JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,
Bangalore - 560 098

Date: / /2018 ***SUBJECT: BASIC MATHEMATICS***

II PUC
MOCK II

Timings Allowed: 3Hrs 15Mins ***Total Marks:100***

PART-A

I. Answer ALL the questions. **1 X 10 =10**

1. Evaluate $\begin{vmatrix} 3200 & 3201 \\ 3202 & 3203 \end{vmatrix}$
2. Find the value of n if $nC_{10} = nC_{15}$
3. Negate : If two triangles are similar then their areas are equal.
4. Find the value of x if $5:20 = 3:x$
5. Define learning curve.
6. Find the value of $Cos75^0$
7. If the length of latus rectum of $y^2 = 8kx$ *is* 4 $find$ $value$ of k
8. Evaluate $\lim_{x\to 2} \frac{x-2}{x^{\frac{1}{3}}-2^{\frac{1}{3}}}$
9. $x^3 + y^3 = 3axy$ $find$ $\frac{dy}{dx}$
10. $Evaluate$ $\int \left(\frac{1}{x} - Sinx + 3\right) dx$

PART-B

II. Answer any TEN questions. **10X2=20**

11. In how many ways can 7 gentlemen and 2 5 ladies be arranged in a circle if no two ladies are together.
12. Solve for x and y $\begin{bmatrix} 1 & 3 \\ -2 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \end{bmatrix}$
13. Two cards are drawn at random from a well shuffled pack of 52 cards. What is the probability that either both are queen or both are king cards.
14. Negate : 'if x is divisible by y then it is divisible by a and b'.
15. If a:b=2:3, b:c=3:5 and c:d=5:7 find a:d
16. Find banker's discount on Rs. 1000 due 6 months hence at 10% p.a
17. Prove that $\frac{Cos2A}{1+Sin2A} = \frac{CosA-SinA}{CosA+SinA}$
18. If $A + B + C = 180^0$ $prove$ $that$

    $CotB.CotC + Cotc.CotA + CotA.CotB = 1$
19. Write the focus, equation of the directrix of the parabola $y^2 = -8x$
20. Evaluate $\lim_{x\to 0} \left(\frac{2^x-1}{3x}\right)$
21. Differentiate w.r.t x x^{Sinx}
22. Find the average cost and marginal cost if the total cost function of an article given by C(x)= $5x^2 + 2x + 3$
23. Evaluate $\int Cos^2x\ Sinx\ dx$
24. Find the area bounded by the curve $y = x^2, x$ $axis$ and $ordinate$ $x = 0, x = 1$

PART-C

III. Answer any TEN questions **3 X 10 =30**

25. A team of 11 players has to be selected from 14players of which only 2 can play as wicket keeper ? Given each team must have exactly one wicket keeper, how many different teams can be made?

26. A sum of Rs. 2415 has to be divided among three persons A,B,C in such proportion that A's share to B's share as 4:5,B's share to C's share as 9:16. How much does each get?

27. A bill of Rs. 50000 was drawn on 10-04-2014 at 3 months and was discounted on 1-05-2014 @ 12% p,a.,. For what sum was the bill discounted and also find the Banker's gain

28. Find the interest earned on Rs.4897.50 caash invested in 15% stock at 81.5 brokerage given is 0.125

29. The owner of departmental store purchased an article of Rs.1500 at 4% VAT and sell it at Rs.1700 to the customer at 4% VAT. How much amount did the shopkeeper deposit to the Government as VAT?

30. Find the equation of the parabola given that the ends of latus rectum are L(3,6) and L^{I}(-5,6)

31. If $x=a\cos^4 t$, $y=b\sin^4 t$. Find $\frac{dy}{dx}$ at $t=\pi/4$

32. The height of a cone is 30cm and it is constant ,the radius of the base is increasing at the rate 0.25cm/sec. Find the rate of increase of volume of the cone when the radius is 10cm.

33. The cost function $C(x)=500x-20x^2+\frac{x^3}{3}$ where 'x' is the number of output .Calculate the output when marginal cost is equal to average cost

34. Differentiate $x^{(Sinx-Cosx)}$ with respect to x.

35. The sides of an equilateral triangle increasing at the rate of 2cm/sec. How fast its area increases when the sides are 10cm.

36. Find the equation of the parabola if the vertex is (0,0), axis y-axis and passes through the point $\left(\frac{1}{2}, 2\right)$

37. Evaluate $\int \frac{1}{e^x+e^{-x}}dx$

38. Evaluate $\int \frac{1}{\sqrt{x}+x}dx$

PART D

IV. ANSWER ANY SIX **6 X 5=30**

39. Find the term independent of x in $\left(\frac{\sqrt{x}}{2}-\frac{2}{x^2}\right)^{10}$

40. Resolve into partial fractions $\frac{x^2-2}{x^2+x-12}$

41. Prove that ~(p↔ q) ≡ (p^~q)V(q^~p)

42. If 15 men working 12 hrs per day perform job in 16 days. How long will it take for 21 men working 10 hrs daily to do the same job

43. A company requires 1000 hrs to produce the first 30 engines. If the learning effect is 90% , then Find the total labour cost to produce a total of 120 engines @ Rs. 20 per hr.

44. Using Graphical method , Solve LPP Minimize Z=1.5X+2.5Y , subjected to constraints X+3Y≥ 3, X+Y ≥2 and X,Y≥0

45. Show that $\frac{sin^3\theta+sin3\theta}{sin\theta}+\frac{cos^3\theta-cos3\theta}{cos\theta}=3$

46. Find equation of circle passing through (1,1), (2,-1) and (3,2)

47. IF $e^Y=\sin(x+y)$, Prove that $\frac{dy}{dx}=\frac{\cos(x+y)}{e^y-\cos(x+y)}$

48. Find the area enclosed by $y^2=4x$ and $x^2=4y$

PART-E

V. Answer any ONE question. 1 X 10 =10

49. a). The price of 4 accounting books, 2 commerce books, 3 economics books is Rs.134, the cost of one accountancy book, 3 commerce books and 2 economics books is Rs.81. The cost of 2 accounting books, one commerce book and 5 economics book is Rs.130. Find the rate per each book.

b) Find the value of $(1.01)^5$ correct to 4 decimal places

50. a) Prove that $\lim_{\theta\to 0}\frac{Sin\theta}{\theta}=1\ and\ hence\ deduce\ \lim_{\theta\to 0}\frac{tan\theta}{\theta}$.

b). A company produces two types of leather belts A and B. A is of superior quality an B is of inferior quality. The respective profits are Rs.10 and Rs.5 per belt. The supply of raw materials is sufficient for making 850 bets per day. For belt A, a special type of buckle is required and 500 are available per day. There are 700 buckles available for belt B per day. Belt A needs twice as much time as that required for belt B and the company can produce 500 belts if all of them were of type A. Formulate LPP model for the problem.