Combined Graduate Level (Mains) Examination for UDC/Assistant Grade held by SSC

The SSC Graduate Level Examination is meant for recruiting persons to various government posts. The UDC examination comprises two papers while the Assistant Grade examination comprises five papers.

For those gearing up to the mains ahead, we present a MOCK TEST, based on the previous year examinations and the current trends, so that the candidates are not taken aback.

The MOCK TEST provides a general, most probable pattern and new trends are always possible. The pattern of SSC examinations has been completely overhauled over the past years. Till the late 1990s, only one objective type test was held. Since 1999, mains are also being conducted and the formats for Assistant Grade are under scheme A while those for UDCs are under scheme B.

We wish our readers 'the best' for their mains.

* For all questions, wherever mentioned, stick to the word-limit, or else, marks are deducted.

PAPER I
General English and General Studies

Time allowed : 2 hours   *MM - 100*

Part A—General English   (50 marks)

1. You are a member of the environment club of your town. You want others also to be conscious of the environmental hazards and join the club. Write a short speech (100 words) to be delivered to the students of a school in your town, urging them to join the club and save mother earth on a function titled 'Mother Earth'.   (10)

2. You are Ram Swaroop Srivastava of GH-4, Highway No. 3, Pune. You have been noticing how people are remaining glued to their mobile phones these days and how it is causing a nuisance, especially among the student class. People are being isolated from books as well as games. Write a letter (150 words) to the Editor, *The Times of India*, a national newspaper, on this subject, suggesting ways to curb the growing menace.   (10)

3. Read the following passage and fill in the blanks with the most appropriate words/ phrases provided in the key following the passage.

(The Search for Happiness)

Do you _(a)_ for happiness? Then, first get ridden of the idea that you can _(b)_ it from the enjoyment of sense objects. For it _(c)_ you anyway and makes you dependent on those objects of pleasure. Dependence in any _(d)_ is but the root cause of _(e)_ . Those objects, on which you depend for your pleasure are not always available to you. Then, a stage will come when your senses will lose their _(f)_ to enjoy. All this is because the dirt of _(g)_ envelopes the intellect. What is happiness? You are happiness- _(h)_ but are only giving rise to problems by desiring for happiness and _(i)_ away from the _(j)_ centre of your own true bliss.

Key: capacity, original, aspire, stray, shape, desires, derive, binds, personified, misery. $(1 \times 10 = 10)$

4. Do as directed:

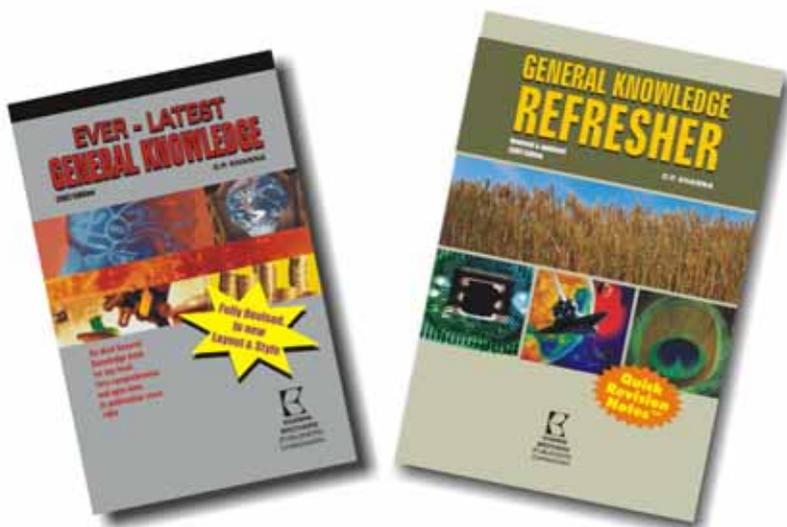(*a*) It is time to finish this. (change the voice)

(b) The troop haven't advanced far as yet. (make necessary correction and re-write).

(c) I was afraid. I could not even move. (join the sentences using 'so').

(d) Ravi said, "How are you?" (Change into indirect speech).

(e) The alarm had been sounding ____ at least five minutes. (insert appropriate preposition).

(f) The cat attacked the mouse. (change the voice).

(g) Old men are often seen ___ like children. (use the correct form of the word 'behave').

(h) If he behaves like this, it will lead him ___ . (insert determiner).

(i) Ravi ___ skate when he was just five years old. (insert modal).

(j) You gave me this inspiring book. Thank you so much for it.

(combine using relative pronoun). (1 × 10 = 10)

5. Complete the passage by filling the blanks with the correct tense from the verbs provided in the brackets.

When I and you _(a)_ (be) _(b)_ (work) at the Metropolitan Corporation, Rahul had _(c)_ (decide) to obstruct the proceedings in all possible ways. But it _(d)_ (turn) out to be so embarrassing for him that later on he decided never to be _(e)_ (draw) into such things. (1 × 5 = 5)

6. Complete the following expressions:

(a) as white as ___ .

(b) as soft as ___ .

(c) as cunning as a ___ .

(d) as cool as ___ .

(e) as light as a ___ . (1 × 5 = 5)

Part B—General Studies
General Studies (Sections I and II)
MM - 36

Section I

1. How are amendments made to the Indian Constitution? Explain briefly. (about 120 words).

OR

2. Explain briefly the economic impact of British rule in India. (about 120 words).

OR

3. "50 years of satyagraha and its relevance today." Write a short note on this topic. (about 120 words) (8)

Section II

4. Write short notes on any two of the following. (About 50 words each).

(a) Poverty Alleviation Schemes in India.

(b) Human Development Report, 2006.

(c) 11th 5-year Plan : Objectives and Challenges.

(d) Service Tax. (4 × 2 = 8)

5. (a) Who said "Sarfaroshi Ki Tamanna Ab Hamare Dil Main Hai"?

(b) When did man Ist land on the moon?

(c) On which river is the Baglihar Dam proposed?

(d) Who is the new strategic partner in the Mt Everest drinking water company?

(e) What is Brain-Mapping? (1 × 5 = 5)

6. (a) Who was the first woman Chief Minister of a State? (in India).

(b) What was the venue of the 94th Indian Science Congress?

(c) What is the Union Jack?

(d) Where is Pentagon situated?

(e) What is a 'Ray Gun'? (1 × 5 = 5)

7. With which field of activity do you associate the following?

(a) Laurie Baker

(b) Abdul Kareem Telgi

(c) Roger Federer

(d) Desmund Tutu

(e) Glen McGraw (1 × 5 = 5)

8. Fill up the blanks:

(a) Jambudvipa is the ancient name of __ .

(b) The Ist man to reach the South-Pole was ___ .

(c) The ancient town of Prayag is on the banks of river ___ .

(d) The Ist modern Olympics were held at ___ .

(e) Ustad Bismillah Khan is associated with ___ . (1 × 5 = 5)
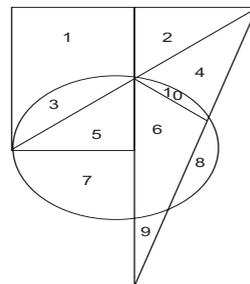
Section III (14 Marks)
General Intelligence and Reasoning Ability)
All the questions carry ONE MARK each.

Directions (Qs. 9, 10). Study the following diagram comprising geometrical figures.

9. Which numbers are common to 3 regions?

10. Which numbers are uncommon?

Directions (Qs. 11, 12). Six friends are sitting on a long, straight chair. A and F are at the ends. B is to the right of A and second to left of D who is at 3rd place from the right. C is not adjacent to F.

11. What is the position of E from left?

12. Who is seated between B and D?

Directions (Qs. 13, 14). Study the trend on left side and find out the missing numbers, denoted by the question marks.

13.

9	64	13
2	16	3
7	48	10

13	16	25
9	?	16
4	7	9

14.

E	J	O	T	Y

C	H	M	R	?

Directions (Qs. 15, 16). Complete the following series:

15. _ _ b a a b _ _ a b _ a.

16. 1, 5, _ , 25, 41.

Directions (Qs. 17, 18). Ramesh, facing south, walked 16 metres. From this point, he turned left and walked another 9 metres. From here, he walked another 5 metres in some direction to reach his friend's house such that on returning he had to walk only $\sqrt{512}$ metres straight in the north-west.

17. In which direction is his friend's house, from his house?

18. In which direction did he move 5 metres?

Directions (Qs. 19, 20). Fill in the blank spaces in the following series:

19. ADGJ, CFIL, ____, GJMP.

20. ABZ, CDX, EFV, ___ .

21. How many triangles can you form by joining 5 points, no three being collinear?

22. In a family of a few persons, there are 4 fathers, 6 sons and 3 grandsons. How many family members are there?

PAPER II
Arithmetic

Time allowed - 2 hrs   *MM - 100*

1. Find the value of:

$$\frac{0.3 \times 0.3 \times 0.3 - 0.2 \times 0.2 \times 0.2}{0.3 \times 0.3 + 0.2 \times 0.2 + 0.3 \times 0.2}$$ (4)

2. Simplify:

$$\sqrt{\frac{156.25}{22.09}} + \sqrt[3]{\frac{2197}{1728}}$$ (4)

3. Three numbers are in the ratio 3 : 4 : 5 and the sum of their squares is equal to 200. Find the numbers.   (4)

4. Rationalise the denominator and find the answer to 2 decimal places:

$$\frac{4 + \sqrt{3}}{\sqrt{3} + 1}$$ (4)

5. Find the units place in the expression:
$6^{21} \times 3^{19} + 4^{71}$ (4)

6. There are 40 boys in a class. One of the boys goes away and is replaced by a boy weighing 80 kg, by which the average increases by 0.5 kg. What was the weight of the boy who went away?   (6)

7. The price of ghee increases by 20%. By how much % should a housewife decrease its consumption so that the expenditure remains the same?   (6)

8. A shopkeeper mixed two kinds of teas costing Rs 200/kg and Rs 100 per kg in the ratio 3 : 2 and sold the mixture so as to gain 10% profit. Find the selling price per kg of the mixture.   (6)

9. If I walk at 9 km/hr, I reach 5 mins earlier than the scheduled time but if I walk at 6 km/hr, I reach 5 minutes late to my workplace, from my home. How far is the workplace from my home?   (6)

10. A building worth Rs 20 lakh is constructed on land worth Rs 5 lakh. The building depreciates constantly at 10% p.a. while the land becomes costlier by 10% p.a. After p.a. approximately how much time will the two be equal in value?   (6)

11. A and B can do a piece of work in 4 and 8 days respectively. They work together for 2 days, when B leaves and C comes in. The remaining work is now completed in $\frac{3}{4}$ day only. How many days does C alone take to do the work?   (6)

12. If x + y = 3 and xy = – 4, find the value of $x^4 + y^4$.   (6)

13. A tent is in the form of a cylinder, radius 4 m and height 3 m, surmounted by a cone of height 3 m. Find out how many men can be accommodated if each one requires 5m^3 of air.   (6)

14. How many spherical balls, each of radius 1 cm can be formed by melting an iron cylinder of radius 10 cm and height 20 cm? (8)

15. A, B, C and D enter into a partnership. A, B, C subscribe $\frac{1}{3}, \frac{1}{4}$ and $\frac{1}{5}$ of the capitals respectively and D, the rest. How should they divide a profit of Rs 7,20,000, if A is also to receive Rs 1,20,000 as the manager.   (8)

16. The following bar graph shows the production of various eatables in a State X, for the years 2005 and 2006. Study the graph and answer the questions that follow:

4
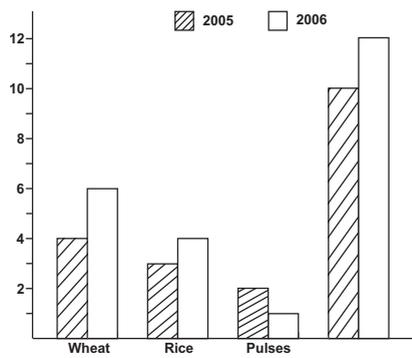
(*a*) In which commodity is the % growth the highest? (2)

(*b*) What is the ratio of total production in 2005 to that in 2006? (2)

(*c*) The ratio of productions of fruits and vegetables in 2005 to wheat in 2006, bears what ratio? (2)

(*d*) Find the overall % growth in 2006, over 2005. (2)

17. The following pie-chart shows the budget of a businessman:
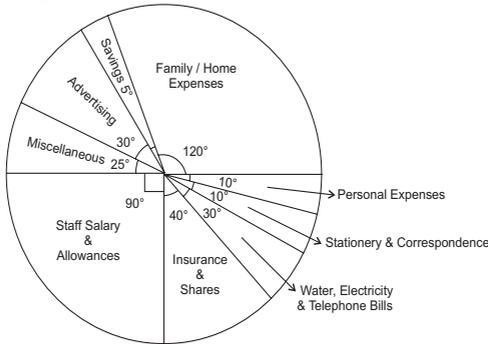
(*a*) If the total budget for a month is Rs 2,88,000, what is the family expenditure? (2)

(*b*) If his personal expenses are Rs 20,000 per month, how much is given as staff salary and allowances? (2)

(*c*) By how much does the water, electricity and telephone bill exceed his savings, when his total budget was Rs 1,44,000 per month? (2)

(*d*) Find his annual earning in an year in which he spent Rs 1 lakh on advertisements. (2)

ANSWERS AND EXPLANATIONS

PAPER 1
(General English and General Studies)
Part A-General English

1. Dear Friends,

We all know that a clean environment is essential for human growth. It is necessary to provide a pollution-free environment to the living creatures and to conserve resources of earth. The earth not only provides us with materials for food, shelter and clothing but also soothing scenes and recreations. Environmental hazards have become manifold these days. Besides land, water and air pollution, we now have to face problems like ozone depletion, noise pollution, menace of synthetics like plastics, etc which do not decompose easily. So, on this occasion I invite you all to move forward and join the mission to save our 'mother earth'.

2. Ram Swaroop Srivastava,
   GH - 4, Highway No. 3,
   Pune.

To,
   The Editor,
   The Times of India,
   Pune.

Dear Sir,

It is so tragic to note that in a country where even the basic needs of human population are not met properly, there is an alarming rise in the number of mobile phone users. Newspapers, magazines and other media glamorise the mobile phones, luring people into its unwanted use. The sad part is that it is mostly the youth who are in the least need of them. The students, who should divert their attention to studies are instead seen listening to music, making stray calls for long periods, misutilising free incoming facilities or SMS facilities. People seem to be so helpless without mobile phones that they can be seen on calls even while driving, which is become a major cause of road accidents. The parents, teachers and authorities must take immediate restrictive measures against this menace. Students, especially minors must be prohibited or at least restricted from using mobile phones. Advertisements offering unlimited free calls, etc should be curbed. Mobiles should not be allowed into classrooms. Similarly, other feasible steps can be taken in this direction.

Thanking you,
            Yours sincerely,
            Ram Swaroop Srivastava

3. (*a*) aspire   (*b*) derive
   (*c*) binds   (*d*) shape
   (*e*) misery   (*f*) capacity
   (*g*) desires   (*h*) personified
   (*i*) stray   (*j*) original

4. (*a*) It is time this was finished.
   (*b*) The troops haven't advanced far as yet.
   (*c*) I was so afraid that I could not even move.
   (*d*) Ravi asked him how he was.
   (*e*) The alarm had been sounding for at least five minutes.
   (*f*) The mouse was attacked by the cat.
   (*g*) Old men are often seen behaving like children.
   (*h*) If he behaves like this, it will lead him nowhere.
   (*i*) Ravi could skate when he was just five years old.
   (*j*) Thank you, who gave me this inspiring book, so much!

5. (*a*) were   (*b*) working
   (*c*) decided   (*d*) turned
   (*e*) drawn

6. (*a*) snow   (*b*) silk
   (*c*) fox   (*d*) cucumber

(*e*) feather

Part B—General Studies

Section I:

2. The British came to India as traders, in 1600 A.D. when India had a flourishing economy in several regions. They started by begging trade concessions from Indian rulers but soon after their victories at Plassey and Buxar in 1757 and 1764, they gained administrative and economic controls. Heavy taxes were imposed on the farmers and handicrafts. The Indian weavers were ruined by the introduction of powerlooms in Britain. Several famines occurred and millions died. In the second phase, capital investments in infrastructure like rails, roads, telegraphs, basic industries, was started to facilitate faster and further exploitation of resources. In the final phase, after 1857, India became a free-trade area, where foreign goods were imported for sale at negligible taxes while Indian exporters paid heavy duties. Economy was thus crippled.

Section II:

4. (*c*) **11th 5-year Plan: Objectives and Challenges.**

   The Indian Economy is at a high. The 11th plan (2007-12) aims at 9% average growth rate, (4.1% in agriculture, 10.5% in Industrial and 9.9% in Services), 7 crore jobs are to be created and poverty to be lessened by 10%. But policy lapses, mere government endeavours, lesser investments in agriculture will pose problems.

   (*d*) The Services Sector contributes the maximum to the GDP in India. Every year, it is being extended to include more and more services. Still, it is not regulated by any Act. The government can have a separate Tax Act for its detailed regulation, although currently the collections are stable. It is a kind of indirect tax.

5. (*a*) Ram Prasad Bismil.
   (*b*) July 21, 1969, Armstrong and Aldrin of USA.
   (*c*) River Chenab, J&K.
   (*d*) Tata Company
   (*e*) Reading human brain for truth of statements, using EEG and computers. It is the most reliable forensic test.

6. (*a*) Vijailakshmi Pandit, UP.
   (*b*) Annamalai University, Chidambaram, TN.
   (*c*) Flag of U.K.
   (*d*) Washington, USA
   (*e*) Recent US innovation, weapon which produces the effect as if one is engulfed in fire flames.

7. (*a*) Low-cost, environment-friendly houses
   (*b*) Stamp paper scam
   (*c*) Tennis player from Switzerland, recently won Australian Open.
   (*d*) South African peace worker against apartheid, recently awarded Gandhi Peace Prize.
   (*e*) Cricket player, Australia, retired after taking 563 test-wickets.

8. (*a*) Indian subcontinent
   (*b*) Ronald Amundsen, 1912
   (*c*) Ganga
   (*d*) Athens, Greece
   (*e*) Shahnai (music)

Section III:

9. 3 (common to larger triangle, circle and rectangle), 2, 5 and 10

10. 7, 9 and 8

11. The positions for Qs. 11, 12 are as follows :

A	B	C	D	E	F

    From figure, position of E (from left) = 5th

12. (*c*)

13. $9-2=7$, $64-16=48$ and $13-3=10$
    Let $? = x$
    $\therefore 16 - x = 7, \rightarrow x = 9$

14. J = E + 5 letters, O = J + 5 letters ... and so on
    $\therefore ? = R + 5 = W$

15. a b b a a b b a a b b a

16. We have : $1^2, 1^2 + 2^2, 2^2 + 3^2, 3^2 + 4^2, 4^2 + 5^2$
    $\therefore \_\_\_ = 2^2 + 3^2 = 4 + 9 = 13$

17.
    $512 = 16^2 + x^2$
    $x^2 = 256$
    $x = 14$
    $\therefore$ Remaining distance $= 14 - 9 = 5m$
    (in same line)

    Thus, friend's house is towards South – East

18. Along East (same as he moved 9m)

19. In each group, move 3 places
    $A + 3 = D, D + 3 = G, G + 3 = J$
    and Also, A + 2 = C,
    C + 2 = E,
    E + 2 = G
    $\therefore \_\_\_ = E, E + 3, E + 6, E + 9$
    $= E, H, K, N$

20. The first 2 terms are as :
    AB, CD, EF ____ GH
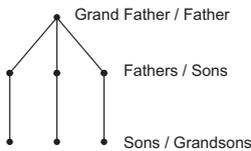   and the last terms as :
    T + 2 = V, V + 2 = X, X + 2 = Z
    ∴ The value of ___ is : GHT

21. Out of five points, each time any 3 points are to be combined
    So, $^5C_3 = \dfrac{5!}{2!\ 3!}$
    $= \dfrac{5 \times 4 \times 3 \times 2 \times 1}{2 \times 1 \times 3 \times 2 \times 1} = 10$

22. The information can be arranged as :

    Grand Father / Father

    Fathers / Sons

    Sons / Grandsons

    Thus, total numbers $= 1 + 3 + 3 = 7$

PAPER II (Arithmetic)

1. The given expression is of the form
   $$\dfrac{a^3 - b^3}{a^2 + ab + b^2}$$
   We know that,
   $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
   Thus, $\dfrac{a^3 - b^3}{a^2 + ab + b^2} = a - b$
   $$\dfrac{(0.3)^3 - (0.2)^3}{(0.3)^3 + (0.3 \times 0.2) + (0.2)^2} = 0.3 - 0.2$$
   $$= 0.1$$

2. $\sqrt{\dfrac{156.25}{22.09}} + \sqrt[3]{\dfrac{2197}{1728}} = \dfrac{12.5}{4.7} + \dfrac{13}{12}$
   $= 2.66 + 1.08 = 3.74$
   $= 3.7$ (Consider number of significant digits).

3. Let the numbers be : 3x, 4x and 5x.
   From the given condition, sum of squares $= 200$
   Thus, $(3x)^2 + (4x)^2 + (5x)^2 = 200$
   $9x^2 + 16x^2 + 25x^2 = 200$
   $50x^2 = 200$
   $x^2 = \dfrac{200}{50} = 4$
   $x = + 2$ or $x = - 2$
   Now, for $x = +2$, the numbers are :
   $3x = 3 \times 2 = 6$,
   $4x = 4 \times 2 = 8$,
   and $5x = 5 \times 2 = 10$
   Similarly, when $x = - 2$, the numbers are $-6, -8, -10$.

4. $\dfrac{4 + \sqrt{3}}{\sqrt{3} + 1}$

   $= \dfrac{4 + 3}{\sqrt{3} + 1} \times \dfrac{\sqrt{3} - 1}{\sqrt{3} - 1}$

   $= \dfrac{4\sqrt{3} - 4 + 3\sqrt{3} - 3}{(\sqrt{3} + 1)(\sqrt{3} - 1)}$

   Denominator $= (\sqrt{3} + 1)(\sqrt{3} - 1)$
   $= (\sqrt{3})^2 - (1)^2$ (∵ $(a + b)(a - b) = a^2 - b^2$)
   $= 3 - 1 = 2$

   Thus, we have : $\dfrac{7\sqrt{3} - 7}{2}$

   i.e. $\dfrac{7 \times 1.7 - 7}{2} = \dfrac{7}{2}(1.7 - 1) = \dfrac{7(0.7)}{2}$

   $= \dfrac{4.9}{2} = 2.45$ Ans

5. 6^{21} gives last digit as 6
   (∵ $6^n = \ldots 6$ always,
   E.g. $6^1 = 6$, $6^2 = 36$, $6^3 = 216$ etc)
   $3^{19} = 3^{4 \times 4 + 3} = 3^{16} \cdot 3^3 = \ldots 1 \times 27$
   Last digit $= \ldots 7$
   and $4^{71} = 4^{17 \times 4} \cdot 4^3 = \ldots 6 \times \ldots 4$
   $= \ldots 4$ (last digit $= 4$)
   Thus, given expression gives us :
   $\ldots 6 \times \ldots 7 + \ldots 4$
   $\ldots\ldots\ldots\ldots 2 + \ldots 4$
   $\ldots\ldots\ldots\ldots 6$
   Ans. Last digit of expression $= 6$

6. Let the boy who goes away weigh x kg
   So, when 80 kg comes in and x kg goes away, the net effect is :
   $+80 - x$
   Total persons $= 40$
   ∴ Increase $= \dfrac{80 - x}{40} = 0.5$
   $80 - x = 20$
   $80 - 20 = x$
   $x = 60$ kg

7. Let the price be Rs 100 and consumption be 100 units
   Then, initial expenditure
   $= 100 \times 100 = $ Rs 10,000
   Let the new consumption
   $= x$ units, price $= 100 + 20\% = 120$
   Since expenditure is same, 100×100
   $$= 120 \times x \rightarrow x = 83\dfrac{1}{3}$$
   ∴ Decrease in consumption
   $$= 100 \text{ units} - 83\dfrac{1}{3} \text{ units}$$
   $$= 16\dfrac{2}{3} \text{ units}$$

and % decrease $= \dfrac{\text{decrease}}{\text{original}} \times 100$

$$= \dfrac{16\frac{2}{3}}{100} \times 100 = 16\frac{2}{3}\%$$

8. Cost price of 1st kind of tea

$$= 3 \times 200 = Rs\ 600$$

And cost price of 2nd kind of tea

$$= 2 \times 100 = Rs\ 200$$

∴ Total C.P. of 5 kg tea = Rs 800

C.P. of tea (per kg) mixture

$$= \dfrac{800}{5} = Rs\ 160$$

SP = CP + P

∴ SP $= 160 + \dfrac{10}{100} \times 160 = 160 + 16$

$$= Rs\ 176\ per\ kg$$

9. Let the distance be 'd' km

Since time $= \dfrac{\text{distance}}{\text{speed}}$,

Time (case I) $= \dfrac{d}{9}$ hours

and time (case II) $= \dfrac{d}{6}$ hours

Difference in the two times

$$= 5 + 5 = 10\ minutes$$

i.e. $\dfrac{10}{60}$ hours, or $\dfrac{1}{6}$ hours

∴ $\dfrac{1}{6} = \dfrac{d}{6} - \dfrac{d}{9} = \dfrac{3d - 2d}{18} = \dfrac{d}{18}$

$$d = 3\ km$$

10. Use $A = P\ (1 + \dfrac{R}{100})$ for increase

and $A = P\ (1 - \dfrac{R}{100})$ for decrease

Thus, 20 lakh $(1 - \dfrac{10}{100})^n$

$$= 5\ lakh\ (1 + \dfrac{10}{100})^n$$

$$20\ (\dfrac{90}{100})^n = 5\ (\dfrac{110}{100})^n$$

$$\dfrac{20}{5} = (\dfrac{110}{100} \times \dfrac{100}{90})^n\ or\ (\dfrac{110}{90})^n = 4$$

$$(\dfrac{11}{9})^n = 4\ or\ (1.22)^n = 4$$

Taking logs on both the sides,

n log 1.22 = log 4

11. A's 1 day's work $= \dfrac{1}{4}$

and B's 1 day's work $= \dfrac{1}{8}$

∴ Together, in 1 day, they do,

$$\dfrac{1}{4} + \dfrac{1}{8} = \dfrac{2 + 1}{8} = \dfrac{3}{8}\ work$$

∴ in 2 days, they do,

$$2 \times \dfrac{3}{8} = \dfrac{6}{8} = \dfrac{3}{4}\ work$$

Remaining work $= 1 - \dfrac{3}{4} = \dfrac{1}{4}$

Together, A and C take $\dfrac{3}{4}$ days for

$\dfrac{1}{4}$ work

∴ For 1 work, they take $\dfrac{\frac{3}{4}}{\frac{1}{4}} = 3$ days

Let C take x days, then we have

$\dfrac{1}{x} + \dfrac{1}{4} = \dfrac{1}{3}$ (A + C's 1 day's work)

$$\dfrac{1}{x} = \dfrac{1}{3} - \dfrac{1}{4} = \dfrac{1}{12}$$

$$x = 12\ days\ (Ans)$$

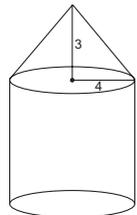12. We know that $(x + y)^2 = x^2 + y^2 + 2xy$

i.e. $x^2 + y^2 = (x + y)^2 - 2xy$

Thus, $x^4 + y^4 = (x^2 + y^2)^2 - 2x^2y^2$

$$= [(x + y)^2 - 2xy]^2 - 2(xy)^2$$

$$= [3^2 - 2(-4)]^2 - 2(-4)^2$$

$$= (9 + 8)^2 - 2(16) = 289 - 32 = 257\ Ans.$$

13.

Volume of the tent,

V = Volume of cylinder + Volume of

cone $= \pi r^2 h + \dfrac{1}{3}\pi r^2 h$

$$= \dfrac{4}{3}\pi r^2 h\ (h\ and\ r\ are\ same)$$

$$V = \dfrac{4}{3} \times \dfrac{22}{7} \times 4 \times 4 \times 3 = 200.96\ m^3$$

∴ No. of men that can be

accommodated n $= \dfrac{200.96}{5} = 40.2$

Since men cannot be in fractions,

n = 40 Ans.

14. Volume of cylinder

= Volume of n spheres

(Let number of spheres formed be n)

∴ $\pi r^2 h = (\dfrac{4}{3}\pi r'^3)n$

$$\dfrac{22}{7} \times 10 \times 10 \times 20 = \dfrac{4}{3} \times \dfrac{22}{7} \times 1 \times 1 \times 1 \times n$$

n = 1500 Ans

15. The 4 partners will get profit according to their investments,

i.e. $\dfrac{x}{3} : \dfrac{x}{4} : \dfrac{x}{5} : \dfrac{13x}{60}$

i.e. taking LCM, $\dfrac{20 : 15 : 12 : 13}{60}$

Sum of parts $= 20 + 15 + 12 + 13 = 60$

Since A gets Rs 1,20,000, remaining sum to be distributed

$= $ Rs 7,20,000 $-$ Rs 1,20,000

$= $ Rs 6,00,000

$\therefore$ A gets $\dfrac{20}{60} \times 60,00,000 + 1,20,000$

$= 2,00,000 + 1,20,000 = $ Rs 3,20,000

B gets $\dfrac{15}{60} \times 60,00,000 = $ Rs 1,50,000

C gets $\dfrac{12}{60} \times 60,00,000 = $ Rs 1,20,000

and D gets $= \dfrac{13}{60} \times 60,00,000$

$= $ Rs 1,30,000

16. (*a*) In wheat, % growth

$= \dfrac{6-4}{4} \times 100 = 50$

(*b*) Required ratio

$= \dfrac{4+3+2+10}{6+4+1+12} = \dfrac{19}{23}$

(*c*) Required ratio $= \dfrac{10}{6} = 5 : 3$

(*d*) % growth

$= \dfrac{\text{Growth in produce}}{2005 \text{ produce}} \times 100$

$= \dfrac{23-19}{19} \times 100$

$= \dfrac{4}{19} \times 100 = 21.05$

17. (*a*) Family expenses $= \dfrac{120°}{360°} \times 2,88,000$

$= $ Rs 96,000

(*b*) Personal expenses $= $ Rs 20,000 $= 10°$

and staff salary, etc $= 90°$

$= 9 \times 10° = 9 \times 20,000 = $ Rs 1,80,000

(*c*) Water, Electricity and Telephone bills $-$ savings $= 30° - 5° = 25°$

$\dfrac{25}{360} \times 1,44,000 = $ Rs 10,000

(*d*) Total annual earnings

$= \dfrac{360°}{30°} \times 1 \text{ lakh} = $ Rs 12 lakh