ACE
Engineering Academy

ESE- 2018 (Prelims) - Offline Test Series   Test-18
GENERAL STUDIES

SUBJECT: ENGINEERING APTITUDE COVERING LOGICAL REASONING AND ANALYTICAL ABILITY
SOLUTIONS

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01. Ans: (d)

Sol: Total number of smaller cubes = $4^3 = 64$
un painted cubes = 8 [i.e., inner cubes]
Probability that side of the cube is not painted
$$= \frac{8}{64} = \frac{1}{8}$$

02. Ans: (c)

Sol: Size of square is (5×5)
then number of squares
$$= 1^2 + 2^2 + 3^2 + 4^2 + 5^2$$
$$= 1 + 4 + 9 + 16 + 25 = 55$$
(or)
$$\sum n^2 = \frac{n(n+1)(2n+1)}{6} = \frac{5[6][11]}{6} = 55$$

03. Ans: (a)

Sol: Based on Cyclicity concept,
$17^{125} * 16^{95} * 523^{13}$
unit digits are = $7 \times 6 \times 3$
unit digit = 6

04. Ans: (b)

Sol: $y = 5^{\frac{1}{3}} + 5^{\frac{-1}{3}}$
Cubing on both sides
$$y^3 = 5 + 5^{-1} + 3. \ 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \left(5^{\frac{1}{3}} + 5^{\frac{-1}{3}} \right)$$

$$y^3 = 5 + \frac{1}{5} + 3y$$
$$5y^3 = 25 + 1 + 15y$$
$$5y^3 - 15y = 26$$

05. Ans: (a)

Sol: 664/2 = 332

332+8 = 340

340/2 = 170

170+8=178

06. Ans: (b)

Sol: We have 60% of 50 = 30

Number of students scoring "30" and above

marks in physics = 32

07. Ans: (a)

Sol: Suppose Temperature on 1st day = 7K
Suppose Temperature on 5th day = 8K
Average temperature on M+T+W+Thu
$$= 58 \times 4 = 232$$
Average temperature on T +W +Thu +F
$$= 4 \times 60 = 240$$
$\therefore 232 - 7K = 240 - 8K \Rightarrow K = 240 - 232 = 8$
$\therefore$ Temperature on 5th day = $8 \times 8 = 64^0$

08. Ans: (c)

Sol: $7 + 77 + 777 \ldots\ldots n = 7[1 + 11 + 111 + \ldots\ldots n]$

$$= 7.\frac{9}{9}[1 + 11 + \ldots\ldots n]$$

$$= \frac{7}{9}[9 + 99 + 999 + \ldots\ldots]$$

$$= \frac{7}{9}[(10-1) + (10^2 - 1) + \ldots\ldots\ldots(10^n - 1)]$$

$$= \frac{7}{9}[(10 + 10^2 + \ldots\ldots 10^n) - n] \quad \text{[Based on G.P]}$$

$$= \frac{7}{9}\left[\frac{10(10^n - 1)}{10 - 1} - n\right]$$

$$= \frac{7}{9}\left[\frac{10[10^n - 1]}{9} - n\right]$$

09. Ans: (b)

Sol: Working days = Total days in a month − Holidays

So for,

Minimum no. of working days $\Rightarrow$ Maximum no. of holidays and minimum days in a month.

In a non leap year February month,

Total days = 28

Possible holidays = 6 (if the month starts with the Sunday)

Hence minimum working days = 28 − 6 = 22

10. Ans: (a)

Sol: Let the distance = d km

now, $T_1 - T_2 = \frac{2}{3}$ hrs

[as the difference between the timings is 40 min]

$$\frac{d}{4} - \frac{d}{6} = \frac{2}{3}$$

$\therefore d = 8$ km

11. Ans: (c)
Sol: Number of middle cubes
= number of two face painted cubes
where n = number of pieces in side of cube
$= 12(n - 2) = 12(4 - 2) = 24$ cubes

12. Ans: (c)
Sol: Required number of cuttings $= AR^{n-1}$
$A = 2$, $R = 2$ and $n = 10 \Rightarrow 2 \times 2^{10-1}$
$\Rightarrow 2 \times 2^9 = 1024$

13. Ans: (b)
Sol: Total members
= Rank from Top + Rank from Bottom – 1
= 13 + 26 + 1 = 38
Total students = 38 + Failed students
        + does not participated students
= 38 + 6 + 5 = 49

14. Ans: (d)
Sol: [**Hint:** By using Rational method]
$y = 5 + 2\sqrt{6}$
$y + \dfrac{1}{y} = 2(5) = 10$
$y = 5 + 2\sqrt{6}$
$\sqrt{y} = \sqrt{3} + \sqrt{2}$
$\sqrt{y} + \dfrac{1}{\sqrt{y}} = 2\sqrt{3}$

15. Ans: (c)
Sol: For Electricity = 20%
20% of $25000 = \dfrac{20}{100} \times 25000 = 5000$

16. Ans: (b)
Sol: Atmost one head = (H, T)
                        (T, H)
                        (T, T)
3- chances probability $= \dfrac{3}{4}$

17. Ans: (d)
Sol: A → 35 % → 15(F)
B → 50% → 45(P)

difference 15% = 15 + 45
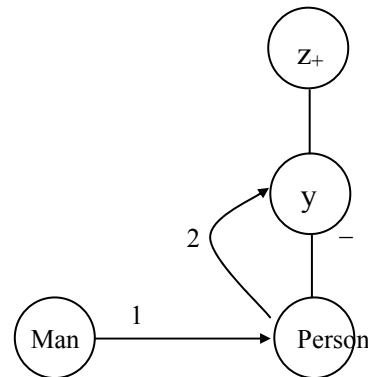   15% = 60
        1% = 4
        100% = 400

A = 35% = 35 × 4 = 140
Pass marks compare with A = 140 + 15
                            = 155

18. Ans: (b)
Sol:

answer is Mother

19. Ans: (a)
Sol:

C O M P U T E R

R F U V Q N P C
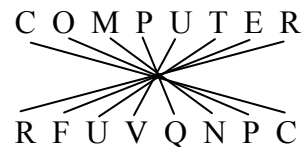
Logic: First and Lasts letters inter change. Remaining letters reverse order and also increased by 1.

20. Ans: (b)
Sol: Number of boys in the class = 18
Number of girls in the class = 48 – 18 = 30
HCF of 18 and 30 = 6
So, a row can have maximum of 6 students.

21. Ans: (a)

Sol: $a^n + b^n$ is divisible by $a + b$, where 'n' is odd number.
$21^{11} + 6^{11}$ divisible by $= 21 + 6$
$= 27$

22. Ans: (d)

Sol: a men or b women → x days
c men and d women → ?
$$\frac{abx}{ad + bc}$$
3 m or 6 w → 90
4m and 7 w → ?
$$\frac{3(6)90}{3(7) + 4(6)} = 36 \text{ days}$$

23. Ans: (d)

Sol: Let the ages of A and B 10 years ago be x and 2x years respectively.
Then, $\dfrac{x + 10}{2x + 10} = \dfrac{3}{4}$
$\Leftrightarrow 4(x + 10) = 3(2x + 10)$

$\Leftrightarrow 2x = 10 \Leftrightarrow x = 5$
∴ sum of their present ages
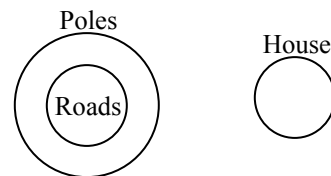$= ((x + 10) + 2x + 10)$
$= (3x + 20) = 35$ years

24. Ans: (b)

Sol: All Roads are poles
No pole is house

"No Road is house"

25. Ans: (d)

Sol: Give dice is called general dice.
Observe I and III views of dice.
There are two common numbers
then remaining corresponding numbers are called opposite surfaces.
So 5 – opp – 3

26. Ans: (b)

Sol: Angle between min hand and hour hand

$$\theta = \left| \frac{11}{2}m - 30\,h \right|$$

6 : 10

$$\theta = \left| \frac{11}{2}(10) - 30(6) \right| = 55 - 180 = 125°$$

27. Ans: (c)

Sol: Let total profit = Rs x

Then, Profit given in charity = Rs 0.2x

Remaining profit = Rs 0.8x

A's share in Remaining profit = $\frac{3}{8} \times 0.8x$

i.e. 12,000 = $\frac{3}{8} \times 0.8x$

x = Rs 40,000

28. Ans: (c)

Sol: $343^{0.3} * 343^{0.03} * 343^{0.003}$ ....

$343^{0.333} = 343^{0.\overline{3}} = 343^{\frac{3}{9}} = (343)^{\frac{1}{3}} = (7^3)^{\frac{1}{3}}$
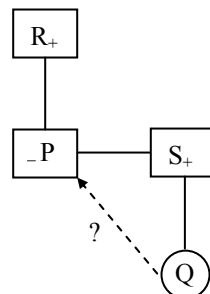$= 7$

29. Ans: (c)

Sol: P ÷ R + S + Q

Hint: P and S are children of R.
'S' is father of Q
'P' is sister of S

So, 'P' is Aunt of 'Q'

30. Ans: (b)

Sol: Formula: $^mC_2 \times {}^nC_2$
m = number of horizontal lines
n = number of vertical lines

m = 3 lines
n = 6 lines

$^3C_2 \times {}^6C_2 = 3 \times \frac{6 \times 5}{2} = 45$

31. Ans: (a)

Sol: Gagan present age = x

So, x − 6

$\frac{x-6}{18} = y$ [y is Anup age] → I

Anup age is '2' years younger than Madan, whole age is 5 years.

i.e., Madan = 5 yrs

Anup = 5 − 2 = 3 year

From (I) equation $\frac{x-6}{18} = y$

$\frac{x-6}{18} = 3$

x − 6 = 54

x = 60

32. Ans: (b)

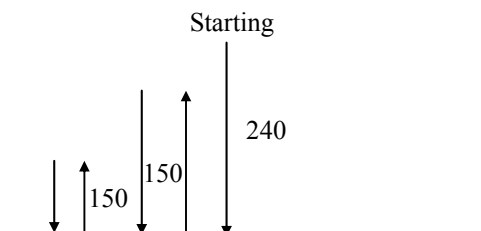**Sol:** Height = 240 m

rebounded = $\frac{5}{8}[240] = 150$

Agan rebounded = $\frac{5}{8}[150] = \frac{5(75)}{4}$

240 + 150+ 150 + ...

240 + 2[150 + ...]

$240 + 2\left[\dfrac{150}{1 - \dfrac{5}{8}} \right]$ $\left[\because S_\infty = \dfrac{a}{1-r} \right]$

$240 + \dfrac{2[150]}{3} \times 8 = 240 + 800 = 1040$ m

33. Ans: (c)
Sol:

Raju's facing → South

Raju ↓

Nirosha ↑
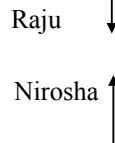
34. Ans: (a)

35. Ans: (c)
Sol: A → 40 % $\xrightarrow{\text{Lost by}}$ 300

B → 50 %
10% = 300 (v)
1% = 30
100% = 3000
valid = 90%
= 90 × 30
= 2700

36. Ans: (a)
Sol:

| D = S.T |
| $D = \dfrac{4}{5}(S)(T+12)$ |

Here Distance equal.

So, $ST = \dfrac{4}{5}(S)(T+12)$

5T = 4(T+12)
5T = 4T + 48
' T ' means
correct time → T = 48 min

37. Ans: (b)
Sol: For 53 Sundays
2- Chances only
Probability = $\dfrac{2}{7}$

L - year
366 days

52(W)   2(Odd) days

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Mon	Tue	Wed	Thu	Fri	Sat	Sun

38. Ans: (a)

Sol: Logic is column wise (vertical)

$x + y - z$ = Last Number

$15 + 25 - z = 0$

$z = 35$

x	10	7	15
y	20	6	20
z	3	2	35
Last Number	27	11	0

39. Ans: (d)

Sol: "EQUATION" here vowels are AEIOU = 5 letters

Vowels come together, so calculate as "1" letter.

Remaining letters QTN = 3 letters

QTN[AEIOU]- consider 4 letters, so number of ways = 4!

Ans also vowels [AEIOU] arranged as 5!

So, total number of ways = 4! * 5 != 2880

40. Ans: (a)

Sol: $x\left(\dfrac{1}{15} + \dfrac{1}{20}\right) + [10 - x]\dfrac{1}{20} = 1$

simplify the equation, then $x = 7\dfrac{1}{2}$ min

41. Ans: (a)

Sol: A container contains "x" liters of pure liquid from which "y" liters taken out and replaced by water. This operation performed "n" times.

Then present quantity of pure liquid

$$= x\left[1 - \frac{y}{x}\right]^n$$

Present Question $= 50\left[1 - \dfrac{10}{50}\right]^2 = 50\left[\dfrac{4}{5}\right]^2$

$$= 50\left[\dfrac{16}{25}\right] = 32 \text{ liters}$$

42. Ans: (b)

Sol: 20% of the total funds, arranged through – External Assistance

20% of total funds $= \dfrac{20}{100}[57,600]$

$= 11,520$ crores

43. Ans: (c)

Sol:

Answer is 13LS

44. Ans: (c)

Sol:

The following are the numbers (between 99 and 1000) with 8 in the units place.

108, 118, 128, 138, 148, 158, 168, 178, 188, 198

Between 99 and 200, 10 such numbers are there

Similarly between 99 and 1000, 90 such numbers will be there.

45. Ans: (a)

Sol: Logic:

Row wise			
x	**y**	**(diff)^3**	**(x+y)^2**
5	3	8	64
4	1	27	25
6	3	27	81

46. Ans: (a)

Sol: 5 % loss i.e., 95 % = x (S.P)

2% profit i.e., 102% = 84 (S.P)

difference   7% = 84

100% = 1200

47. Ans: (c)

Sol: $\alpha + \beta = \dfrac{-b}{a}$

$\alpha\beta = \dfrac{c}{a}$

$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$

$= \left(-\dfrac{b}{a}\right)^2 - 2\dfrac{c}{a} = \dfrac{b^2}{a^2} - \dfrac{2c}{a} = \dfrac{b^2 - 2ac}{a^2}$

$\dfrac{1}{\alpha^2} + \dfrac{1}{\beta^2} = \dfrac{\alpha^2 + \beta^2}{\alpha^2\beta^2} = \dfrac{\dfrac{b^2 - 2ac}{a^2}}{\dfrac{c^2}{a^2}} = \dfrac{b^2 - 2ac}{c^2}$

48. Ans: (b)

Sol: [4 M + 6 W] = 8 day → (1)

[3 M + 7 W] = 10 day → (2)

$M_1D_1 = M_2W_2$

(4 M + 6W]8 = (3 M + 7 W]10

32M + 48 W = 30 M + 70 W

2M = 22W

1M = 11W

Relation substitute in equation. (1)

4[11W] + 6W → 8

50 W → 8 → (A)

Requirement 10 W → ?

From (A) & (B)

$M_1D_1 = M_2D_2$(Chain rule)

50[8] = 10[x]

x = 40 days

49. Ans: (b)

Sol: $a^x = b^y = c^z = k$ say

$a^x = k$

$a = k^{\frac{1}{x}}$, $b = k^{\frac{1}{y}}$, $c = k^{\frac{1}{z}}$

Condition $a = \dfrac{b}{c^3}$

$k^{\frac{1}{x}} = \dfrac{k^{\frac{1}{y}}}{\left(k^{\frac{1}{z}}\right)^3}$

$k^{\frac{1}{x}} = k^{\frac{1}{y}} \cdot k^{\frac{-3}{z}}$

$\dfrac{1}{x} = \dfrac{1}{y} - \dfrac{3}{z}$

50. Ans: (c)

Sol: Difference $= \dfrac{Pr^2(300+r)}{100^3}$ (For 3 years)

$= \dfrac{10000[300+10](10^2)}{100\times100\times1000}$

= 310 Rs

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GATE 2017

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1	ME	HASAN ASIF
1	EE	SHIVAM SINGH
1	CE	MRIDUL RAKESH
1	CS	DEVAL N PATEL
1	IN	NAVEEN
2	EC	SREE KALYANI
2	CE	PUNEET KHANNA
2	IN	RAHUL MAHATO
2	IN	SHUBHAM BANSAL
2	PI	GAURAV DHAUDIYAL
3	EC	KARUN
3	EE	RAVI TEJA
3	ME	PRADIP BOBADE
3	CS	RAVI SHANKAR
3	CE	ANKUR TRIPATHI
4	EC	SONU SHARMA
4	EE	SARFRAJ NAWAZ
4	CE	CHIRAG MITTAL
4	ME	GAUSH ALAM
4	IN	MONTI
4	PI	Sanghamitra Adhikari
5	IN	VRAJESH SHAH
5	PI	ANKIT TIWARI
6	EC	LIKHITA SAI UPPU
6	CS	MEGHASHAYAM
6	EE	RAJASEKHAR REDDY
6	IN	RAMESH KAMELLA
6	PI	PINAL KUMAR RANA
7	IN	PANKAJ MISHRA
8	ME	DIVYANSHU JHA
8	PI	Mohit Bhargava
9	EC	Anand Uppada
9	CS	Nitan Ranjan Sahoo
9	ME	DHRUV KUMAR JHA
10	EC	AMIT RAWAT
10	ME	ANKAN GUPTA
10	EE	SURAJ DASH
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ESE 2017

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🏆 **7** — All India 1st Rank in ESE.

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5	E&T	AMIT GAUTAM
6	E&T	SUBHRANGINI MISHRA
7	E&T	DEVADURGAM PAWAN KUMAR
8	E&T	DEEPALI GOYAL
9	E&T	ABHISHEK PRATAP SINGH
10	E&T	UMESH

8 IN TOP 10 RANKS

🏆 EE 🏆

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3	EE	SUMAN CHANDRA GHOSH
4	EE	HARSHIT KUMAR SINGH
5	EE	NIKHIL KUMAR
6	EE	DUSHYANT SINGH
8	EE	APOORVA GUPTA
9	EE	KIRAN BABU KONERU

7 IN TOP 10 RANKS

and many more...

🏆 ME 🏆

Rank	Branch	Name
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4	ME	AMIT KUMAR RAI
6	ME	ANKAN GUPTA
7	ME	DHRUW JHA
9	ME	ACHARAJ GUPTA

5 IN TOP 10 RANKS

🏆 **27** Ranks in Top 10 in ESE-2017

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