

HIGHER SECONDARY I<sup>ST</sup> YEAR

Model Question Paper

BUSINESS MATHS

Marks : 90  
Time: 2 ½ hrs

PART – I

Answer all the questions

20 x 1 = 20

Choose the appropriate answer

1.  $\begin{pmatrix} 3 & 5 & 6 \\ -2 & 1 & 6 \end{pmatrix} \times \begin{pmatrix} 5 & -1 & 0 \\ 3 & 2 & 1 \end{pmatrix}$  is
  - (a)  $\begin{pmatrix} 15 & 12 \\ -4 & 1 \end{pmatrix}$
  - (b)  $\begin{pmatrix} -3 & 15 \\ 8 & -3 \end{pmatrix}$
  - (c) Cannot be multiplied
  - (d) None of these
2. If the value of  $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} = -2$ , then  $\begin{vmatrix} 1 & 3 \\ 2 & 4 \end{vmatrix}$  is
  - (a) 0 (b) -2 (c) 2 (d) None of these
3. The value of  $\frac{1}{4!} + \frac{1}{3!}$  is
  - (a) 5/20 (b) 5/24 (c) 7/12 (d) 1/7
4. Sum of all binominal coefficients is
  - (a)  $2^n$  (b)  $b^n$  (c)  $2n$  (d)  $n$
5. Arrange AM, GM, HM on real number line in ascending order
  - (a) AM,GM,HM
  - (b) GM,AM, HM
  - (c) GM,HM,AM
  - (d) HM,GM, AM

6. A sum of money at C.I amounts to thrice itself in 3 years. It will be 9 times in  
(a) 9 years  
(b) 6 years  
(c) 12 years  
(d) 15 years
7. Equation of angle bisectors of X and Y axes  
(a)  $y = x$   
(b)  $y = -x$   
(c)  $y = 2x$   
(d)  $y = \pm x$
8. The length of the diameter of a circle with centre (1,2) passing through the point (5,5) is  
(a) 5  
(b)  $\sqrt{45}$   
(c) 10  
(d)  $\sqrt{50}$
9. If  $x = a \cos^3 \theta$ ;  $y = b \sin^3 \theta$  then  $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{b}\right)^{2/3} =$   
(a)  $2 \cos^3 \theta$   
(b)  $3 b \sin^3 \theta$   
(c) 1  
(d)  $a b \sin^2 \theta \cos^2 \theta$
10.  $\sin^{-1}x - \cos^{-1}(-x) =$   
(a)  $-\frac{\pi}{2}$   
(b)  $\frac{\pi}{2}$   
(c)  $-3 \frac{\pi}{2}$   
(d)  $3 \frac{\pi}{2}$
11. If the function  $f(x) = f(-x)$  then f is  
(a) odd function  
(b) even function  
(c) inverse function  
(d) constant function

12. Zero is not a point in the interval  
(a)  $(-\infty, \infty)$   
(b)  $-3 \leq x \leq 5$   
(c)  $-1 < x \leq 1$   
(d)  $(-\infty, -1)$
13.  $\lim_{x \rightarrow \pi/2} \frac{\sin x}{x} =$   
(a)  $\pi$   
(b)  $\frac{\pi}{2}$   
(c)  $\frac{2}{\pi}$   
(d) None of these
14. If  $x=t^2$  and  $y=2t$  then,  $\frac{dy}{dx}$  is,  
(a)  $2t$   
(b)  $1/t$   
(c)  $1+2t$   
(d)  $1/2t$
15.  $\int \frac{10}{x} dx =$   
(a)  $1/x$   
(b)  $-1/x^2$   
(c)  $10 \log x+c$   
(d)  $\log x+c$
16.  $\int e^x [f(x)+f'(x)] dx$  is equal to  
(a)  $e^x f(x)+c$   
(b)  $e^x f'(x)+c$   
(c)  $e^x+c$   
(d)  $e^{-x} + c$
17. The calculation of brokerage is based on  
(a) Face value  
(b) Market value  
(c) Capital  
(d) None of these
18. The yield of 9% stock at 90 is  
(a) 10%  
(b) 9%  
(c) 6%  
(d) 8%

19. If the S.D. and the C.V of a series are 5 and 25, then the arithmetic mean is  
(a) 20  
(b) 5  
(c) 10  
(d) None of these
20. Probability of sure event is  
(a) 1  
(b) 0  
(c) -1  
(d) S

**PART II**

**Answer any 7 questions in which question no. 26 is compulsory**

7 x 2 = 14

21. If  $A = \begin{pmatrix} 5 & 3 \\ 7 & 2 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & 2 \\ 4 & 6 \end{pmatrix}$  find  $5A + 2B$
22. Insert 4 Harmonic Means between  $\frac{1}{5}$  and  $\frac{1}{20}$
23. Find the length of the perpendicular from (3,2) on the line  $3x + 2y + 1 = 0$
24. Express as sum or difference :  $\sin (60+A) \sin (120+A)$
25. What is the domain of f for  $f(x) = \frac{x-4}{x+5}$
26. If  $\lim_{x \rightarrow 2} \frac{x^n - 2^n}{x-2} = 80$ , find n
27. Evaluate  $\int \frac{dx}{x^2-7}$
28. A person buys a stock of face value of Rs.5000 at a discount of  $9\frac{1}{2}\%$  paying brokerage at  $\frac{1}{2}\%$ . Find the purchase price of the stock.
29. Find the standard deviation of the following observations:  
1, 3, 5, 4, 6, 7, 9, 10, 2, 8
30. If  ${}^9P_r = 3024$ , find r ?

**PART III**

**Answer any 7 questions in which question no. 40 is compulsory**

7 x 3 = 21

31.

Show that 
$$\begin{vmatrix} 1 & b+c & b^2+c^2 \\ 1 & c+a & c^2+a^2 \\ 1 & a+b & a^2+b^2 \end{vmatrix} = (a-b)(b-c)(c-a)$$

32. A committee of 7 students is formed from 6 boys and 5 girls such that majority are from boys. How many different committees can be formed?

33. If x, y, z be unequal positive real numbers prove that  $(x+y)(y+z)(z+x) > 8xyz$

34. A point P moves so that P and the points (2,3) and (1,5) are always collinear. Find the locus of P?

35. Prove that  $\frac{1 + \sin\theta - \cos\theta}{1 + \sin\theta + \cos\theta} = \tan \theta/2$

36. If  $f(x) = 2x + 7$  and  $g(x) = 3x+b$  find 'b' if  $f\{g(x)\}=g\{f(x)\}$

37. Differentiate with respect to x:  $(\sin x)^x$

38. Find the effective rate of return on 15% debentures of face value Rs.100 issued at a premium of 2% interest being paid quarterly.

39. A person is known to hit the target 3 out of 4 shots whereas another person is known to hit 2 out of 3 shots. Find the probability of the target being hit when they both shoot.

40. Evaluate:  $\int \frac{x^{15}}{1+x^{32}} dx$

**PART-IV**

**Answer all the questions**

(7 x 5 = 35)

41. If  $A = \begin{pmatrix} 3 & -2 \\ 4 & -2 \end{pmatrix}$  and  $A^2 = kA - 2I$ , find k.

(or)

If  $x = \cos(\log t)$ ,  $y = \sin(\log t)$  find  $\frac{d^2y}{dx^2}$

42. Resolve into partial fractions :  $\frac{1}{(x-1)(x+2)^2}$   
 (or)

Solve  $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

43. Find the middle term(s) in the expansion of  $\left(3x - \frac{x^3}{6}\right)^9$   
 (or)

A circle passes through the points (4,1) and (6,5) and has its centre on the line  $4x+y=16$ . Find the equation of the circle.

44. What equal payments made at the beginning of each month for 3 years will accumulate to Rs.4,00,000 if money is worth 15% compounded monthly.  
 (or)

A company's total capital of Rs. 3,00,000 consists of 1000 preferential shares of 10% stock and remaining equity stock. In a year the company decided to distribute Rs.20,000 as dividend. Find the rate of dividend for equity stock if all the shares have face value Rs.100.

45. The life expectancy of female in 2003 in a country is 70 years. In 1978 it was 60 years. Assuming life expectancy to be a linear function of time make a prediction for the year 2013.  
 (or)

Find the arithmetic mean, median and mode

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	5	10	25	30	20	10

46. Differentiate  $\tan^{-1}\left(\frac{1-x}{1+x}\right)$  with respect to x  
 (or)

Let  $U_1, U_2, U_3$  be 3 Urns with 2 red and 1 black, 3 red and 2 black, 1 red and 1 black ball respectively. One of the urns is chosen at random and a ball is drawn from it. It was black. What is the probability that it has been chosen from  $U_3$ ?

47. Evaluate  $\int \log x \, dx$   
 (or)  
 Evaluate  $\int_1^2 x^2 \, dx$  as a limit of sum

