must be devised along with a method for comparing what actually occurs against what was planned. (Short-term) Capacity Management (PRODUCTION ACTIVITY CONTROL) * (1) Overtime, (2) Second Shift, (3) Extended Workweek, (4) Subcontract — in & out Categorization of Sequencing Problems (PRIORITY MANAGEMENT)??? * Operation sequencing is a technique for short-term planning of actual jobs to be run in each work center based on capacity and priorities. Control of priorities is exercised through dispatching. Dispatching is the function of selecting and sequencing available jobs to be run at individual work centers. The dispatch list is the instrument of priority control. It's a listing by

operation of all the jobs available to be run at a work center with the job listed in priority sequence. * The ranking of jobs for the dispatch list is created through the application of priority rules. Some commonly used rules are: (1) first come, first served (FCFS), (2) earliest job due date (EDD), (3) earliest operation due date (ODD), (4) shortest process time (SPT), and (5) critical ratio (CR = (due date — present date) / lead time remaining) Sequencing Rules: FCFS; SPT; EDD * (1) First Come First Served (FCFS) * (2) Shortest Processing (Operation) Time (SPT; SOT) * (3) Earliest Due Date Evaluation Criteria for evaluating Sequencing Rules: * (Minimize) * Average Flow Time * Average number of Jobs in System * Average Lateness * Maximum Lateness V. Non-Linear Optimization Non-Linear Optimization 0-1 (Mixed) Integer Programming; Applications and Examples