PROJECT RAIL

मॉडल प्रश्न पत्र
2023

संकायः– विज्ञान

विषय : (MATH)

कक्षा : 12th

कक्षा – 12 की बोर्ड परीक्षा 2022–23 हेतु
झारखण्ड अधिविद्य परिषद, राँची
के पाठ्यक्रम पर पूर्णतः आधारित

जिला प्रशासन, कोडरमा

संदेश !

उपायुक्त
आदित्य रंजन

प्यारे इन्टरमीडिएट के परीक्षार्थियों,

परीक्षा में बेहतर प्रदर्शन एवं परीक्षा का भय पूरी तरह से समाप्त करने के लिए जिला प्रशासन ने प्रोजेक्ट **RAIL** और स्वस्थ शैक्षणिक माहौल के लिए प्रोजेक्ट **IMPACT** के माध्यम से तनावमुक्त एवं प्रेरणादायक गतिविधियों से पूरे वर्ष आपके विद्यालय में पठन–पाठन का कार्य पूरा करवाया है।

वार्षिक माध्यमिक परीक्षा 2023 के मद्देनजर जैक बोर्ड के पैटर्न पर आधारित कक्षा 10 के लिए जिला प्रशासन, कोडरमा द्वारा विगत दिनों जारी किया गये मॉडल सेट; बोर्ड में सम्मिलित होने वाले परिक्षार्थियों के लिए काफी उत्साहवर्द्धक एवं लाभदायक सिद्ध हो रहे हैं।

हम सभी अवगत है कि इन्टरमीडिएट परीक्षा–2023 दिनांक 14–3–2023 से आयोजित होगी। ऐसे समय में अभ्यर्थी जितने अधिक प्रश्नों का अभ्यास करेंगे उनके लिए उतना ही लाभप्रद होगा। इस निमित आयोजित होने वाले इन्टरमीडिएट परीक्षा में अभ्यर्थियों का अपेक्षाओं के अनुरूप बेहतर परिणाम के उद्देश्य से कक्षा 12 हेतु (सभी संकायों के महत्वपूर्ण विषय) जैक बोर्ड के पैटर्न पर आधारित अत्यंत महत्वपूर्ण प्रश्नों के तीन–तीन मॉडल सेट; जिला प्रशासन एवं शिक्षकों के सहयोग से उपलब्ध कराए जा रहे हैं।

आशा है कि इस मॉडल सेट के प्रश्नों पर पूरी ईमानदारी से अभ्यास करेंगे, ताकि आगामी 12वीं कक्षा के वार्षिक इन्टरमीडिएट परीक्षा–2023 में कोडरमा जिला पूर्व वर्ष की भाँति पूरे झारखण्ड में अव्वल स्थान प्राप्त कर सके।

जिला प्रशासन के सभी सदस्यों एवं सभी शिक्षकों के प्रति आभार व्यक्त करते हुए जिला के सभी इन्टरमीडिएट परीक्षार्थियों के उज्ज्वल भविष्य की कामना करता हूँ।

उपायुक्त,
कोडरमा।

प्रश्न पत्र डाउनलोड करने का लिंक:

https://koderma.nic.in/education/

https://youtube.com/@degstrainingcentre2255

PROJECT RAIL 2.O

MODEL QUESTION PAPER-2023

MODEL SET -1 (1X 40=40)

CLASS – XII (OBJECTIVE) SUB : MATHS TIME : 1:30Hrs

1. **Let R be a relation in the set N given by R =** $\{(a,b): a = b-2, \ b > 6\}$ **choose the correct answer**
   (a) $(2,4) \in R$ **(b)** $(3,8) \in R$ **(c)** $(6,8) \in R$ **(d) none of these**
2. **Let A =** $\{a,b,c\}$ $and\ R = \{(a,a),(a,b),(a,c),(b,c)\}$ **be a relation on A , then R is**
   (a) Reflexive (b) Symmetric (c) Transitive (d) none of these
3. **Let f(x) =** $x^2 + x + 7$ **, then f(0) is**
   (a) - 7 (b) 0 (c) 7 (d) none of these
4. **Let f : N →** N **be defind as f(x) = 2x . Choose the correct answer**
   (a) f is one –one, onto (b) f is many one , onto
   (C) f is one –one but not onto (d) none of these
5. **Let f : R →** R **be defind as f(x) = 2X +7 , then** $f^{-1}(x)$ **is**
   (a) $\frac{x+7}{2}$ **(b) 7x-2 (c)** $\frac{7-x}{2}$ **(d)** $\frac{x-7}{2}$
6. **Principal value of** $\tan^{-1}(-1)$
   (a) $\frac{\pi}{4}$ **(b) -** $\frac{\pi}{4}$ **(c)** $\frac{3\pi}{4}$ **(d) none of these**
7. **If** $\sin^{-1} x$ **= y , then**
   (a) $0 \le y \le \pi$ **(b)** $0 < y < \pi$ **(c) -** $\frac{\pi}{2} \le y \le \frac{\pi}{2}$ **(d) none of these**
8. $\sin(\tan^{-1} x)$ **,** $|x| < 1$ **is equal to**
   (a) $\frac{x}{\sqrt{1-x^2}}$ **(b)** $\frac{1}{\sqrt{1-x^2}}$ **(c)** $\frac{x}{\sqrt{1+x^2}}$ **(d) none of these**
9. **The value of** $\cos\left\{\sin^{-1}\frac{1}{2} + \cos^{-1}\frac{1}{2}\right\}$
   (a) 1 (b) -1 (c) 0 (d) none of these
10. **If** $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix} = \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$

Then the value of x,y are respectively

(a) (3,1) (b) (2,3) (c) (2,4) (d) none of these

11. **If A =** $[1\ 2\ 3\ 4]$ **and B =** $\begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}$ **then AB is equal to**

(a) $[30]$ **(b)** $[20]$ **(c)** $[40]$ **(d) none of these**

12. **If A =** $\begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$ **then (adj.A) is equal to**

(a) $\begin{bmatrix} 5 & -1 \\ -7 & 3 \end{bmatrix}$ (b) $\begin{bmatrix} 5 & 1 \\ 7 & 3 \end{bmatrix}$ (c) $\begin{bmatrix} -5 & -1 \\ -7 & -3 \end{bmatrix}$ (d) none of these

13. Area of the triangle whose vertices are (1,0) (6,0) and (4,3) is

(a) 7.5 sq.units (b) 8.5 sq.units (c) 6.5 sq.units (d) none of these

14. The function f(x) = $|x-1|$, $x \in R$

(a) Continuous at x = 1 (b) Continuous everywhere

(c) not differentiable at x = 1 (d) none of these

15. If $\sqrt{x} + \sqrt{y} = \sqrt{a}$, then $\frac{dy}{dx}$ = ?

(a) $-\frac{\sqrt{x}}{\sqrt{y}}$ (b) $\frac{\sqrt{y}}{\sqrt{x}}$ (c) $-\frac{\sqrt{y}}{\sqrt{x}}$ (d) none of these

16. If x = at^2 and y = 2at , then $\frac{d^2y}{dx^2}$ =

(a) $-\frac{1}{t^2}$ (b) $-\frac{1}{2at^3}$ (c) $-\frac{1}{t^3}$ (d) none of these

17. y = $\tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$ $-\frac{1}{\sqrt{3}} < x < \frac{1}{\sqrt{3}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{3}{1+x^2}$ (b) $\frac{-3}{1+x^2}$ (c) $\frac{1}{1+x^2}$ (d) none of these

18. If y = $\cos(logx)$ then $\frac{dy}{dx}$ = ?

(a) - $\sin(logx)$ (b) - $\frac{\sin(logx)}{x}$ (c) $\frac{\cos(logx)}{x}$ (d) none of these

19. The slope of the tangent to the curve y + x = x^3 at x = 2

(a) 13 (b) 11 (c) 6 (d) none of these

20. The slope of the normal to the curve y = $2x^3 + 3\sin x$ at x = 0

(a) 3 (b) - $\frac{1}{3}$ (c) - 3 (d) none of these

21. $\int(\sqrt{x} + \frac{1}{\sqrt{x}})$ dx equals

(a) $\frac{1}{3}x^{\frac{1}{3}} + 2x^{\frac{1}{2}} + C$ (b) $\frac{2}{3}x^{\frac{2}{3}} + 2x^2 + C$

(c) $\frac{1}{3}x^{\frac{2}{3}} + \frac{1}{2}x^2 + C$ (d) none of these

22. $\int \frac{10x^9+10^x \log_e 10}{x^{10}+10^x}$dx equals

(a) $10^x - x^{10} + C$ (b) log($10^x + x^{10}$) + C

(c) $10^x + x^{10} + C$ (d) none of these

23. $\int \frac{dx}{x(x^2+1)}$ equals

(a) $\log|x| - \frac{1}{2}\log|x^2+1| + C$ (b) $\log|x| + \frac{1}{2}\log|x^2+1|$ + C

(c) - $\log|x| + \frac{1}{2}\log|x^2+1|$ + C (d) none of these

24. $\int \frac{dx}{x^2-6x+13}$ equals

(a) $\frac{1}{2}\tan^{-1}\frac{x-3}{2}$ +C (b) $\frac{1}{4}\tan^{-1}\frac{x-3}{2}$ + C (c)) $\frac{1}{2}\tan^{-1}\frac{x+3}{2}$ + C (d) none of these

25. $\int_0^{\frac{2}{3}} \frac{dx}{4+9x^2}$ equals

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{12}$ (c) $\frac{\pi}{24}$ (d) none of these

26. The order of the differential equation

$2x^2\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + y = 0$ is

(a) 2 (b) 1 (c) 0 (d) not defined

27. Which of the following differential equation has y = $c_1e^x + c_2e^{-x}$ as the general solution ?

(a) $\frac{d^2y}{dx^2} + y = 0$ (b) $\frac{d^2y}{dx^2} - y = 0$ (c) $\frac{d^2y}{dx^2} + 1 = 0$ (d) none of these

28. The integrating factor of the differential equation $x\frac{dy}{dx} - y = 2x^2$ is

(a) e^{-x} (b) e^{-y} (c) $\frac{1}{x}$ (d) none of these

29. If $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $\vec{b} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ then magnitude of $\vec{a} + \vec{b}$ is

(a) $\sqrt{29}$ (b) $\sqrt{27}$ (c) $\sqrt{26}$ (d) none of these

30. Let the vectors $\vec{a}$ and $\vec{b}$ be such that $|\vec{a}| = 1$ and $|\vec{b}| = \frac{2}{\sqrt{3}}$ $\vec{a} \times \vec{b}$ is a unit vector , if the angle betwwen $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) none of these

31. The projection of $2\hat{\imath} + 3\hat{\jmath} + 2\hat{k}$ on $\vec{b} = \hat{\imath} + 2\hat{\jmath} + \hat{k}$

(a) $\frac{10}{\sqrt{6}}$ (b) - $\frac{10}{\sqrt{6}}$ (c) $\frac{6}{\sqrt{10}}$ (d) none of these

32.The value of $\hat{\imath}.(\hat{\jmath} \times \hat{k}) + \hat{\jmath}.(\hat{\imath} \times \hat{k}) + \hat{k}.(\hat{\imath} \times \hat{\jmath})$ is

(a) 3 (b) -1 (c) 1 (d) none of these

33. Find the direction cosines of the line passing through the two points (-2,4,-5) and (1,2,3) is

(a) $\frac{3}{\sqrt{77}}, -\frac{2}{\sqrt{77}}, \frac{8}{\sqrt{77}}$ (b) $\frac{3}{\sqrt{77}}, \frac{2}{\sqrt{77}}, -\frac{8}{\sqrt{77}}$ (c) $-\frac{3}{\sqrt{77}}, -\frac{2}{\sqrt{77}}, \frac{8}{\sqrt{77}}$ (d) none of these

34. The direction cosine of x axis are

(a) (1,0,0) (b) (0,1,0) (c) (0,0,1) (d) none of these

35. Distance between two planes 2x + 3y +4z = 4 and 4x + 6y +8z = 12 is

(a) $\frac{3}{\sqrt{29}}$ (b) $\frac{2}{\sqrt{29}}$ (c) $\frac{4}{\sqrt{29}}$ (d) none of these

36. The angle between two planes 2x + y – 2z = 5 and 3x – 6x – 2z = 7 is

(a) $\cos^{-1}\left(\frac{4}{21}\right)$ (b) $\cos^{-1}\left(\frac{21}{4}\right)$ (c) $\cos^{-1}\left(\frac{23}{4}\right)$ (d) none of these

37. If P(A) = $\frac{1}{2}$, P(A) = 0 , then P(A/B) is

(a) 0 (b) $\frac{1}{2}$ (c) not defined (d) 1

38. Two coins are thrown simultaneously. find the probability of event when head will appear both of them

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{8}$ (d) none of these

39. The probability that a student is not swimmer is $\frac{1}{5}$, then the probability that out of 5 students 4 students swimmers is

(a) $5_{c_4}\left(\frac{4}{5}\right)^4\frac{1}{5}$ (b) $5_{c_2}\left(\frac{4}{5}\right)^4\frac{1}{5}$ (c) $5_{c_1}\left(\frac{4}{5}\right)^4\frac{1}{5}$ (d) none of these

40. If A and B are any two events such that P(A) + P(B) – P (A and B) = P(A) ,then

(a) P(B/A)=1 (b) P(A/B) = 1 (C) P(B/A)= 0 (d) P(A/B) = 0

MODEL SET – 1

Class-XII (sub) **Subject-Maths** **TIME : 1:30Hrs**

SECTION – A (2 X 5= 10)

Ans. Any five questions

1. If f :R – R : f (x) = 2x +1 , f :R – R : g (x) = $x^2 - 2$ find $(gof)(x)$
2. Prove that $2\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{7} = \tan^{-1}\frac{31}{17}$
3. Find $\frac{dy}{dx}$ if y= sec (tan$\left(\sqrt{x}\right)$)
4. Find the rate of change of the area of a circle with respect to its radius 'r' when r = 5cm.
5. Evaluate $\int(4x^3 - b)\,dx$
6. If $\vec{a} = 2\hat{\imath}$ - $\hat{\jmath} + 2\hat{k}$ and $\vec{b} = -\hat{\imath} + \hat{\jmath} - \hat{k}$ then ,find the angleθ between the vectors.
7. If P(A) = $\frac{6}{11}$ P(B) = $\frac{5}{11}$and P(A∩B) = $\frac{4}{11}$ then evaluate P(A/B) and P(B/A)

SECTION – B (3 X 5= 15)

Ans. Any five questions

8. By using the properties of determinant

   show that $\begin{vmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{vmatrix} = (1 - x^3)^2$

9. Test the continuity of the following function at the point x = 0

   f(x) = $\begin{cases} x+1 & when\ x \geq 1 \\ x^2+1 & when\ x < 1 \end{cases}$

10. Evaluate $\int \tan^4 x\,dx$

11. Evaluate $\int_0^{\frac{\pi}{2}} \frac{(\sin x)^{\frac{3}{2}}}{(\sin x)^{\frac{3}{2}}+(\cos x)^{\frac{3}{2}}}\,dx$

12. Solve x$\frac{dy}{dx}$ + 2y = x^2

13.If $\vec{a} = 2\hat{\imath} - \hat{\jmath} + \hat{k}$ and $\vec{b} = \hat{\imath} + \hat{\jmath} + \hat{k}$. Find (I) $\vec{a} \cdot \vec{b}$ (II) $|\vec{a} \times \vec{b}|$

14. Given three identical boxes I , II and III ,each containing two coins. In box I, both coins are gold coins, in box II, both are silver coins and in the box III, there is one gold and one silver coin . A person chooses a box at random and takes out a coin. If the coin is of gold , what is the probability that the other coin in the box is also of Gold ?

SECTION – C (3 X 5= 15)

Ans. Any three questions

15.Solve the following system of equation using matric method.

$x - 2y + 2z = 7$

$3x + 4y - 5z = -5$

$2x - y + 3z = 12$

16.Find the maximum and minimum value of the following function.

f(x) = $x^3 - 6x^2 + 9x + 12$

17.Find the area enclosed by the circle

$x^2 + y^2 = a^2$

0r using integration ,find the area bounded by the triangle whose vertices are (-1,0) ,(1,3) and (3,2)

18.Find the shortest distance between the following lines :-

$\vec{r} = \hat{\imath} + \hat{\jmath} + \lambda(2\hat{\imath} - \hat{\jmath} + \hat{k})$

$\vec{r} = 2\hat{\imath} + \hat{\jmath} - \hat{k} + \mu(3\hat{\imath} - 5\hat{\jmath} + 2\hat{k})$

19.Solve the following LPP graphically :-

Maximize z = 5x + 3y

Subject to constraints:

$3x + 5y \leq 15$

$5x + 2y \leq 10$

$x , y \geq 0$

MODEL SET -2 (1X40 =40)

CLASS – XII (OBJECTIVE) **SUB : MATHS** **TIME : 1:30Hrs**

1.Let A = $\{1, 2, 3, 4\}$ $and\ R = \{(1,1), (2,2), (3,3), (4,4), (1,2)\}$ **be a relation on A , then R is**

(b) Reflexive (b) Symmetric (c) Transitive (d) none of these

2.Let f : N → N **be defind as f(x) = 3x . Choose the correct answer**

(b) f is one –one, onto (b) f is many one , onto

(C) f is one –one but not onto (d) none of these

3. Let f : R $\rightarrow R$ be defind as f(x) = 3X -7 , then $f^{-1}(x)$ is

(a) $\frac{x+7}{3}$ (b) 3x-7 (c) 3x+7 (d) $\frac{x-7}{3}$

4. Let f(x) = $|x|\ and\ g(x) = [x]$, then the value of fog$\left(\frac{3}{2}\right)$ is

(a) 5 (b) 6 (c) 1 (d) -1

5. If f :R – R : f (x) = $(3 - x^3)^{\frac{1}{3}}$ find $(fof)(x)$

(a) x (b) 1/x (c) - x (d) none of these

6. The value of $\sin\{\tan^{-1} a + \cot^{-1} a\}$ is

(a) 0 (b) -1 (c) 1 (d) none of these

7. Principal value of $\cos^{-1}\left(-\frac{1}{2}\right)$

(a) - $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) none of these

8. $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$ is equal to

(a) - $\frac{\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) none of these

9. $\sin\left(\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right)$ is equal to

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) 1

10. If A= $\begin{bmatrix}1 & 3\\ 2 & 1\end{bmatrix}$, $B = \begin{bmatrix}4\\ -1\end{bmatrix}$

then the value of$(AB)'$ are respectively

(b) $[1 \quad 7]$ (b) $\begin{bmatrix}7\\ 1\end{bmatrix}$ (c) $\begin{bmatrix}1\\ 7\end{bmatrix}$ (d) $\begin{bmatrix}-1\\ -7\end{bmatrix}$

11. For what value of x the given matrix $\begin{bmatrix}x & x+1\\ 1 & 2\end{bmatrix}$ is singular

(a) 1 (b) 2 (c) 3 (d) none of these

12. If A = $\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}$, then AA' is equal to

(a) I_2 (b) I_3 (c) I_4 (d) none of these

13.If $\begin{vmatrix}3 & x\\ x & 1\end{vmatrix} = \begin{vmatrix}3 & 2\\ 4 & 1\end{vmatrix}$, thenx is equal to

(a) $\pm 2\sqrt{2}$ (b) $\sqrt{2}$ (c) $\pm 3\sqrt{2}$ (d) none of these

14. What is the value of k for which the function at x=0

f(x)= $\begin{Bmatrix}\frac{\sin 2x}{5x} & if\ x \neq 0\\ k & if\ x = 0\end{Bmatrix}$

15. If y + $\sin y = \cos x$, then $\frac{dy}{dx}$ = ?

(a) $\frac{\cos x}{1+\cos y}$ (b) $\frac{\sin x}{1+\cos y}$ (c) - $\frac{\sin x}{1+\cos y}$ (d) none of these

16. If y = $\log(\cos e^x)$, then $\frac{dy}{dx}$ = ?

(a) - $e^x \tan e^x$ (b) $e^x \tan e^x$ (c) $e^x \cot e^x$ (d) none of these

17. y = 10^{100} then $\frac{dy}{dx}$ = ?

(a) 10010^{99} (b) 10^9 (c) 0 (d) 1

18. If x+ 2y = 6 then $\frac{dy}{dx}$ = ?

(a) - $\frac{1}{2}$ (b) $\frac{1}{2}$ (c) 1 (d) 2

19. The slope of the tangent to the curve y = $\sin x$ at x = $\frac{\pi}{2}$

(a) 1 (b) 0 (c) 2 (d) 3

20. The interval in which y = $x^2 e^{-x}$ is increasing is

(a) (-2,0) (b) (0,2) (c) $(2, \infty)$ (d) $(-\infty, \infty)$

21. The interval in which the function f(x) = $4x^3 - 6x^2 - 72x + 30$ is decreasing is

(a) (-2,3) (b) (2,3) (c) -(2,3) (d) none of these

22. $\int \frac{e^x(1+x)}{\cos^2(e^x x)}$ dx is equal to

(a) - $\cot(e^x x)$ + C (b) $\tan(xe^x)$ + C

(c) $\tan(e^x)$ + C (d) None of these

23. $\int \frac{dx}{\sin^2 x \cos^2 x}$ is equal to : -

(a) $\tan x + \cot x + C$ (b) $\tan x - \cot x + C$

(c) $\tan x - \cot 2x + C$ (d) $\tan x \cot x + C$

24. $\int x^2 e^{x^3}$ dx equals

(a) $\frac{1}{3} e^{x^3}$ + C (b) $\frac{1}{3} e^{x^2}$ + C

(c) $\frac{1}{2} e^{x^3}$ + C (d) $\frac{1}{2} e^{x^2}$ + C

25. $\int_0^{\frac{2}{3}} \frac{dx}{4+9x^2}$ equals

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{12}$ (c) $\frac{\pi}{24}$ (d) $\frac{\pi}{4}$

26. Degree of the given differential equation is

$(y''')^3 + (y'')^3 + (y')^4 + y^5 = 0$

(a) 2 (b) 3 (c) 4 (d) 5

27. A homogeneous differential equation of the form $\frac{dy}{dx} = h\left(\frac{x}{y}\right)$ can be solved by making the substitution

(a) y= vx (b) v = yx (c) x = vy (d) x = v

28. The general solution of the differential equation $\frac{dy}{dx}$ + y = 1 (y $\neq$ 0)

(a) y = 1+ A e^{-x} (b) y = 1+ A e^x (c) y = 2+ A e^{-x} (d) None of these

29. . If $\hat{a}$ and $\hat{b}$ be two unit vectors and θ is the angle between them, then $\hat{a} + \hat{b}$ is a unit vector if

(a) $\theta = \frac{\pi}{4}$ (b) $\theta = \frac{\pi}{3}$ (c) $\theta = \frac{\pi}{2}$ (d) $\theta = \frac{2\pi}{3}$

30. The value of $\hat{\imath}.(\hat{\jmath} \times \hat{k})$ is

(a) 0 (b) 2 (c) 1 (d) $\hat{\imath}$

31. If a line makes angle $90°, 135°, 45°$ with x,y and z axes respectively ,its direction cosine is

(a) $\left(1, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ (b) $\left(0, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ (c) $\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$ (d) (0, 1, 1)

32. Cartesian equation of line passing through (0,0,0) and (5,-2,3) is

(a) $\frac{x-5}{0} = \frac{y+2}{o} = \frac{z-3}{0}$ (b) $\frac{x}{5} = \frac{y}{-2} = \frac{z}{3}$ (c) x = y = z (d) None of these

33. Distance of the plane 2x – 3y + 4z = 6 from the origin is

(a) $\frac{4}{\sqrt{29}}$ (b) $\frac{6}{\sqrt{92}}$ (c) $\frac{6}{\sqrt{29}}$ (d) 1

34. The planes 2x – y + 4z = 5 and 5x - 2.5y + 10z = 6 are

(a) perpendicular (b) parallel (c) intersect y – axis (d) None of these

35. The vector equation of a line where cartesian equation is $\frac{x-5}{1} = \frac{y+2}{2} = \frac{z-3}{-5}$

(a) $\vec{r} = (5\hat{\imath} + 2\hat{\jmath} - 3\hat{k}) + \lambda(\hat{\imath} + 2\hat{\jmath} - 5\hat{k})$ (b) $\vec{r} = (5\hat{\imath} - 2\hat{\jmath} + 3\hat{k}) + \lambda(\hat{\imath} + 2\hat{\jmath} - 5\hat{k})$

(c) $\vec{r} = (\hat{\imath} + 2\hat{\jmath} - 5\hat{k}) + \lambda(5\hat{\imath} - 2\hat{\jmath} + 3\hat{k})$ (d) None of these

36. A pair of dice are rolled. the probabity of obtaining an even prime number on each die is.

(a) $\frac{1}{36}$ (b) $\frac{1}{6}$ (c) $\frac{1}{12}$ (d) None of these

37. A family has two children. what is the probability that both the children are boys given that at least one of them is a boy

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) $\frac{1}{2}$ (d) None of these

38. If A and B are independent events ,then which one is true

(a) $P(A \cap B) = \emptyset$ (b) $P(A \cap B)$ = P(B) - P(A)

(C) $P(A \cap B)$ = 1 (d) $P(A \cap B)$ = P(B) × P(A)

39. $P\left(\frac{E'}{F}\right)$ = ……..

(a) 1 – P(E) (b) 1 – P (F) (c) $1 - P\left(\frac{E}{F}\right)$ (d) $1 - P\left(\frac{F}{E}\right)$

40. In a box containing 100 bulbs ,10 are defective. the probability that out of a sample of 5 bulbs none is defective is

(a) 10^{-1} (b) $\left(\frac{1}{2}\right)^5$ (c) $\left(\frac{9}{10}\right)^5$ (d) $\frac{9}{10}$

MODEL SET - 2

Class-XII (sub) Subject-MATHS TIME: 1:30Hrs

SECTION – A (2 X 5= 10)

1.If f(x) = $(7 - x^4)^{\frac{1}{4}}$, Find fof(x)

2.Prove that $\tan^{-1}\frac{2}{11} + \tan^{-1}\frac{7}{24} = \tan^{-1}\frac{1}{2}$

3.Find $\frac{dy}{dx}$ if y= x^x

4.Find the rate of change of circumference with respect to radius when r = 5 cm

5.Evaluate $\int \cot x\, dx$

6.Find the angle betwwen pair of lines

$\vec{r} = 3\hat{\imath} + 2\hat{\jmath} - 4\hat{k} + \lambda(\hat{\imath} + 2\hat{\jmath} + 2\hat{k})$

$\vec{r} = 5\hat{\imath} - 2\hat{\jmath} + \mu(3\hat{\imath} + 2\hat{\jmath} + 6\hat{k})$

7.If 2P(A) = P(B) = $\frac{5}{13}$ and P($\frac{A}{B}$) = $\frac{2}{5}$,then evaluate P(A∩B)

SECTION – B (3 X 5= 15)

8.By using the properties of determinant

show that $\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$

9.Test the continuity of the following function at the point x = a

f(x) = $\begin{cases} x\sin\frac{1}{x} & when\ x \neq 0 \\ 0 & when\ x = 0 \end{cases}$

10.Evaluate $\int \frac{\sin 2x}{\sin 5x \sin 3x}$ **dx**

11.Evaluate $\int_0^4 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{4-x}}\, dx$

12.Solve ydx - $(x - 2y^2)$**dy = 0**

13.If $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ **and** $\vec{b} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ **Find the value of (a)** $|\vec{a}|$ **(b)** $\vec{a} \cdot \vec{b}$ **(c)** $\vec{a} \times \vec{b}$

14.A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six.

SECTION – C (3 X 5= 15)

Ans. Any three questions

15.Use product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}\begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ **to solve the following system of equations**

$x - y + 2z = 1$
$2y - 3z = 1$
$3x - 2y + 4z = 2$

16.Find the maximum and minimum value of the following function.

$f(x) = 41 - 72x - 18x^2$

17.Using integration ,find the area bounded by the curve $\frac{x^2}{16} + \frac{y^2}{9} = 1$

18.Find the values of p so that line

$\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$ **and** $\frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$

19.Solve the following LPP graphically :-

Maximize $z = 4x + y$

Subject to constraints:

$x+y \leq 50$

$3x+ y \leq 90$

$x , y \geq 0$

MODEL SET -3 (1 x 40 = 40)

CLASS – XII (OBJECTIVE) SUB : MATHS TIME : 1:30Hrs

1.Let A = $\{1, 2, 3\}$ $and\ R = \{(1, 1), (1, 2), (2, 1),\}$ **be a relation on A , then R is**

(c) Reflexive (b) Symmetric (c) Transitive (d) none of these

2. Let A = $\{1, 2, 3, 4, 5\}$ $and\ R = \{(x, y) : x , y \in A\ and\ x < y\}$ **be a relation on A , then R is**

(a) Reflexive (b) Symmetric (c) Transitive (d) none of these

3.If f : N X N → N is such that f(m,n)= m+n, where N is set of natural no. then

(a) f is one-one (b) f in onto (c) f is many one onto (d) f is one -0ne onto

4.Let f : R → R **be defind as f(x) =** $\frac{2x}{5x+3}$, $x \neq \frac{-3}{5}$ **, then** $f^{-1}(x)$ **is**

(a) $\frac{3x}{2-5x}$ **(b)** $\frac{2x}{3-5x}$ **(c)** $\frac{5x}{2-3x}$ **(d)** $\frac{x}{3+2x}$

5. Let f(x) = $|x|$ $and\ g(x) = 2x - 3$**, then the value of gof**(-2) **is**

(a) -1 (b) 1 (c) -11 (d) none of these

6. Range of $\tan^{-1} x$ **is**

(a) $[0, \pi]$ (b) $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$ (c) R (d) none of these

7. Domain of function $\cos^{-1} x$ is

(a) $(0, \pi)$ (b) $[-1, 1] - \{0\}$ (c) $[-1, 1]$ (d) none of these

8. The value of $\sin^{-1}\left\{\sin\frac{3\pi}{4}\right\}$ is

(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{1}{\sqrt{2}}$ (d) $-\frac{1}{\sqrt{2}}$

9. The value of $\sec^{-1}\left\{\frac{1}{2x^2-1}\right\}$ is

(a) $2\sec^{-1} x$ (b) $\cos^{-1}(2x^2 - 1)$ (c) $\cos(2x^2 - 1)$ (d) $2\cos^{-1} x$

10. A matrix A of order 3x3 has determinant 5. What is the value of $|3A|$

(a) 125 (b) 5 (c) 135 (d) 75

11. For what value of x , the matrix $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ is singular

(a) 4 (b) 3 (c) 0 (d) 1

12. A is 3x3 matrix such that $|adjA|$ = 64 , then $|A|$ =

(a) ± 8 (b) ± 4 (c) 0 (d) 1

13. Points (2,0) , (x,y) and (0,5) are collinear if

(a) 2y = x (b) 2y = 10 – 5x (c) y = $\frac{5-10x}{2}$ (d) none of these

14. If f(x) = $\begin{Bmatrix} \frac{a\sin 2x}{x} & x \neq 0 \\ 2 & x = 0 \end{Bmatrix}$

Is continuous at x = 0 , then the value of a is

(a) 2 (b) 1 (c) 4 (d) $\frac{1}{2}$

15. Find $f'(4)$, if $f(x) = \frac{x-4}{2\sqrt{x}}$

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{8}$ (d) none of these

16 . Differential coefficient of $\log\sec x$ w.r.t.x is

(a) $\mathrm{Sec}\, x$ (b) $\cos x$ (c) $\tan x$ (d) $\mathrm{cosec}\, x$

17. Find $\frac{dy}{dx}$ when $x^{2/3} + y^{2/3} = a^{2/3}$

(a) $-\left(\frac{y}{x}\right)^{1/3}$ (b) $\left(\frac{y}{x}\right)^{2/3}$ (c) $\left(\frac{x}{y}\right)^{1/3}$ (d) $\left(\frac{x}{y}\right)^{2/3}$

18 . y = $\sin^{-1}\left(\frac{1-\tan^2 x}{1+\tan^2 x}\right)$, then $\frac{dy}{dx}$ equal to

(a) 0 (b) -2 (c) 2 (d) $\frac{\pi}{2}$

19. Find the slope of the tangent to the curve x = 1- a$\sin\theta$, y = b$\cos^2\theta$ at $\theta = \frac{\pi}{4}$

(a) $\frac{2b}{a}$ (b) $\frac{2a}{b}$ (c) $\sqrt{2}\frac{b}{a}$ (d) none of these

20. f (x) = $\frac{x-3}{x+2}$ is increasing on

(a) R (b) R - $\{-2\}$ (c) $[2, \infty[$ (d) $]-\infty, -3]$

21. Anti derivative of $\sqrt{x}$ is

(a) $\frac{1}{2\sqrt{x}}$ (b) $2\sqrt{x}$ (c) $\frac{2}{3}(x)^{3/2}$ (d) $\frac{2}{3}(x)^{2/3}$

22. Evaluate $\int \frac{x^2-1}{x^2+1} dx$

(a) $\tan^{-1} x$ (b) $2x + \tan^{-1} x$ (c) $x - 2\tan^{-1} x + C$ (d) $\log|x^2+1| + x + c$

23. $\int \frac{\sec^{-1}(\log x)}{x} dx$ is

(a) $\tan(\log x)$ $(b) - \operatorname{cosec}(\log x) + C$ $(c) \log(1+\cos x) + C$ (d) none of these

24. $\int x \sin 3x \, dx$ is

(a) $\frac{-x\cos 3x}{3} + \frac{\sin 3x}{12} + c$ (b) $x \sin 3x + \sin 3x + C$

(c) $\frac{\cos 3x}{3} + 3x^2 \sin 3x + C$ (d) none of these

25. $\int_0^4 |x-1| \, dx$ is

(a) 0 (b) 4 (c) 5 (d) 6

26. The order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^3 + \frac{dy}{dx} + x^2 y = 0$

(a) order = 3 , degree = 2 (b) order = 2 , degree = 3

(c) order = 1 , degree = 1 (d) none of these

27 . The order of differential equation of a family of curve y = A $e^x + Be^{-x}$ is

(a) 2 (b) 1 (c) 3 (d) none of these

28. Solution of differential equation $\frac{dy}{dx} = (e^x + 1)y$ is

(a) $\log y = e^x + x + C$ (b) $|\log y| = e^x + C$

(c) $\log|1+y| = x - \frac{x^2}{2} + C$ (d) none of these

29. The scalar product of $5\vec{i} + \vec{j} - 3\vec{k}$ and $3\vec{i} - 4\vec{j} + 7\vec{k}$ is

(a) 15 (b) -15 (c) 10 (d) -10

30. Vectors $2\vec{i} + \lambda\vec{j} + \vec{k}$ and $\vec{i} - 2\vec{j} + 3\vec{k}$ are perpendicular if value of λ is

(a) $\frac{5}{2}$ (b) $\frac{2}{5}$ (c) 0 (d) none of these

31. If θ is the angle betwwen two vectors $\vec{a}$ and $\vec{b}$, then $\vec{a} \cdot \vec{b} \geq 0$ only when

(a) $0 < \theta < \frac{\pi}{2}$ (b) $0 \leq \theta \leq \frac{\pi}{2}$ (c) $0 < \theta < \pi$ (d) $0 \leq \theta \leq \pi$

32. If $\vec{a} = 2\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} - 4\hat{k}$, then magnitude of $\vec{a} + \vec{b}$ is equal to

(a) $5\sqrt{2}$ (b) $2\sqrt{5}$ (c) $\frac{2}{\sqrt{5}}$ (d) None of these

33. The direction cosines of y – axis are

(a) (a,0,0) (b) (1,0,0) (c) (0,1,0) (d) (0,0,1)

34. The direction ratios of the normal to the plane 7x + 4y – 2z + 5 = 0 are

(a) (7,4,-2) (b) (7,4,2) (c) (-7, -2, 4) (d) None of these

35. The direction ratio of the straight line

$\vec{r} = \hat{\imath} + \hat{\jmath} - \hat{k} + \lambda(2\hat{\imath} - 3\hat{\jmath} + 4\hat{k})$

(a) (1,1,-1) (b) (2,3,-4) (c) (-2,3,-4) (d) None of these

36. The equation of the plane with intercepts 2 , 3 and 4 on the x, y and z axis respectively is

(a) 6x + 4y +3z = 12 (b) 6x + 4y - 3z = 12 (c) 6x – 4y - 3z = 12 (d) None of these

37. If A and B are events such that P (A/B) = P(B/A) . then

(a) $A \subset B$ but $A \neq B$ (b) A = B (c) $A \cap B = \emptyset$ (d) P(A) = P(B)

38. Two events A and B will be independent . if

(a) A and B are mutually exclusive (b) P(A) + P(B) = 1

(C) $P(A'B') = [1 - P(A)][1 - P(B)]$ (d) P(A) = P(B)

39. Events A and B are such that P(A) = 1/4 , P(A/B) = 1/2 , and P(B/A) = 2/3 , then P (B) is

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) $\frac{2}{3}$

40. If

$P(\bar{A}) = 0.4$, $P(A \cup B) = 0.7$ and A and B are independent events , then $P(B) =$

(a) $\frac{1}{4}$ (b) $\frac{1}{7}$ (c) $\frac{1}{28}$ (d) $\frac{4}{7}$

MODEL SET - 3

Class-XII (sub) **Subject-MATHS** **TIME : 1:30Hrs**

SECTION – A (2 X 5= 10)

Ans. Any five questions

1.If f(x) = $\frac{1-x^2}{1+x^2}$, show that f($\tan\theta$) = $\cos 2\theta$

2.Evaluate $\tan^{-1}\left\{2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right\}$

3.Find $\frac{dy}{dx}$ if y= $log_3 x$

4.Use differentiation to evaluate $\sqrt{17}$

5.Evaluate $\int x \sin x \, dx$

6.Find direction cosines of the line joining the points (1,2,3) and (3,1,7)

7.If P(A) = $\frac{1}{4}$ **P(B) =** $\frac{1}{3}$ **and P(A∪B) =** $\frac{1}{2}$ **then evaluate P(A∩B)**

SECTION – B (3 X 5= 15)

Ans. Any five questions

8.By using the properties of determinant

show that $\begin{vmatrix} x+4 & 2x & 2x \\ 2x & x+4 & 2x \\ 2x & 2x & x+4 \end{vmatrix}$ **= (5x+4)**$(x-4)^2$

9.Test the continuity of the following function at the point x = a

f(x) = $\begin{cases} \frac{x^2-a^2}{x-a} & when\ 0 \le x < a \\ 2a & when\ x \ge a \end{cases}$

10.Evaluate $\int \frac{\sin x}{\sin(x-a)}$ **dx**

11.Evaluate $\int_{-5}^{5} log\left(\frac{2+x}{2-x}\right) dx$

12.Solve x$\frac{dy}{dx}$ **– y = 2** $x^2 y$

13.Find the area of the parallelogram if the digonals are $\hat{\imath} + 2\hat{\jmath} - 3\hat{k}$ **and** $5\hat{\imath} - 2\hat{\jmath} + \hat{k}$

14.Two dice are thrown. find the probability that the numbers appeared has a sum 8 , if it is known that the second dice always exhibit 3.

SECTION – C (3 X 5= 15)

Ans. Any three questions

15.Solve the following system of equation using matric method.

x + 2y + z = 7
x +3 z = 11
2x - 3y = 1

16.Find the maximum and minimum value of the following function.

f(x) = $2x^3 - 15x^2 + 36x + 1$ **on** $[1, 5]$

17.Using integration ,find the area bounded by the curve $y^2 = 8x$ **and line x= 2**

18.Find the foot of the perpendicular from the point (3, -1,5) on the line

$$\frac{x+1}{4} = \frac{y-2}{1} = \frac{z-1}{2}$$

19.Solve the following LPP graphically :-

Maximize z = 3x + 5y

Subject to constraints:

$x+y \geq 2$

$x+3y \geq 3$

$x, y \geq 0$

BEST OF LUCK