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(b) What is regular point of a differential equation?	
 (a) What do you mean by a power series solution to a differential equation? 	1.
Time : 3 hours	
Pass Marks : 24	
Full Marks : 60	
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- a) 5 the second Solve with y(0) = 0 and y'(0) = 0. Laplace the initial-value transform problem using $y'' + 9y = 27t^3$ S
- **.** â Write simulation technique. the importance of Monte Carlo N
- 6 with an Explain example classical Monte Carlo method ŝ
- çn S, (a) middle square method. Write generation number square method for generation of random OM) 2 Write disadvantages random Che number algorithm <u>o</u>f middle Bursn lor.

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- B does it work? Explain with an example. What is linear congruence method? How CR
- 6 0 Explain about morning rush hour
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Explain example. (4)

7. Answer any three of the following questions :

5×3=15

A nutritionist advises an individual (a) is suffering from who iron and vitamin B deficiency to take at least 2400 mg (milligrams) of iron, 2100 mg of vitamin B1 (thiamine), and 1500 mg of vitamin B2 (riboflavin) over a period of time. Two vitamin pills are suitable, brand-A and brand-B. Each brand-A pill costs ₹ 60 and contains 40 mg of iron, 10 mg of vitamin B1 and 5 mg of vitamin B2. Each brand-B pill costs ₹80 and contains 10 mg of iron and 15 mg each of vitamins B1 and B2. What combination of pills should the individual purchase in order to meet minimum the iron and vitamin requirements at the lowest cost? (Use graphical method) :

	Brand-A	Brand-B	Minimum requirement
Iron	40 mg	10 mg	2400 mg
Vitamin B1	10 mg	15 mg	2100 mg
Vitamin B2	5 mg	15 mg	1500 mg
Cost/Pill	₹ 60	₹ 80	

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(5)

(b) A manufacturer produces three types of plastic fixtures. The time required for molding, trimming and packaging is given in the following table (Times are given in hours per dozen fixtures). How many dozens of each type of fixture should be produced to obtain a maximum profit?

	Type-A	Type-B	Type-C	Total time available
Molding	1	2	3/2	1200
Trimming	2/3	2/3	1	4600
Packaging	1/2	1/3	1/2	2400
Profit	₹ 1,100	₹ 1,600	₹ 1,500	_

(c) A company has two grades of inspectors, I and II to undertake quality control inspection. At least 1500 pieces must be inspected in an 8-hour day. Grade I inspector can check 20 pieces in an hour with an accuracy of 96%. Grade II inspector checks 14 pieces an hour with an accuracy of 92%. Wages of grade I inspector are ₹ 5 per hour while those of grade II inspector are ₹ 4 per hour. Any error made by an inspector costs ₹ 3 to the company.

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If there are, in all, 10 grade I inspectors and 15 grade II inspectors in the company, find the optimal assignment of inspectors that minimize the daily inspection cost.

(d) A manufacturer of cylindrical containers receives tin sheets in widths of 30 cm and 60 cm respectively. For these containers the sheets are to be cut to three different widths of 15 cm, 21 cm and 27 cm respectively. The number of containers to be manufactured from these three widths are 400, 200 and 300 respectively. The bottom plates and top covers of the containers are purchased directly from the market. There is no limit on the lengths of standard tin sheets. Formulate the LPP for the production schedule that minimizes the trim losses.