SOLUTIONS FOR BNU 1501 EXAMINATION QUESTION PAPER MAY/JUNE 2016

1. $3(x+1)+4=5-3(x-2)$

   $3x+3+4=5-3x+6$

   $3x+3x=5+6-4$

   $6x=4$

   $x=\frac{2}{3}$ Option [4]

2. $\frac{30x}{9}+2=5x$

   $30x+2(9)=5x(9)$

   $30x+18=45x$

   $15x=18$

   $x=\frac{6}{5}$ Option [1]

3. $\sqrt{36x^4y^{16}}=6x^2y^8$ Option [2]

4. $a(2a^2-a-4)-2a(a+3)-1=2a^3-a^2-4a-2a^2-6a-1$

   $=2a^3-3a^2-10a-1$ Option [3]

5. $\frac{5}{6} \div \frac{3}{6}\ X \frac{3}{15}$

$= \frac{5}{6} X \frac{6}{3}\ X \frac{3}{15}$

$= \frac{1}{3}$ Option [2]

6. $\frac{5}{6} - \frac{3}{4} + \frac{7}{24}$

$= \frac{5}{6} + \frac{7}{24} - \frac{3}{4}$

$= \frac{20}{24} + \frac{7}{24} - \frac{18}{24}$

$= \frac{27}{24} - \frac{18}{24}$

$= \frac{9}{24}$

$= \frac{3}{8}$ Option [4]

7. $\frac{3}{4} + \frac{1}{2}\ X \frac{5}{4}$

$\frac{3}{4} + \frac{5}{8}$

$\frac{6}{8} - \frac{5}{8}$

$\frac{11}{8}$ Option [2]

8. $6a^2bc = 3\ X\ 2\ X\ a\ X\ a\ X\ b\ X\ c$

   $8abc = 2\ X\ 2\ X\ 2\ X\ a\ X\ b\ X\ c$

   $12ab^3 = 2\ X\ 2\ X\ 3\ X\ a\ X\ b\ X\ b\ X\ b$

   $LCM = 2\ X\ 2\ X\ 2\ X\ 3\ X\ a\ X\ a\ X\ b\ X\ b\ X\ b\ X\ c$

   $LCM = 24a^2b^3c$ Option [1]

9. $L = 2x - 3$ Option [3]

10. $\frac{x^2 X\ x^3}{x^5} = \frac{x^5}{x^5} = 1$ Option [4]

11. $Perimeter = (10X2) + \frac{1}{2}\ X\ 2\ X\ \pi\ X\ 8$

    $= 20 + 8\pi$

    $= 45.1\ m$ Option [4]

12. $Area\ of\ lawn = \left[(10\ X\ 8) + \left(\pi\ X\ 4^2\ X \frac{1}{2}\ X\ 2\right)\right] - [(2\ X\ 2) + (\pi\ X\ 0{,}5^2 X\ 6)]$

    $= (80 + 16\pi) - (4 + 1{,}5\pi)$

    $= 76 + 14{,}5\pi$

    $= 121{,}6\ m^2$ Option [1]

13. $V = 2\ X\ 2\ X\ 1{,}5$

$V = 6m^3 \quad but\ 1m^3 = 1\ 000l$

$V = 6\ 000l$ Option [1]

14. $C = 2(l + w)$

$C = 2l + 2w$

$2w = C - 2l$

$w = \frac{C-2l}{2}$ Option [2]

15. $Total\ cost = 18\ 000 + (500\ X\ 100)$

$= 68\ 000$

$Selling\ price = 800\ X\ 100$

$= 80\ 000$

$Profit = Selling\ price - Total\ cost$

$= 80\ 000 - 68\ 000$

$Profit = 12\ 000$ Option [1]

16. $Given\ two\ points\ (-1, -2)\ and\ (3,4)$

$slope = \frac{y2-y1}{x2-x1}$

$= \frac{4-(-2)}{3-(-1)}$

$slope = \frac{4+2}{3+1}$

$= \frac{6}{4}$

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

17. $VAT = \frac{14}{100}\ X\ 2\ 410$

$= 337.40$

$Cost + VAT = 2\ 410 + 337.40$

$= R\ 2\ 747.40$ Option [3]

18. $Using\ proportion: Eggs\ needed\ to\ bake\ 14\ cakes = \frac{14}{2}\ X \frac{5}{1}$

$= 35\ eggs$ Option [3]

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

$S = 36\ 000\left(1 + \frac{6}{100} X\ 6\frac{5}{12}\right)$

$S = 36\ 000\left(1 + \frac{6}{100} X\ \frac{77}{12}\right)$

$S = 36\ 000(1,385)$

$S = R\ 49\ 860{,}00$ Option [2]

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

$S = 45\ 000\left(1 + \frac{6}{100}X\frac{5}{1}\right) + 20\ 000\left(1 + \frac{6}{100}X\frac{3}{1}\right)$

$S = 45\ 000(1{,}3) + 20\ 000(1.18)$

$S = R\ 82\ 100{,}00$ Option [1]

21. $S = P\left(1 + \frac{jm}{m}\right)^{tm}$ $where: jm = \ norminal\ interest\ rate$

$m = number\ of\ compounding\ periods$

$t = \ number\ of\ years$

$S = Sum\ accumulated$

$P = Principal$

$i = \frac{jm}{m}\ , n = tm$

$S = 2P$

$\left(\frac{2P}{P}\right) = \left(1 + \frac{jm}{m}\right)^{tm}$

$ln(2) = tm\ ln\left(1 + \frac{jm}{m}\right)$ $m = 12;$ $t = 10 years$

$ln(2) = 120\ ln\left(1 + \frac{jm}{12}\right)$

$\frac{\ln(2)}{120} = ln\left(1 + \frac{jm}{12}\right)$

$e^{\left(\frac{ln2}{120}\right)} = \ 1 + \frac{jm}{12}$

$e^{\left(\frac{ln2}{120}\right)} - 1 = \frac{jm}{12}$

$jm = 12\left(e^{\left(\frac{ln2}{120}\right)} - 1\right)$

$jm = 0.0695 = 6.95\%$ Option[4]

22. $P = 8\,000; \quad t = \frac{30}{12}; \quad i = \frac{0{,}13}{2} \; ; \quad n = 2\,X\frac{30}{12}$

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

$S = 8\,000\left(1+\frac{0.13}{2}\right)^{2\,X\frac{30}{12}}$

$S = 8\,000(1{,}065)^5$

$S = 10\,960{,}69$

$Interest = S - P$

$= 10\,960{,}69 - 8\,000$

$= R\,2\,960{,}69$ Option [1]

23. $S = R\left[\frac{(1+i)^n-1}{i}\right]$

$100\,000 = R\left[\frac{\left(1+\frac{0.08}{52}\right)^{52X2}-1}{\frac{0.08}{52}}\right]$

$100\,000 = R(112.6882872)$

$R = \frac{100\,000}{112.6882872}$

$R = R887{,}40$ Option[3]

24. $Loan = 480\,000 - 150\,000 = 330\,0000$

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

330 000 = R $\left[\frac{\left(1+\frac{0.24}{12}\right)^{12X20}-1}{\frac{0.24}{12}\left(1+\frac{0.24}{12}\right)^{12X20}}\right]$

$$R = \frac{330000}{49{,}56855168}$$

$$Payment, R = R6\ 657.446885$$

$$Outstanding\ amount\ after\ 10\ years = 6\ 657.45\left[\frac{\left(1+\frac{0.24}{12}\right)^{12X10}-1}{\frac{0.24}{12}\left(1+\frac{0.24}{12}\right)^{12X10}}\right]$$

$$= 6\ 657.446885(45{,}3553885)$$

$$= R301\ 951{,}08 \quad \text{Option [2]}$$

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

$$330\ 000 = 8\ 000\left[\frac{\left(1+\frac{0.24}{12}\right)^{n}-1}{\frac{0.24}{12}\left(1+\frac{0.24}{12}\right)^{n}}\right]$$

$$\frac{330000}{8000} = \frac{(1{,}02)^n - 1}{0{,}02(1.02)^n}$$

$$0{,}02\ X\ 41{,}25 = \frac{(1{,}02)^n - 1}{(1.02)^n}$$

$$0{,}825 = \frac{(1{,}02)^n}{(1.02)^n} - \frac{1}{(1.02)^n}$$

$$\frac{1}{(1.02)^n} = 1 - 0{,}825$$

$$(1{,}02)^{-n} = 0{,}175$$

$$-nln(1{,}02) = \ln(0{,}175)$$

$$n = -\frac{\ln(0{,}175)}{\ln(1{,}02)} \qquad but\ n = 12t$$

$$12t = -\frac{\ln(0{,}175)}{\ln(1{,}02)}$$

$$t = -\frac{\ln(0{,}175)}{12\ln(1{,}02)}$$

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