BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

II Semester (2016-17) Mid Semester Examination (Regular)

Title: **Manufacturing Planning & Control**   Date: **06/03/2017**

Course No: **MSE G512**   **(6 Questions)**   MM: **20 (Closed Book)**

1. Answer the following questions briefly (**1 mark** each):
   (a) What are the major issues faced by operations and supply chain management?
   (b) How service design different from goods design? What factors need to be considered while designing services?
   (c) Explain how and why time series and regression forecasting methods differ?
   (d) What factors affect the outsourcing decision of a firm? and How?
   (e) What is retail slotting? What factors influence retail slotting?

2. Mother dairy is trying to decide whether to start selling curd with its other products. You have been asked to evaluate different options for 250gm curd cups. Making the curd in-house would cost ₹2000 per day and ₹25 per cup. Cups can be purchased for ₹100 each from a local dairy, or ₹75 each from a regional co-operative dairy. The co-operative dairy requires a minimum purchase of 25 cups per day. Solve using graph sheet.   [**3**]

3. Smart mobiles showroom selling the Samsung smartphone S8, with monthly sales as shown in the following table. Store owner, Karan forecasts using 3-period moving average. His brother, Varun who is also a co-owner forecasts using exponential smoothing by initially setting February's forecast equal to January's sales with α = 0.2.

Month	Sales	Month	Sales
January	415	May	410
February	389	June	432
March	420	July	405
April	382	August	

   a) Calculate forecasts for August and the earlier months using both methods [**2**]

   b) August actual sales figure turns out to be 421. Calculate the mean absolute deviation for both Karan's and Varun's methods. Which method is more accurate?   [**1**]

4. Develop layout for one section of Birla Sarvajanik hospital with a rectangular floor plan measuring 200m x 400m. The following specifications and relationships need to be maintained in the final layout. Construct relationship diagram to help in developing the layout.   [**3**]

Area in m	Department	NS	AE	PR	R	ME	OT
80x120	Nurse's Station (NS)		A	A	O	I	E
80x80	Ambulance Entrance (AE)	A		E	U	X	U
Remaining	Patient Rooms (PR)	A	E		I	E	I
120x80	Recreation (R)	O	U	I		X	U
120x80	Main Entrance (ME)	I	X	E	X		X
80x80	Operation Theatre (OT)	E	U	I	U	X	

5. As a manager of BITS Institute Canteen you need to plan for stocks of different items based on the following details:

Item	Selling Price	Variable Cost	% of Revenue
Shikanji	₹50.00	₹35.00	25
Idli	₹90.00	₹50.00	25
Coffee	₹50.00	₹15.00	30
Cake	₹50.00	₹15.00	20

From past experience you are sure that you need to add 12% of variable cost as a waste allowance for all items. You estimate labour cost to be ₹1250 (5 counters with 2 people each). Even if nothing is sold, your labour cost will be ₹1250. Counter rental, which is a contractual cost at ₹300 for each counter per day.

a) What is breakeven point (BEP) in ₹ per day? [**2**]

b) How many Coffee would you expect to sell at the BEP? [**1**]

6. Bharat Forge wants to expand by constructing a new plant. The search for location has been narrowed down to four cities: Amaravathi (A), Begur (B), Chambalpur (C), or Dibrugarh (D). The factors, weights, and scores (1 to 5) are given in the following table:

i	Factor	Weight (w_i)	Scores by Site			
			A	B	C	D
1	Labour Quality	20	5	4	4	5
2	Quality of life	16	2	3	4	1
3	Transportation	16				
4	Proximity to markets	14	5	3	4	4
5	Proximity to suppliers	12	2	3	3	4
6	Taxes	12	2	5	5	4
7	Energy supplies	10	5	4	3	3

The coordinates of four cities and the nearest ports are given below:

City	Coordinates	Port	Coordinates
Amaravathi (A)	(100,100)	Visakhapatnam	(125,125)
Begur (B)	(50,50)	Mangalore	(30,50)
Chambalpur (C)	(40, 200)	Surat	(10,219)
Dibrugarh (D)	(200,400)	Kolkata	(165,365)

a) Using the factor-rating method, what will be the recommended site for Bharat Forge's new plant? [**2**]

b) For what range of values for the weight (currently $w_3 = 16$) does the site given as the answer to part (a) remain a recommended site? [**1**]