SOLUTIONS FOR BNU 1501 EXAMINATION QUESTION PAPER OCT/NOV 2016

1. $3(y+2) = 4(2-y)$

   $3y + 6 = 8 - 4y$

   $3y + 4y = 8 - 6$

   $7y = 2$

   $y = \frac{2}{7}$ Option [3]

2. $2(x-1) - 3(x+1) = 12x + 21$

   $2x - 2 - 3x - 3 = 12x + 21$

   $12x + 3x - 2x = -21 - 3 - 2$

   $13x = -26$

   $x = -2$ Option [2]

3. $\sqrt{16x^{16}} = 4x^8$ Option [4]

4. $2x^2 - (x-3) - 2x(1+x)$

   $= 2x^2 - x + 3 - 2x - 2x^2$

   $= -3x + 3$ Option [1]

5. $\frac{7}{24} X \frac{3}{16} \div \frac{14}{32}$

$= \frac{7}{24} X \frac{3}{16} X \frac{32}{14}$

$= \frac{1}{8}$ Option [4]

6. $\frac{6}{11} + \frac{3}{2} - \frac{5}{3}$

$= \frac{12}{22} + \frac{33}{22} - \frac{5}{3}$

$= \frac{45}{22} - \frac{5}{3}$

$= \frac{135}{66} - \frac{110}{66}$

$= \frac{25}{66}$ Option [2]

7. $\frac{5}{9} - \frac{9}{8} \div \frac{3}{4}$

$\frac{5}{9} - \frac{9}{8} X \frac{4}{3}$

$\frac{5}{9} - \frac{3}{2}$

$\frac{10}{18} - \frac{27}{18}$

$-\frac{17}{18}$ Option [3]

8. $9xy = 3\ X\ 3\ X\ x\ X\ y$

   $8x^2 = 2\ X\ 2\ X\ 2\ X\ x\ X\ x\ X$

   $6xy^3 = 2\ X\ 3\ X\ x\ X\ y\ X\ y\ X\ y$

   $LCM = 2\ X\ 2\ X\ 2\ X\ 3\ X\ 3\ X\ x\ X\ x\ X\ y\ X\ y\ X\ y$

   $LCM = 72x^2y^3$ Option [2]

9. $5x - 3$ Option [3]

10. $(ab^2)(a^2b)^3 = (ab^2)(a^6b^3)$

    $= a^7b^5$ Option [3]

11. $Circumference\ of\ the\ jacuzzi = \pi d$

    $= \pi\ X\ 3$

    $= 9{,}4\ m$ Option [1]

12. $Paved\ area = [(12\ X\ 8)] - \left[\left(\frac{1}{2}\ X\ 3\ X\ 3\ X\ 4\right) + (\pi\ X\ 1{,}5^2)\right]$

    $96 - 18 - 2{,}25\pi$

    $= 78 - (2{,}25\pi)$

    $= 70{,}9\ m^2$ Option [4]

13. $V = \pi\ X\ (1.5)^2\ X \frac{3}{4}$

$V = 5{,}3014m^3 \quad but\ 1m^3 = 1\ 000l$

$V = 5\ 301{,}4l$ Option [4]

14. $a = \frac{1}{2}bh$

$2a = bh$

$h = \frac{2a}{b}$ Option [1]

15. $Total\ cost = 240 + (60\ X\ 9)$

$= 780$

$Selling\ price = 120\ X\ 9$

$= 1\ 080$

$Profit = Selling\ price - Total\ cost$

$= 1\ 080 - 780$

$Profit = R300$ Option [1]

16. $Given\ two\ points\ \ (2, -7)\ and\ (1,4)$

$\frac{y-y1}{x-x1} = \frac{y2-y1}{x2-x1}$

$\frac{y-(-7)}{x-2} = \frac{4-(-7)}{1-2}$

$\frac{y+7}{x-2} = \frac{11}{(-1)}$

$y + 7 = -11(x - 2)$

$y + 7 = -11x + 22$

$y = -11x + 22 - 7$

$y = -11x + 15$ Option [2]

17. $7{,}5\%\ of\ 7\ 500 = \frac{7{,}5}{100}\ X\ 7\ 500$

$= 562{,}50$

$The\ workers\ will\ earn\ (7\ 500 + 562{,}50) = R8\ 062{,}50\ after\ the\ wage\ increase$

Option [4]

18. $\underline{Washing\ powder\ A}$:

$Using\ proportion, cost\ of\ 10kg = \frac{10}{2}\ X\ 48$

$= R240{,}00$

$\underline{Washing\ powder\ B}$:

$Using\ proportion, cost\ of\ 10kg = \frac{10}{5}\ X\ 125$

$= R250{,}00$

$Cheapest\ washing\ powder = 240{,}00$ Option [1]

19. $S = P(1 + rt)$

$55\ 440 = 36\ 000\left(1 + \frac{6}{100}t\right)$

$1 + 0{,}06t = \frac{55440}{36000}$

$0{,}06t = \frac{55440}{36000} - 1$

$t = \left(\frac{55440}{36000} - 1\right)/0{,}06$

$t = 9\ years$ Option [3]

20. $S = P(1 + rt)$

$S = 12\ 000\left(1 + \frac{15}{100}X3\right) + 12\ 000\left(1 + \frac{15}{100}X2\right) + 12\ 000\left(1 + \frac{15}{100}X1\right)$

$S = 12\ 000(1{,}45) + 12\ 000(1{,}30) + 12\ 000(1{,}15)$

$S = R\ 46\ 800{,}00$ Option [2]

21. $S = P\ (1 + i)^n$

$30\ 000 = 10\ 000\ \left(1 + \frac{0{,}15}{4}\right)^n$

$\frac{30000}{10000} = (1 + 0{,}0375)^n$

$(1{,}0375)^n = 3$

$n\ln(1{,}0375) = \ln(3)$

$n = \frac{\ln(3)}{\ln(1{,}0375)}$ $but\ n = 4t$

$4t = \frac{\ln(3)}{\ln(1{,}0375)}$

$t = \frac{\ln(3)}{4\ln(1{,}0375)}$

$t = 7{,}5\ years$ Option [3]

22. $P = 2P;\quad t = 7years\ ;\quad n = 7$

$S = P(1+i)^n$

$2P = P(1+i)^{7X1}$

$\frac{2P}{P} = (1+i)^7$

$\ln(2) = 7\ln(1+i)$

$\frac{\ln(2)}{7} = \ln(1+i)$

$e^{\frac{\ln(2)}{7}} = e^{\ln(1+i)}$

$e^{\frac{\ln(2)}{7}} = 1+i$

$i = e^{\frac{\ln(2)}{7}} - 1$

$i = 0.104 = 10{,}4\%$ Option [3]

23. $Present\ value\ of\ loan = 250\ 000$

$P = Ra_{\overline{n}|i} = R\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$

$250\ 000 = \mathrm{R}\left[\frac{\left(1+\frac{0.18}{12}\right)^{12X5} - 1}{\frac{0.18}{12}\left(1+\frac{0.18}{12}\right)^{12X5}}\right]$

$$R = \frac{250000}{39{,}38026889}$$

$Payment, R = R6\ 348{,}36$ Option[1]

24. $Payment, R = R6\ 348{,}356856$

$$P = 6\ 348{,}356856\left[\frac{\left(1+\frac{0.18}{12}\right)^{12X(5-3)}-1}{\frac{0.18}{12}\left(1+\frac{0.18}{12}\right)^{12X(5-3)}}\right]$$

$$P = 6\ 348{,}356856\left[\frac{(1{,}015)^{12X2}-1}{0{,}015(1{,}015)^{12X2}}\right]$$

$$= 6\ 348{,}356856(20{,}03040537)$$

$Present\ value\ of\ loan\ after\ 3\ years = R127\ 160{,}16$ Option [1]

25. $P = Ra\,n\urcorner\ i = R\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$

$$250\ 000 = 7\ 500\left[\frac{\left(1+\frac{0.18}{12}\right)^n - 1}{\frac{0.18}{12}\left(1+\frac{0.18}{12}\right)^n}\right]$$

$$\frac{250000}{7500} = \frac{(1{,}015)^n - 1}{0{,}015(1.015)^n}$$

$$\frac{250000X0{,}015}{7500} = \frac{(1{,}015)^n - 1}{(1.015)^n}$$

$$0{,}5 = \frac{(1{,}015)^n}{(1.015)^n} - \frac{1}{(1.015)^n}$$

$$\frac{1}{(1.015)^n} = 1 - 0{,}5$$

$$(1{,}015)^{-n} = 0{,}5$$

$-nln(1{,}015) = \ln(0{,}5)$

$n = -\frac{\ln(0{,}5)}{\ln(1{,}015)}$ $\quad but\ n = 12t$

$12t = -\frac{\ln(0{,}5)}{\ln(1{,}015)}$

$t = -\frac{\ln(0{,}5)}{12\ln(1{,}015)}$

$t = 3{,}9\ years$ Option [3]