ESE-2018 PRELIMS TEST SERIES

Date: 02th December, 2017

GS–TEST 10(OBJECTIVE SOLUTION)...

ANSWERS

1.	(d)	21.	(a)	41.	(b)	61.	(b)	81.	(c)
2.	(c)	22.	(b)	42.	(a)	62.	(a)	82.	(c)
3.	(d)	23.	(a)	43.	(b)	63.	(c)	83.	(d)
4.	(c)	24.	(c)	44.	(a)	64.	(d)	84.	(c)
5.	(b)	25.	(d)	45.	(c)	65.	(a)	85.	(d)
6.	(c)	26.	(a)	46.	(d)	66.	(d)	86.	(b)
7.	(b)	27.	(a)	47.	(b)	67.	(c)	87.	(c)
8.	(d)	28.	(c)	48.	(a)	68.	(b)	88.	(c)
9.	(0.0025)	29.	(a)	49.	(d)	69.	(a)	89.	(d)
10.	(a)	30.	(a)	50.	(d)	70.	(c)	90.	(d)
11.	(a)	31.	(c)	51.	(d)	71.	(a)	91.	(d)
12.	(a)	32.	(b)	52.	(a)	72.	(a)	92.	(d)
13.	(a)	33.	(d)	53.	(b)	73.	(b)	93.	(a)
14.	(b)	34.	(d)	54.	(d)	74.	(c)	94.	(d)
15.	(b)	35.	(b)	55.	(c)	75.	(b)	95.	(d)
16.	(c)	36.	(b)	56.	(b)	76.	(d)	96.	(c)
17.	(d)	37.	(c)	57.	(a)	77.	(b)	97.	(a)
18.	(d)	38.	(a)	58.	(a)	78.	(b)	98.	(a)
19.	(a)	39.	(a)	59.	(b)	79.	(d)	99.	(a)
20.	(d)	40.	(d)	60.	(d)	80.	(d)	100.	(a)

1. (d)

Considering Fig. 3.1 integrating first over a vertical strip, that is with respect to y from $y = x^{3/2}$ to $y = x$ and then from $x = 0$ to $x = 1$, we get

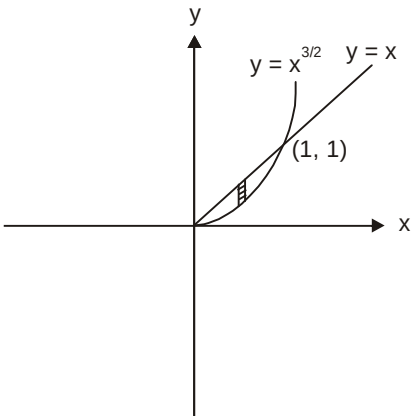


Fig. 3.1

$$I = \int_0^1 \int_{x^{3/2}}^{x} dy\,dx$$

$$= \int_0^1 (x - x^{3/2})dx$$

$$= \left[\frac{x^2}{2} - \frac{2}{5}x^{5/2}\right]_0^1$$

$$= \frac{1}{2} - \frac{2}{5} = \frac{1}{10}$$

2. (c)

Constant term is the determinant of the matrix

Now determinant is

$$\begin{vmatrix} 1 & 2 & 6 & 5 \\ 2 & 4 & 12 & 10 \\ 7 & 6 & 17 & -10 \\ -11 & 0 & 1 & 2 \end{vmatrix} = 2\begin{vmatrix} 1 & 2 & 6 & 5 \\ 1 & 2 & 6 & 5 \\ 7 & 6 & 17 & -10 \\ -11 & 0 & 1 & 2 \end{vmatrix}$$

$$= \begin{vmatrix} 0 & 0 & 0 & 0 \\ 1 & 2 & 6 & 5 \\ 7 & 6 & 17 & -10 \\ -11 & 0 & 1 & 2 \end{vmatrix} = 0$$

3. (d)

n = 2000, p = 0.001

Let $\lambda = np = 2$

Since n is very large in comparison to p, this is a case of Poisson's distribution

$$P(X = r) = \frac{e^{-\lambda}(\lambda)^r}{r!}$$

Therefore required probability is

$$= 1 - \left[\frac{e^{-\lambda}(\lambda)^0}{0!} + \frac{e^{-\lambda}(\lambda)'}{1!} + \frac{e^{-\lambda}(\lambda)^2}{2!}\right]$$

$$= 0.3233$$

4. (c)

$$S = \sum_{n=1}^{\infty} \frac{1}{(2n-1)(2n+1)}$$

$$u_n = \frac{1}{(2n-1)(2n+1)}$$

$$= \frac{1}{2}\left(\frac{1}{(2n-1)} - \frac{1}{(2n+1)}\right)$$

Now

$$s_n = \frac{1}{2}\left(1 - \frac{1}{3}\right) + \frac{1}{2}\left(\frac{1}{3} - \frac{1}{5}\right) + \ldots$$

$$\frac{1}{2}\left(\frac{1}{(2n-1)} - \frac{1}{(2n+1)}\right)$$

$$s_n = \frac{1}{2}\left(1 - \frac{1}{3} + \frac{1}{3} - \frac{1}{5} + \ldots\right.$$

$$\left. + \frac{1}{(2n-1)} - \frac{1}{(2n+1)}\right)$$

Thus $s = \lim_{n\to\infty} S_n$

$$= \lim_{n\to\infty} \frac{1}{2}\left[1 - \frac{1}{2n+1}\right] = \frac{1}{2}$$

5. (b)

Now, Let $M(t, x) = 2t\left(xe^{t^2} - 1\right), N(t,x) = e^{t^2}$

$$\frac{\partial M}{\partial x} = 2te^{t^2} = \frac{\partial N}{\partial t}$$

Hence the given differential equation is exact.

Thus the solution of the given differential equation is

$$\int M(t,x)dt + \int 0.dx = c$$

$$\Rightarrow 2xe^{t^2} - t^2 = c$$

6. (c)

Now $\frac{\partial u}{\partial r} = \frac{\partial u}{\partial x}\frac{\partial x}{\partial r} + \frac{\partial u}{\partial y}\frac{\partial y}{\partial r} + \frac{\partial u}{\partial z}\frac{\partial z}{\partial r}$

So, $\frac{\partial u}{\partial x} = \frac{-yz}{x^2}\frac{\cos y}{x}$

$\frac{\partial u}{\partial x} = \frac{z}{x}\cos\frac{y}{x}, \frac{\partial u}{\partial z} = \sin\frac{y}{x},$

$$\frac{\partial x}{\partial r} = 6r, \frac{\partial y}{\partial r} = 4, \frac{\partial z}{\partial r} = 4r$$

Thus, $\frac{\partial u}{\partial r} = \frac{-6ryz}{x^2}\cos\frac{y}{x} + \frac{4z}{x}\frac{\cos y}{x} + 4r\sin\frac{y}{x}$

7. (b)

Let $x = r\cos\theta$, $y = r\sin\theta$

Now $\frac{\partial(x,y)}{\partial(r,\theta)} = r.$

Then $I = \int_{\theta=0}^{2\pi}\int_{r=2}^{3} r^2 dr d\theta$

$= \int_{\theta=0}^{2\pi}\left[\frac{r^3}{3}\right]_2^3 d\theta = \frac{38\pi}{3}$

8. (d)

The auxillary equation is

$D^4 - D^3 - 9D^2 - 11D - 4 = 0$

$\Rightarrow D^3(D+1) - 2D^2(D+1) - 7D(D+1) - 4(D+1) = 0$

$\Rightarrow (D+1)(D^3 - 2D^2 - 7D - 4) = 0$

$\Rightarrow (D+1)\left[D^2(D+1) - 3D(D+1) - 4(D+1)\right] = 0$

$\Rightarrow (D+1)^2 [D^2 - 3D - 4] = 0$

$\Rightarrow (D+1)^2 [D^2 - 4D + D - 4] = 0$

$\Rightarrow (D+1)^2 (D-4)(D+1) = 0$

$\Rightarrow (D+1)^3 (D-4) = 0$

Hence its characteristic roots are –1, –1, –1, 4.

Thus solution is

$y(x) = e^{-x}(C_1 + C_2x + (C_3x^2) + C_4e^{4x}$

9. (0.0025)

$s = \frac{h}{2}\left[y_0 + 2(y_1 + y_2 + y_3 + y_4) + y_5\right]$

$h = 0.2, s = 0.1\,[1 + 2\,(0.8333 + 0.7143 + 0.6250 + 0.5556) + 0.5$

$s = 0.69564 \approx 0.6956$

Thus, $|0.6931 - s| = 0.0025$

10. (a)

A vector normal to the surface is given by

$\nabla\left(2x^2 + 4yz - 5z^2 + 10\right) =$

$4x\hat{i} + 4z\hat{j} + (4y - 10z)\hat{k}$

so at the normal to the surface is $12\hat{i} + 8\hat{j} - 24\hat{k}$.

Thus a unit normal to the surface at P is

$\frac{12\hat{i} + 8\hat{j} - 24\hat{k}}{\sqrt{12^2 + 8^2 + (-24)^2}} = \frac{12\hat{i} + 8\hat{j} - 24\hat{k}}{28}$

$= \frac{3\hat{i} + 2\hat{j} - 6\hat{k}}{7}$

And the another unit normal to the surface at P is $\frac{-3\hat{i} - 2\hat{j} + 6\hat{k}}{7}$

11. (a)

We have to find least number of soldiers that are common to all four troops. Hence, we need to find out LCM of the given numbers.

LCM of 12, 15, 18, 20 is

$12 = 2^2 \times 3$

$15 = 5 \times 3$

$18 = 3^2 \times 2$

$20 = 2^2 \times 5$

LCM = highest power of all prime factors

LCM $= 2^2 \times 3^2 \times 5 = 180$

Since the soldiers are in the form of a solid square. Hence, LCM must be a perfect square. Hence, the required number of soldiers = 180 × 5 = 900, which is a perfect square.

12. (a)

Let the number be xy. Hence the value of the number is 10 x + y

$|x - y| = 2$

$x - y = 2$ or $y - x = 2$ ...(i)

$10(10x + y) = 5(10y + x + x + y) + 90$

$90x - 45y = 90$

$2x - y = 2$ ...(ii)

From (i) and (ii)

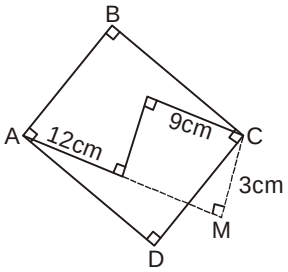
$2x - (x \pm 2) = 2$

$x = 4$ or 0

as x cannot be 0, x = 4 and y = 6

The number is 46

13. (a)



In ΔACM, since it is a right angle triangle,

$$AC^2 = AM^2 + CM^2$$
$$= (12 + 9)^2 + 3^2$$
$$= 21^2 + 3^2$$
$$= 15\sqrt{2}$$

In square ABCD, AC is a diagonal, hence

$$AD^2 + DC^2 = AC^2$$
$$\Rightarrow \quad AD = DC = x = 15 \text{ cm}$$

14. (b)

Let 2x be the total number of chocolates that Usha bought.

Cost price of 16 chocolates = $\frac{12}{16}x$

Cost price of 24 chocolates = $\frac{20}{24}x$

Hence, total cost price for usha.

$$\frac{12}{16}x + \frac{20}{24}x = \frac{19}{12}x$$

Total selling price of usha

$$= \frac{30}{30} \times 2x = 2x$$

Hence the gain % of usha

$$= \frac{2x - \frac{19}{12}x}{\frac{19}{12}x} \times 100 = \frac{500}{19}\%$$

$$= 26\frac{6}{19}\%$$

15. (b)

The amount payable should be proportional to the fraction of work done.

Word done by first two men in 8 days

$$= 8 \times \frac{1}{16} + 8 \times \frac{1}{24}$$

Part of the job done by the third man

$$= 1 - \left(\frac{8}{16} + \frac{8}{24}\right)$$

$$= \frac{1}{6}$$

$\therefore$ Third man should get Rs. $\frac{960}{6} = \text{Rs. } 160$

16. (c)

1. SOUND – 67039
2. BOARD – 85723
3. WORK – 1847

In all the words the letters '0' and digit '7' are common. Hence the code for '0' is 7.

In 1st and 2nd word the letters 'D' and the digit 3 are common. Hence the code for 'D' is 3.

In 2nd and 3rd words the letters 'R' and the digit 8 are common. Hence the code for 'DOOR' is 3778.

17. (d)

Angle between hour and minute hand is given by

$$\theta = \left|\frac{11}{2}m - 30h\right|$$
$$\pm 70 = \left(\frac{11}{2}m - 30 \times 7\right)$$
$$m = (70 + 210)\frac{2}{11}, \ (-70 + 210)\frac{2}{11}$$
$$m = 50\frac{10}{11} \text{ minute}, \ 25\frac{5}{11} \text{ minutes}$$

Hence, time can be

$$\Rightarrow 7 \text{ hours } 50\frac{10}{11} \text{ min}, 7 \text{ hours } 25\frac{5}{11} \text{ min}$$

$\Rightarrow$ Option (d) is correct

18. (d)

NH $\rightarrow$ comming of non heart

H $\rightarrow$ represents that heart comes

$$P(NH) = \frac{39}{52} = \frac{3}{4}$$

$$P(H) = \frac{1}{4}$$

Probability that Heart comes at 3rd trial =

$$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{4}$$

$$= \frac{3}{4}\times\frac{3}{4}\times\frac{3}{4}\times\frac{1}{4}$$

$$= \frac{3}{4}\times\frac{3}{4}\times\frac{3}{4}\times\frac{3}{4}\times\frac{1}{4}$$

Hence, total probability is

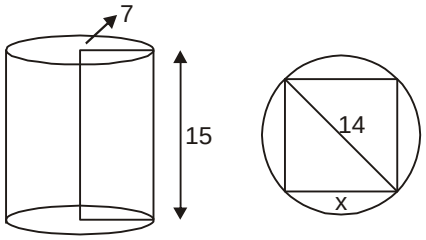
$$P = \left(\frac{3}{4}\right)^2\times\frac{1}{4}+\left(\frac{3}{4}\right)^3\times\frac{1}{4}+\left(\frac{3}{4}\right)^4\times\frac{1}{4}+\cdots$$

$$= \left(\frac{3}{4}\right)^2\times\frac{1}{4}\left[1+\frac{3}{4}+\left(\frac{3}{4}\right)^2+\cdots\right]$$

$$= \frac{9}{16}\times\frac{1}{4}\times\left[\frac{1}{1-\frac{3}{4}}\right]$$

$$= \frac{9}{16}$$

19. (a)



According to figure,

$x\sqrt{2}$ = 14 (diameter of cylinder)

$x = 7\sqrt{2}$ cm

Volume required = Volume of cylinder – volume of rectangular solid

$$= \pi(7)^2\times 15 - 12\times(7\sqrt{2})^2$$

$$= 49\times 3(5\pi-8)\ \text{cm}^3$$

$$= 147(5\pi-8)\ \text{cm}^3$$

20. (d)

The candidate will pass if and only if he recures the cut off marks in each section. So, there is only one way to pass.

The candidate fails if he fails to clear the cutoff in at least one of section. So

No. of ways to fail

$$= {}^6C_1 + {}^6C_2 + {}^6C_3 + {}^6C_4 + {}^6C_5 + {}^6C_6$$

We know that

$$n_{C_0} + n_{C_1} + n_{C_2} + \cdots n_{C_n} = 2^n$$

$$\Rightarrow \quad n_{C_1} + n_{C_2} + \cdots n_{C_n} = 2^n - 1$$

Number of ways a candidate fail to secure the cutoff = $2^6 - 1 = 63$

21. (a)

Ba $\rightarrow$ at corner of cube = $\frac{1}{8}\times 8 = 1$

Ti $\rightarrow$ at center of cube = 1×1 = 1

O $\rightarrow$ are at center of each phase

$$= 6\times\frac{1}{3} = 3$$

Formula $\rightarrow$ $BaTiO_3$

22. (b)

Frenkle defects: An atom or an ion in the lattice is transferred from its normal position to a position which is a normal lattice site of the crystal. This new position which is not a lattice site is called an interstitial site, such defects are called frenkel defects.

Atom size should be small.

23. (a)

If the domain walls in a magnetic material can be easily moved the material means highly senstive to the magnetic field.

24. (c)

$\because$ $l \in$ (O to n – 1)

$\Rightarrow$ $l \in$ (O to n – 1)

when n = 3

$\because$ $m_l \rightarrow -l$ to $+ l$

$\Rightarrow$ $m_l \rightarrow -2$ to $+2$

m_l can not be –3 when $l \rightarrow -2$ to $+2$

25. (d)

Due to weak intermolecular forces, covalent bond breaks easily at room temp. So at room temp. They are in gases or liquid form.

26. (a)

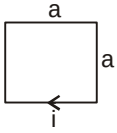
$\because$ For diamagnetic materials $X_r < 0$

$$\mu_r - 1 < 0$$

$$\boxed{\mu r < 1}$$

27. (a)

Magnetic moment magnitude = iA



$$A_1 = a^2, A_2 = \frac{1}{2}a^2, A_3 = \frac{\sqrt{3}}{4}a^2$$

$A_4 = 0.75a^2$

$A_1 > A_2, A_3, A_4$ So

Magnetic moment of loop 'a' is higher.

28. (c)

These are defination of retentivity and coercivity.

29. (a)

Statement (I) is correct

$\Rightarrow$ Material in which polarization effects are important called dielectrics.

30. (a)

31. (c)

A more thorough-going relativism is the view that there are *no* shared underlying principles. This view, sometimes called "radical relativism," is problematic for ethical discussion, because, if true, it would mean that ethical discussion or deliberation between cultures would be an impossibility. Perhaps it would be impossible for a culture to criticize even the standards it had held at a previous time.

32. (b)

Design problems are problems of making or repairing objects and processes to satisfy human wants and needs. The analogy that draw between ethical problems and design problems holds for a variety of design problems, from designing or repairing a bookshelf to devising a rotating work schedule, to designing or redesigning an experiment. The analogy between ethical problems and problems of *engineering design* is especially instructive.

33. (d)

A trademark is a recognizable sign, design, or expression which identifies products or services of a particular source from those of others, although trademarks used to identify services are usually called service marks. The trademark owner can be an individual, business organization, or any legal entity. A trademark may be located on a package, a label, a voucher, or on the product itself and is geographically represented.

35. (b)

A preservation ethic is not based on individualism and egocentricism. Egocentrism is the inability to differentiate between self and other. More specifically, it is the inability to untangle subjective schemas for object reality; an inability to understand or assume any perspective other than their own.

37. (c)

Ethics as its core is about how we relate to others. In such relationships, problems may arise for several reasons, including: limited resource and limited sympathy generating competition and conflict rather than mutually beneficial cooperation: limited agreement on goals and different conceptions of "good", inadequate rationality, insufficient information and limited understanding: poor communication.

38. (a)

Modern ethics should not be seen as a set of obstacles placed in the way of pursuit of our interests but rather as the study and practice of ways of relating to other people that are natural and beneficial. For example, many will be able to recognise the benefits of parental care from their own experience. Conversely, there will generally be agreement that mindless violence is not helpful. An essential corollary of this view is that ethics permeates our lives rather than being an additional activity that we adopt when a dilemma arises.

Ethical principles cannot be framed simply in a way that avoids equivocal cases or the need for exceptions. The more general the framing of the principles the more likely it becomes that such tricky cases or exceptions will arise.

41. (b)

Establishment of Science Cities

National Council of Science Museums (NCSM), an autonomous organization under the Union Ministry of Culture is engaged in establishment of Science Centres throughout the country. NCSM is developing a Science City at Guwahati, Assam which will subsequently be handed over to the Govt. of Assam for future operation and maintenance.

Proposals from various state governments have also been received for setting up of Science Cities. Science Park is now an integral component of all Science Centres and Science Cities.

42. (a)

A mechanism for targeted and less distortive way of supporting poor.

The JAM Number Trinity – Jan Dhan Yojana, Aadhaar and Mobile numbers – allows the state to offer this support to poor households in a targeted and less distortive way.

44. (a)

Saransh has been launched by the Ministry of Human Resource and Development as one of the many digital initiatives under 'Digital India' campaign, to promote information and communication technologies in CBSE affiliated schools and bring transparency in the existing educational system in India.

45. (c)

Government agencies, departments, ministries and **private entrepreneurs are eligible to submit** issues related to stalled projects through the portal.

46. (d)

CERT-In : It is a functional organization of Ministry of Electronics and Information Technology, Government of India.

It performs the following functions in the area of cyber security: (1) collection, analysis and dissemination of information on cyber security incidents; (2) forecast and alerts of cyber security incidents; (3) emergency measures for handling cyber security incidents; (4) coordination of cyber security incident response activities; (5) issue guidelines, advisories, vulnerability notes and white papers relating to information security practices, procedures, prevention, response and reporting of cyber incidents, and; (6) such other functions relating to cyber security as may be prescribed.

Centre for Development of Advanced Computing (C-DAC) has emerged as a premier R & D organization in IT & E (Information Technologies and Electronics) working on strengthening national technological capabilities in the context of global developments in the field and responding to change in the market need in selected foundation areas.

Unique Identification Authority of India:

The Unique Identification Authority of India (UIDAI) was established in January 2009, as an attached office to the Planning Commission now an attached office of Ministry of Electronics & IT with the vision, "To empower residents of India with a unique identity and a digital platform to authenticate anytime, anywhere". A key objective of Aadhaar programme is to provide an 'identity infrastructure' for delivery of various social welfare programs and for effective targeting of welfare services.

47. (b)

The core infrastructure elements in a smart city would include: (i) adequate water supply; (ii) assured electricity supply; (iii) sanitation, including solid waste management; (iv) efficient urban mobility and public transport; (v) affordable housing, especially for the poor; (vi) robust IT connectivity and digitalization; (vii) good governance, especially e-Governance and citizen participation; (viii) sustainable environment; (ix) safety and security of citizens, particularly women, children and the elderly; and (x) health and education.

48. (a)

e-Biz Mission Mode Project

The government has initiated the e-Biz Project, a Mission Mode Project under the National e-Governance Project, to provide online registration, filing payment services to investors and business houses.

Starting a new business in India requires an entrepreneur to register with various regulatory authorities and obtain several licenses, clearances, No Objection Certificates, approvals, etc. Information about these registrations, licenses, clearances and approvals contained in multiple Acts, rules and procedures are difficult to locate and are scattered across a number of Departmental websites. Entrepreneurs are forced to sift through a maze of information to assess their licensing requirements.

An online e-biz Mission Mode Project under the National e-Governance Plan has been conceptualized by the DIPP. The project aims to create an ecosystem by making

all business and investment related regulatory services across Central, state and local governments available on a single portal. The project has been designed on a PPP model, and the concessionaire has been awarded the project for a period of 10 years.

The first 3 years of the term would be the pilot phase, while the remaining 7 years will be the expansion phase, wherein the project will be expanded to cover the whole country.

50. (d)

The Ministry of Environment, Forest and Climate Change is the nodal agency in the Central Government for overseeing the implementation of India's environment and forest policies and programmes relating to conservation of the country's natural resources including lakes and rivers, its biodiversity, forests, wildlife etc. The broad objectives of the Ministry are:

(a) Conservation of flora, fauna, forests and wildlife.

(b) Prevention and control of pollution

(c) Afforestation and regeneration of degraded areas and

(d) Protection of environment and ensuring the welfare of animals.

51. (d)

The WWF focuses their efforts at multiple levels, starting with wildlife, habitats and local communities and expanding up through governments and global networks. The WWF views the planet as a single, complex web of relationships between species, the environment, and human institutions such as government and global markets.

52. (a)

The International Solar Alliance is a common platform for cooperation among sun-rich countries lying fully or partially between the Tropics of Cancer and Capricorn who are seeking to massively ramp up solar energy, thereby helping to bend the global greenhouse emissions curve whilst providing clean and cheap energy.

Countries, bilateral and multilateral organisations, companies, industries, and stakeholders aim to reduce the cost of finance and cost of technology for the immediate deployment of competitive solar generation, storage and technologies adapted to countries'; individual needs and to mobilize billions of dollars for solar.

The initiative was launched at the UN Climate Change Conference in Paris at the end of 2015 by the President of France and the Prime Minister of India.

Joint efforts include innovative policies, projects, programmes, capacity building measures and financial instruments to mobilize more than USD 1 trillion dollars of investments that are needed by 2030. The reduced cost of finance would enable the undertaking of more ambitious solar energy programmes. One of the key areas is to build a common knowledge e-portal.

53. (b)

Cartagena Bio-safety Protocol

The Cartagena Bio-safety Protocol (CBP) was negotiated under the aegis of the Convention on Biological Diversity (CBD) and adopted in 2000. **India is a party to the Protocol.**

The Protocol came into force in 2003. As of date 170 countries are parties to the Protocol.

The main objective of the Protocol is to ensure safe transfer, handling and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity, taking into account risk to human health.

Nagoya COP :

The Supplementary Protocol on Liability and Redress is a new international treaty adopted in the fifth meeting of the Conference of the Parties serving as the Meeting of the Parties (COP MOP) to the CPB at Nagoya, Japan in 2010 after six years of intense negotiations. The scheme helps in strengthening the bio-safety management systems and awareness in India.

54. (d)

Project Elephant :

Project Elephant (PE) was launched in

1991-92 as a Centrally Sponsored Scheme with following objectives- to protect elephants, their habitat and corridors; to address issues of man-animal conflict; and welfare of domesticated elephants.

Financial and technical support is being provided to major elephant bearing states in the country. Under the scheme, 100 per cent financial assistance is provided to the concerned state government for undertaking various activities for scientific management of elephant habitats.

Presently the project is being mainly implemented in 22 states/UTs.

Project Tiger/National Tiger Conservation Authority (NTCA)

The Centrally Sponsored Scheme 'Project Tiger' was launched in 1973 with the objective to ensure maintenance of a viable population of tigers in India for scientific, economic, aesthetic, cultural and ecological values, and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people.

55. (c)

The Plastic Waste Management Rules, 2016 aim to:

Increase minimum thickness of plastic carry bags from 40 to 50 microns.

Expand the jurisdiction of applicability from the municipal area to rural areas, because plastic has reached rural areas also;

Bring in the responsibilities of producers and generators, to introduce collect back system of plastic waste by the producers/ brand owners, as per extended producers responsibility;

Introduce collection of plastic waste management fee through pre-registration of the producers, importers of plastic carry bags/multilayered packaging and vendors

Promote use of plastic waste for road construction.

56. (b)

The following items have been prohibited for import:

(a) Waste edible fats and oil of animals, or vegetable origin

(b) Household waste

(c) Critical Care Medical equipment

(d) Tyres for direct re-use purpose

(e) Solid Plastic wastes including Pet bottles

(f) Waste electrical and electronic assemblies scrap

(g) Other chemical wastes especially in solvent form

57. (a)

The Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs). It does not, however, address the movement of radioactive waste.

60. (d)

Deen Dayal Upadhyaya-Grameen Kaushalya Yojana (DDUGKY) is a Placement Linked Skill Development scheme for rural poor youth. This initiative is part of the National Rural Livelihood Mission (NRLM).

It is marked-led placement linked training programme for rural youth. Mandatory assured placement to 75% of the trained candidates. Social inclusion of candidates through mandatory coverage of socially advantaged group.

61. (b)

"Stand up India Scheme", approved by the Centre promotes entrepreneurship among Scheduled Castes/Schedule Tribes and Women. The scheme provides for composite loans by banks between Rs. 10 lakh and up to Rs.100 lakh for setting up a new enterprise in the non-farm sector. These loans would be eligible for refinance and credit guarantee cover.

There will be a credit guarantee fund of Rs. 5,000 crore for providing guarantee cover for loans under Stand Up India in next five years. The Action Plan for Startup India envisages setting up of 7 New Research Parks modeled on the Research Park at IIT Madras. Indian Institute of Science, Bengaluru in Karnataka has been selected

for establishment of a research park in the Action Plan.

63. (c)

Swadhar Greh : The scheme envisions a supportive institutional framework for women victims of difficult circumstances so that they could lead their life with dignity and conviction. It envisages that shelter, food, clothing, and health as well as economic and social security are assured for such women.

The benefit of the component could be availed by women above 18 years of age of the following categories:

(1) Women who are deserted and are without any social and economic support;

(2) Women survivors of natural disasters who have been rendered homeless and are without any social and economic support;

(3) Women prisoners released from jail and are without family, social and economic support;

(4) Women victims of domestic violence, family tension or discord, who are made to leave their homes without any means of subsistence and have no special protection from exploitation and/ or facing litigation on account of marital disputes; and

(5) Trafficked women/girls rescued or runaway from brothels or other places where they face exploitation and Women affected by HIV/AIDS who do not have any social or economic support.

66. (d)

GST will create a common Indian market, improve tax compliance, boost investment and growth and improve governance. It is also a bold new experiment in the governance of cooperative federalism.

67. (c)

VVPAT :

A Voter-verified paper audit trail (VVPAT) unit provides feedback to voters using EVMs for voting. The VVPAT functions as an independent verification system for EVMs and allows voters to verify that their votes are cast as intended. It also serves as an additional barrier to changing or destroying votes.

Benefits of VVPAT

The use of VVPAT gives the voter an opportunity to challenge her/his votes on the basis of the paper receipt for the first time. As per a new rule, the booth presiding officer has to record the dissent of the vote, which needs to be taken into account at the time of counting.

68. (b)

Rashtriya Vayoshri Yojana :

It is a scheme launched by Ministry of Social Justice and Empowerment.

It is a scheme for providing physical aids and assisted-living devices for Senior citizens belonging to BPL category.

The devices will be distributed in camp mode and will be implemented by 'Artificial Limbs Manufacturing Corporation (ALIMCO)', a Public Sector Undertaking under Ministry of Social Justice and Empowerment.

This is a Central Sector Scheme, fully funded by the Central Government.

The expenditure for implementation of the scheme will be met from the Senior Citizens Welfare Fund.

Beneficiaries in each district will be identified by the State Governments/UT Administrations through a Committee chaired by the Deputy Commissioner/District Collector.

69. (a)

The Ministry of Human Resource Development (MHRD) has launched a programme called Unnat Bharat Abhiyan with an aim to connect institutions of higher education, including Indian Institutes of Technology (IITs), National Institutes of Technology (NITs) and Indian Institutes of Science Education & Research (IISERs) etc. with local communities to address the development challenges through appropriate technologies.

Objectives:

(a) Building institutional capacity in Institutes of higher education in research & training relevant to the needs of rural India.

(b) Provide rural India with professional resource support from institutes of higher education, especially those which have acquired academic excellence in the field of Science,

Engineering & Technology and Management.

70. (c)

According to PMI, "Program is group of related projects" managed in a coordinated way to obtain benefit and control, which is not available from managing them individually.

78. (b)

Obtaining project acceptance is a key activity to ensure the project is approved and accepted by the custome and usually triggers dialogue around the project objectives and outcomes, critical success factors.

84. (c)

$$EOQ = \sqrt{\frac{2DC_O}{C_C}}$$

$$= \sqrt{\frac{2\times 750\times 12\times 10}{2}}$$

$$= 300$$

90. (d)

Heinrich's theory has two central points:

(1) injuries are caused by the action of preceding factors

(2) removal of the central factor (unsafe act/ hazardous condition) negates the action of the preceding factors and, in so doing, prevents accidents and injuries.

92. (d)

A code is a collection of laws and rules that assists a government agency in meeting its obligation to protect the general welfare by preventing damage to property or injury or loss of life to persons. A standard is a generally agreed-upon set of procedures, criteria, dimensions, materials, or parts. Engineering standards may describe the dimensions and sizes of small parts like screws and bearings, the minimum properties of materials, or an agreed-upon procedure to measure a property like fracture toughness.

The terms standards and specifications are sometimes used interchangeably. The distinction is that standards refer to generalized situations, while specifications refer to specialized situations. Codes tell the engineer what to do and when and under what circumstances to do it. Codes usually are legal requirements, as in the building code or the fi re code. Standards tell the engineer how to do it and are usually regarded as recommendations that do not have the force of law. Codes often incorporate national standards into them by reference, and in this way standards become legally enforceable.

93. (a)

Social sustainability is the ability of a community to develop processes and structures which not only meet the needs of its current members but also support the ability of future generations to maintain a healthy community.

94. (d)

- There are five key roles of government in interacting with technology:
- As a stimulus to free enterprise through manipulation of the tax system
- By influencing interest rates and the supply of venture capital through changes in fiscal policy to control the growth of the economy
- As a major customer for high technology, chiefly in military systems
- As a funding source (patron) for research and development
- As a regulator of technology.

95. (d)

The four broad categories of variables useful in segmenting a market are:

- **State of Being**

a. Sociological factors—age, gender, income, occupation

b. For industrial products—company size, industry classification (NAICS code), nature of the buying organization

c. Location—urban, suburban, rural; regions of the country or world

- **State of Mind—** This category attempts to describe the attitudes, values, and lifestyles of potential customers.
- **Product Usage** — looks at how the product is bought or sold

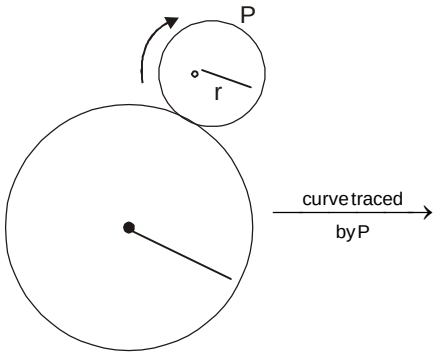
a. Heavy user; light user; nonuser

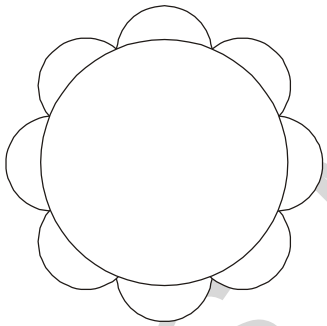
b. Loyalty: to your brand; to competitor's brand; indifferent

- **Benefit Segmentation :** attempts to identify the benefits people perceive in buying the product. This is particularly important when introducing a new product.

97. (a)

In geometry, an epicycloid or hypocycloid is a plane curve produced by tracing the path of a chosen point on the circumference of a circle – called an epicycle – which rolls without slipping around a fixed circle.



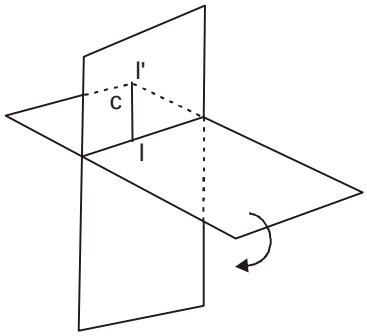


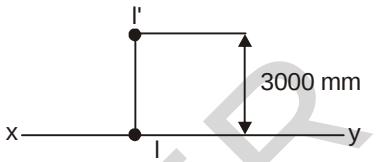
$$x = (R+r)\cos\theta - r\cos\left(\left(\frac{R+r}{r}\right)\theta\right)$$

$$y = (R+r)\sin\theta - r\sin\left(\left(\frac{R+r}{r}\right)\theta\right)$$

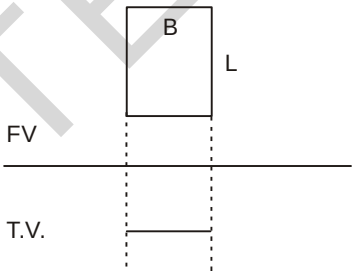
98. (a)

XY = Ground level

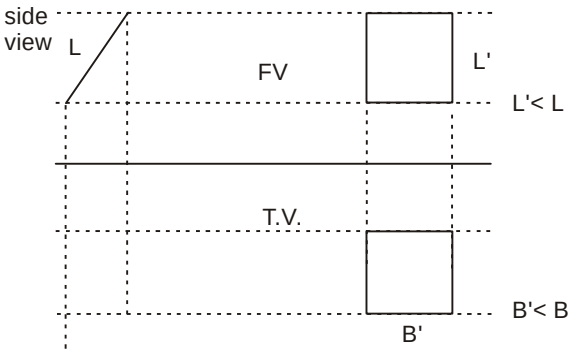




99. (a)



30° inclination with wall



From fig. it can be seen that L' is less than L & $B' < B$ but when the rectangular from is seen from side then it's side view gives actual length L.

100. (a)

According to petersons accident/incident theory ergonomics traps are:

Incompatible Workstation (i.e., size,force, reach, feel)

Incompatible Expectations