

APPSC - 2019 SCREENING TEST (AEE)

Electrical Engineering

17/2/19

PART A

GENERAL STUDIES AND MENTAL ABILITY

01.	1. In which of the following cities is the Saha Institute of Nuclear Physics situated?					
	(1) Pune	(2) Bengaluru	(3) Ahmedabad	(4) Kolkata		
01.	Ans: (4)					
Sol:	Sol: The Saha Institute of nuclear physics is an Institution of basic Research and Training in physical and Biophysical sciences located in Bidhannagar Kolkata. It is named after the famous Indian physicist Meghnad Saha.					
02.	Which of following is/are	correct?				
	(a) ASTROSAT is India	's first astronomical satel	llite			
	(b) GSAT-6 is the 25^{th} ge	eostationary communicat	ion satellite of India buil	t by DRDO		
	(c) Kepler is a space obs	servatory launched by IS	RO			
	(1) Only a	(2) Only b	(3) a and b	(4) a, b and c		
02.	Ans: (1)					
Sol:	ASTROSAT is India's first	st dedicated multi wavele	ength observatory.			
	It was launched on 28th se	p 2015 by PSLV-XL C30)			
	by ISRO.					
	G -SAT- $6 \rightarrow is$ the 25 th Ge	eostationery communicat	tion satellite of India bui	lt by ISRO.		
	Kepler \rightarrow it is a retired spectrum service oct - 30-2018.	pace Telescope launched	l by NASA. It was laund	ched an March 7, 2009 removed from		
03.	Recently India has funded	l for Public Library in wl	hich of the following cou	intries?		
	(1) Bhutan	(2) Afghanistan	(3) Bangladesh	(4) South Africa		
03.	Ans: (2)					
Sol:	India funded public librar	ry for Afghanistan ,recen	tly US President Donald	1 Trump made mocking comments on		
	Prime Minister Narendra	Modi for funding a libra	ry in Afghanistan			
04.	Which of following count	tries hosted the 13 th G-20	Summit?			
	(1) Argentina	(2) France	(3) Russia	(4) USA		
04.	Ans: (1)					
Sol:	The 13th G20 summit, u held in Buenos Aires, Ar	under the theme of Build gentina, India will host	lding Consensus for Fai the G20 summit in 2022	ir and Sustainable Development was , to coincide with the 75th year of its		
	Independence.					

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05.	Which of the following	statements is/are corr	ect about United Nat	ions?		
	(a) The name 'United	Nations' was devised	by Franklin D. Roos	evelt		
	(b) All the member states meet once after every two years in General Assembly Hall, New York					
	(c) It is the General As	sembly which elects :	all the 54 members for	or Economic and Social Council		
	(d) Judges of the International Court of Justice are elected for 8 years					
	(1) a and b	(2) b and c	(3) c and d	(4) a and c		
05.	Ans: (4)					
Sol	The name "United Natio	ons", coined by Unite	d States President Fr	anklin D. Roosevelt,		
	Each year, in September	, the full UN members	ship meets in the Ger	neral Assembly Hall in New York for the annual		
	General Assembly sessi	on,				
	Economic and social co	uncil has 54 Members	s elected by the Gene	eral Assembly for overlapping three-year terms.		
	The International Court	t of justice is compos	ed of 15 judges, who	are elected for terms of office of nine years by		
	the United Nations Gen	eral Assembly and the	e Security Council.			
06.	When was Asia-Pacific	Economic Cooperation	n (APEC) establishe	ed?		
	(1) 1981	(2) 1984	(3) 1987	(4) 1989		
06.	Ans: (4)					
Sola	APEC was established	in 1989 in response t	o the growing interc	lependence of Asia-Pacific economies and the		
	advent of regional trade	blocs in other parts o	f the world .			
07.	'Operation Greens' is re	lated with which of th	e following Ministri	ies?		
	(1) Ministry of Agricult	ure and Farmers' Welt	fare (2) Ministry o	f Food Processing Industries		
	(3) Ministry of Environ	ment	(4) Ministry o	f Mines		
07.	Ans: (2)					
Sol	Operation Greens was a	nnounced in the Budg	et speech of 2018-19	with an outlay of Rs 500 crores to stabilize the		
	supply of Tomato, Onio	n and Potato(TOP) cr	ops and to ensure av	ailability of TOP crops throughout the country		
	round the year without p	price volatility. Ministr	ry of Food Processing	g Industries(MoFPI) under Union Minister Smt		
	Harsimrat Kaur Badal h	as approved the opera	tionalisation strategy	y for Operation Greens		
08.	Match the following Lis	t (1) Year with List (1)	I) Chief Guest:			
	List (I)	List(II)				
	(<i>Republic Day Year</i>	(Chief Guest)	1			
	a. January 26, 2014	I. Francois Hollan	de			
	b. January 26, 2015	II. Ivionammed bin	1			
	Lanuary 26, 2016	Zayed Al-Nahy	/an			
	c. January 26, 2016	III. Shinzo Abe				
	a. January 26, 2017	IV. Barack Obama	l			

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The second se		E				4	APPSC (A	AEE) _ 19 Screening Test Answer
	Select the	e code f	for the co	orrect an	swer from th	e options giv	en below:	
		a	b	c	d			
	(1)	Ι	II	III	IV			
	(2)	III	IV	Ι	II			
	(3)	III	II	Ι	IV			
	(4)	IV	Ι	III	II			
08.	Ans: (2)							
09.	Which ci	ty of In	ndia host	ed the 'O	Owl Festival'	?		
	(1) Pune			(2) B	engaluru		(3) Chandigarh	(4) Patna
09.	Ans: (1)							
Sol:	The India	an owl :	festival v	was held	in pune, Ma	harashtra ,th	e event was organise	ed by Ela foundation.
10.	Which of(a) Vija(b) War(c) Nell(d) Kak	f the fol yawada angal ore inada	llowing o a	cities of .	Andhra Prad	esh are the pa	rt of 'Ease of Living	g Index 2018'?
	(1) a, b a	nd c		(2) a,	b and d		(3) a and d	(4) c and d
Sol:	Of the 12 ,vishakpa Ranking Top ten c 1. Pun 2. Nav 3. Grea 4. Tiru 5. Cha 5. Cha 5. Tha 7. Raip 8. Indo 9. Vija 10. Bho	1 Citie atnam, t <u>Ease c</u> ities e i Muml ater Mu pati ndigarh ne pur ore ywada pal	es covere tirupathi o <u>f Livin</u> bai umbai	ed under , Vijaya g <i>Index-</i>	Ease of Liv wada . Two c 2018	ving Index -2	018 , Andhrpradesh i (4) ,Vijayawada (9	has 4 cities included Kakinada) are included in top ten .
11.	Which of	the fol	llowing	States ha	s topped the	'Ease of Doi	ng Business Ranking	g-2018'?
	(1) Harva	ana		(2) Te	elangana	(3) An	dhra Pradesh	(4) Gujarat
11	Ans: (3)			(_) 1		(5)7111		(.) Jacob
11.								

				5	APPSC (AEE)	_ 19 Screening Test Answers
Sol:	Andhra Pradesh, with a sco by World Bank and the De	re of 98.42 per c partment of Indu	cent, toppe ustrial Pol	ed the 'ease of o	doing business' r tion(DIPP) .	ranking among states prepared
12.	In which year did the Elec (1) 2011	tion Commission (2) 2012	n of India	introduce NO	TA on EVMs?	(4) 2014
12.	Ans: (3)			(-)		
Sol:	The None of The Above (machines (EVMs) in 2013	NOTA) option v	was introd	luced by Elect	ion Commission	of India in electronic voting
13.	Which of the following is/	are correct abou	t East Asia	a Summit?		
	a. 13 th East Asia Summi	t was held in Sin	ngapore			
	b. It is an ASEAN-Center	ered Forum				
	c. It can only be chaired	by an ASEAN r	member			
	d. East Asia Summit con	nprises of the ter	n member	states of the A	SEAN	
	(1) a, b and c	(2) a, b and d				
	(3) c, d and a	(4) All of the at	bove			
13.	Ans: (1)					
Sol:	The East Asia Summit (EA	(S) is a meeting	of 18 regi	onal leaders		
	The EAS comprises the te	n member state	s of the A	ssociation of	Southeast Asian	Nations (ASEAN) – Brunei,
	Cambodia, Indonesia, Lao	s, Malaysıa, Mya	anmar, the	Philippines, S	Singapore, Thaila	and, and Vietnam – along with
	8 other countries Australi	a, China, Japan	, India, N	ew Zealand, th	he Republic of I	Korea, Russia and the United
	The EAS is on ASEAN as	ntrad forum, it a	on only h	a haired by ar	ASEAN momb	or.
	The EAS is an ASEAN-ce	htred forum; it c	in Singer	ore on Novem	bor 14 15 2018	
	The Thirteenth East Asia S	unnin was neid	i ili Siligaj		1001 14–13, 2010).
14	'Blue Economy' is related	with				
1	(1) Ocean Resources		(2) Sky]	Resources		
	(3) Agriculture Resources		(4) Loan	Defaulters		
14.	Ans: (1)					
Sol:	Blue economy is sustaina	ble use of ocear	n resource	es for economi	ic growth, impro	oved livelihood and jobs and
	ocean ecosystem health.				0 1	5
	Blue economy encompass	es.				
	1. Renewable energy	2. Fisheries				
	3. Marine transport	4. Tourism				
	5. Climate change	6. Waste manag	gement			
15	Which was the first State t	o be re-organize	d on the b	asis of langua	ve?	
10.	(1) Karnataka	(2) Tamil Nadu		(3) Ke	rala	(4) Andhra Pradesh
		()		(-)		

Engineering Academy		6 APPSC (A	<pre>LEE) _ 19 Screening Test Answers</pre>		
15. Ans: (4)Sol: In 1953, the government hunger strike of 56 days	nt created first linguistic sta 3.	te of Andhra Pradesh after	death of Potti Sriramulu after a		
16. Which of the following (1) Article 226	Articles enables High Courts (2) Article 213	s to issue writs? (3) Article 249	(4) Article 262		
16. Ans: (1)	(_)	(0)110000 2 03	(.)		
Sol: Article 226 - High Cour mandamus, prohibition conferred by Part III (F	Sol: Article 226 - High Court shall have powers, throughout the territories to issue writs in the nature of habeas corpus, mandamus, prohibitions, quo warranto and certiorari, or any of them, for the enforcement of any of the rights conferred by Part III (Fundamental rights) and for any other purpose .				
 17. Which of the following (a) He can nominate of (b) He can seek any independent of the legislation from th	statements is/are correct abo ne member to the State Legi information relating to the a e Chief Minister completed the age of 30 year as an agent of the Central G	but the Governor? slative Assembly from the a administration of the affair rs can be appointed as Gove overnment	Anglo-Indian Community rs of the State and proposals for ernor		
(1) a and b	(2) b and c	(3) Only a	(4) a, b and d		
 17. Ans: (4) Sol: Article 157 - Qualifica Governor unless he is a Article 167 (a) It is Du Council of Ministers rel Article 333 - the Govern in the Legislative Asser community to the Asser Governor is appointed b 	 Ans: (4) Sol: Article 157 - Qualifications for appointment as Governor.—No person shall be eligible for appointment as Governor unless he is a citizen of India and has completed the age of thirty-five years Article 167 (a) It is Duty of Chief Minister to communicate to the Governor of the State all decisions of the Council of Ministers relating to the administration of the affairs of the State and proposals for legislation . Article 333 - the Governor of a State may, if he is of opinion that the Anglo-Indian community needs representation in the Legislative Assembly of the State and is not adequately represented therein, nominate one member of that community to the Assembly. Governor is appointed by President , he acts as an agent of Central Governent 				
18. Who among the followi	ng has <i>not</i> been the Governo	or of Andhra Pradesh?			
(1) N. D. Tiwari	(2) Rameshwar Thakur	(3) Nikil Kumar	(4) Sushil Kumar Shinde		
18. Ans: (3)Sol: Nikhil kumar did not w	ork as governor of Andhra P	radesh			
19. Who among the followi(1) Shri Bhavanam Ven(3) N. Bhaskara Rao	ng has served as a very shor katarami Reddy	t-term Chief Minister of An (2) N. T. Rama Rao (4) Dr. Marri Chenna Redd	ıdhra Pradesh? y		
19. Ans: (3)					
Sol: Nadendla Bhaskar rao chandrababu naidu is lo	served for shortest term as ngest served chief minister o	chief minister of united Andhra Pradesh fo	ndhra Pradesh for 31 days. Nara or 3178 days.		
ACE Engineering Academy Hyd	erabad + Delhi + Bhopal + Pune + Bhubaneswa	+ Lucknow + Patna + Bengaluru + Chennai +	+ Vijayawada + Vizag + Tirupati + Kolkata + Ahmedabad		

ACE 7 19 Screenina 20. Which of the following statements is/are *incorrect* about the Election Commission of India? (a) The Election Commission of India conducts elections for Lok Sabha, Vidhan Sabha and Gram Sabha (b) The Election Commission of India conducts elections only for Lok Sabha (c) The Election Commision of India conducts elections only for Vidhan Sabha (d) The Election Commission of India conducts only for Lok Sabha and Vidhan Sabha (1) a and c (3) c and d (4) Only a (2) a, b and c 20. Ans: (*) Sol: Article 324 (1) The superintendence, direction and control of the preparation of the electoral rolls for, and the conduct of, all elections to Parliament and to the Legislature of every State and of elections to the offices of President and Vice President held under this Constitution shall be vested in Election Commission. 21. Which of the following statements is/are correct about NITI Aayog? (a) NITI Aayog was introduced by Government of India in 2014 (b) Vice-Chairperson of NITI Aayog is appointed by the President of India (c) It has a Governing Council comprising of the Chief Ministers of all the States and Lt. Governors of the Union Territories (d) Regional Councils of NITI Aayog are formed for specified tenure (4) d and a (1) a and b (2) b and c (3) c and d 21. Ans: (3) Sol: The Government on 1st January 2015 has replaced Planning Commission with a new institution named NITI Aayog through cabinet Resolution . Vice-Chairperson -To be appointed by the Prime Minister Governing Council comprises of the Chief Ministers of all the States and Lt. Governors of Union Territories Regional Councils will be formed to address specific issues and contingencies impacting more than one state or a region. These will be formed for a specified tenure 22. In which year did the Telugu language get the classical status? (1) 2005(2) 2006(3) 2007(4) 200822. Ans: (4) Sol: Six languages i.e. Tamil (2004) Sanskrit (2005) Telugu (2008) Kannada (2008) Malayalam (2013) odiya (2014) have been given status of classical languages. Tamil is the first language to get the status of classical language. The Criteria adopted by the Government to determine the eligibility of a language for granting classical language status are: i. High antiquity of its early texts/ recorded history over a period of 1500-2000 years; A body of ancient literature/ texts, which is considered a valuable heritage by generations of speakers; ii. iii. The literary tradition be original and not borrowed from another speech community;

iv. The classical language and literature being distinct from modern, there may also be a discontinuity between the classical language and its later forms or its offshoots.

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	ACF o	ADDSC (AEE) 10 Scrooping Tost Answors
	Engineering Academy 9	APPSC (ALL) _ 19 SCIEENING TEST ANSWERS
23.	Which of the following statements regarding 'Stupa' are	e correct?
((a) They are pre-Buddhist structures	
((b) They are built on the relics of Buddha	
((c) They are built as objects of devotion by Buddhist r	nonasteries
((d) They are built to commemorate important events in	n Buddha's life
, second s	Select the correct code from the following:	
((1) All of the above (2) b, c and d	(3) a, b and c (4) a, b and d
23.	Ans: (1)	
Sol: S	Stupa, Buddhist commemorative monument usually ho	busing sacred relics associated with the Buddha or other
5	saintly persons.	
	The hemispherical form of the stupa appears to have de	rived from pre-Buddhist burial mounds in India.
24	On demand for energy in India I and Dufferin englished	1 Aitabian Commission in 1996 It managed
24.	(a) To recruit young men from high class families and	accial positions
	(a) To recruit young men from high class families and (b) Simultaneous exams in London and India	social positions
	(c) To strengthen the provincial services	
	(d) To establish imperial provincial and subordinate (ivil Services
	Select the correct answer using the code given below:	
	(1) a. b and d (2) b and d	(3) c and d (4) a, b and c
24.	Ans: (3)	
Sol:	The Aitchison Commission (Public Service Commission	ion) was set up in 1886 under the chairmanship of Sir
	Charles Umpherston Aitchison, It made the following	recommendations
1	1. The two-tier classification of civil services into cov	venanted and uncovenanted should be replaced by a three-
	tier classification-Imperial, provincial and subordin	nate civil services.
2	2. The maximum age for entry into civil services show	uld be 23 years.
3	3. The statutory civil service system of recruitment sh	nould be abolished.
4	4. The competitive exam should not be held simultan	eously in England and India
5	5. Certain percentage of posts in the imperial civil s	ervice should be filled by promotion of the members of
	provincial civil service	
25.	Which of the following statements is <i>not</i> correct?	
((1) The moderate and militant nationalists (extremis	sts) cooperated with one another during the course of
	Swadeshi Movement	
((2) The purpose of boycott during Swadeshi Moveme	ent was to bring pressure upon the British industries and
	(2) The Swedechi Meyer and and a sub-	tical maximum which remained all of from the sultant
((5) The Swadeshi Movement was exclusively a point	near movement which remained about from the cultural

(4) A prominent part in the Swadeshi agitation was played by the students of Bengal

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25. Sol:	Ans: (1) Moderate and Extremists did not cooperate during groups led to surat split in 1907.	swadeshi movement	of 1905, the differences between the two			
26.	 Consider the following statements: (a) Individual Satyagraha was launched by Congress in 1940 to oppose the August Declaration (b) Vinoba Bhave was the first to offer Individual Satyagraha in 1940 Which of the statements given above is/are correct? 					
20	(1) Only a (2) Only b	(3) Both a and b	(4) Neither a nor b			
26. Sol:	Ans: (2) Individul satyagraha was launched by congress to o satyagraha, second was Jawahar lal Nehru, third	ppose August offer , V was Brahma Dutt .	/inoba bhave was first to offer individual			
27.	Consider the following statements:(a) Lord Mountbatten came to India as Viceroy ir(b) In February 1947, Clement Attlee, British PreWhich of the above statements is/are correct?	1945 mier, declared that the	e British would quit India by June 1948.			
	(1) Only a (2) Only b	(3) Both a and b	(4) Neither a nor b			
Sol:	Prime Minister Clement R. Attlee told the House of to hand India over to the Indians not later than Jur has resigned and that Lord Louis Mountbatten has India in 1947.	Commons on Februa ne, 1948. Attlee told t been named to succee	ary 20 th 1947 that the government intends the House that Viceroy Viscount Wavell ed him. Lord Louis Mountbatten came to			
28.	Which of the following statements is/are <i>incorre</i> Bengal in the 18 th century?	<i>ct</i> regarding the Dua	l system of administration prevalent in			
	(a) The Nawab controlled the defence of Bengal,(b) The system was advantageous to the East India	while the East India Company as it had po	Company controlled its finances ower without responsibility			
	(c) The weaivng industry of Bengal mostly suffer	ed due to the dual sys	tem of administration			
	(d) The separation of power resulted in efficient a Select the correct answer using the code given below	dministration and che	cked the drain of wealth			
	(1) Only d (2) a and d	(3) a, b and c	(4) a, c and d			
28.	Ans: (1)					
Sol:	Under the dual system administration of Bengal wa	as divided in to Diwar	ni and Nizamat.			
	Diwani – right to collect revenue was given to East Nizamat (Administrative responsibility i.e., Law a Nawab.	t India company nd order, Military po	wer and criminal justice) remained with			
	East India company had power without response agriculture, Handloom industry etc.,	ibility. This system 1	ed to inefficient administration, fall in			

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29.	Amaravati, the de	signated	capital of Andhra Pr	radesh, was the histor	rical capital of
	(1) Satavahana Dy	ynasty	1	(2) Krishna Dy	nasty
	(3) Buddhist Dyna	asty		(4) Champakan	n Dynasty
29.	Ans: (1)				
Sol:	Amaravathi: It wa	is a capit	tal of Satavahana Kin	ngdom.	
	Amaravathi is pop	oular for	Amara lingeshwara	swamy (lord shiva)	
30.	Andhra Pradesh c	omes un	der which earthquak	e classified zone?	
	(1) Zone 1 and Zo	one 2	(2)	Zone 2 and Zone 3	
	(3) Zone 3 and Zo	one 4	(4)) Zone 4	
30.	Ans: (2)				
Sol:	Old earthquake zo	ones as p	er IS 1893 (Part – 1))	
	(I) No risk		(II) Low risk		
	(III) Medium risk		(IV) High risk		
	(V) Vulnerable				
	New earthquake z	iones as	per IS 1893-2002 (P	art – 1)	
	(II) Low risk				
	(III) Medium risk				
	(IV) High risk				
	(V) Vulnerable				
	Most areas of Ind	ia locate	d in IIIrd zone		
	Where as Andhra	Pradesh	comes under II & II	I zone.	
31.	Which of the follo	owing pa	irs is/are correctly m	natched?	
	Indian State		Founder		
	a. Hyderabad	:	Nizam-ul-Mulk		
	b. Bengal	:	Saadat Ali Khan		
	c. Awadh	:	Murshid Quli Khar	1	
	(1) Only a	(2) a ai	nd c	(3) b and c	(4) None of the above
31.	Ans: (1)				
Sol:	Hyderabad	\rightarrow	Nizam-ul-Mulk		
	Awadh	\rightarrow	Saadat Ali khan		
	Bengal	\rightarrow	Murshid Qulikhan		
ACE	Engineering Acaden	Hyderab	ad + Delhi + Bhopal + Pune + Bhu	ibaneswar + Lucknow + Patna + Be	engaluru + Chennai + Vijayawada + Vizag + Tirupati + Kolkata + Ahmedabad

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32. With reference to t	he first Factories Act, 18	81, consider the following sta	atements:
(a) The Act tried	to limit the working hou	rs for children and also fix a	minimum age limit for employment in a
factory			
(b) The Act got w	vide support from early n	ationalists, especially modera	ates
Which of the stater	nents given above is/are	correct?	
(1) Only a	(2) Only b	(3) Both a and b	(4) Neither a nor b
32. Ans: (3)			
Sol: The first factories a	act was passed by Lord R	Rippon it basically dealt with	problem of children in factories. The act
fixed working hour	rs for children, prohibited	d children below age of sever	1.
The act was suppor	rted by early nationalists		
33 Consider the follow	ving statements regardin	α the role of the Reserve Ban	k of India (RBI):
(a) The RBI man	ages the public debt on h	ehalf of the Central and State	e governments in India
(b) The RBI acts	as a banker to various St	ate governments in India	
Which of the stater	ments given above is/are	incorrect?	
(1) Only a	(2) Only b	(3) Both a and b	(4) Neither a nor b
33. Ans: (4)	· · ·		
Sol: RBI acts banker and	d public debt manager to	both central and state govern	nments.
34. Which of the follow	wing States does <i>not</i> share	re a boundary with Andhra Pr	radesh?
(1) Odisha	(2) Tamil Nadu		
(3) Karnataka	(4) Madhya Pra	desh	
34. Ans: (4)			
Sol: Andhra Pradesh bo	oundary States		
North	\rightarrow Chattishgarh		
North East	\rightarrow Odisha		
North West	\rightarrow Telangana		
West	\rightarrow Karnataka		
South	\rightarrow Tamilnadu	·/ / 11 D 1 1	
Madnya Pradesh de	oesnot have boundary wi	ith Andhra Pradesh	
35. Which of the follow	wing is a part of a Union	Territory located within And	hra Pradesh?
(1) Mahe	(2) Yanam	5	
(3) Karaikal	(4) Daman		
35. Ans: (2)			
Sol: The union Territory	of Puducherry in spread	l across Tamilnadu (Puduche	rry and Karaikal) Mahe (Kerala), Yanam
(Andhra Pradesh).	Puducherry is a former I	French enclave.	
ACE Engineering Academy	y Hyderabad + Delhi + Bhopal + Pune	+ Bhubaneswar + Lucknow + Patna + Bengaluru	+ Chennai + Vijayawada + Vizag + Tirupati + Kolkata + Ahmedabad

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 36. Which of the following is the smallest ocean (1) Atlantic Ocean (2) Arctic Ocean 36. Ans: (2) Sol: Pacific Ocean → Largest Arctic Ocean → Employed 	? (3) Indian Ocean (4) Pacific Ocean				
Arctic Ocean \rightarrow Smallest					
37. Kaziranga National Park is situated in which	of the following States?				
37. Ans: (3) (2) Manipur	(3) Assam (4) Megnalaya				
Sol: Khaziranga national park is a popular in India, located in Assam popular for one horned Rhinoceros recognized by UNESCO.					
38. Tawa Project is associated with which of the	following States?				
(1) Madhya Pradesh (2) Jharkhand	(3) Uttarakhand (4) Karnataka				
38. Ans: (1) Sol: Tawa Project is located in Madhya Pradesh o	on the river Tawa. Tawa is a tributary of narmada river				
 (a) A proclamation of financial emergency financial emergency financial emergency financial emerger directions for the reduction of salaries a with the affairs of the Union but excluding Which of the statements given above is/are constant (1) Only a (2) Only b 	ssued, shall cease to operate at the expiration of two months, unless s been approved by the resolutions of both Houses of Parliament. hey is in operation, it is competent for the President of India to issue and allowances of all or any class of persons serving in connection ng the Judges of the Supreme Court and the High Courts. orrect? (3) Both a and b (4) Neither a nor b				
39 Ans: (1)					
Sol: Article 360 contains Provisions as to financial emergency. Article 360 (2)(c) financial emergency shall cease to operate at the expiration of two months unless before the expiration of that period it has been approved by resolutions of both Houses of Parliament. Article 360 (4)(b) It shall be competent for the President during financial emergency to issue directions for the reduction of salaries and allowances of all or any class of persons serving in connection with the affairs of the Union including the Judges of the Supreme Court and the High Courts.					
40. Which one of the following statements correct(1) It contains the scheme of the distribution	ctly describes the Fourth Schedule of the Constitution of India? n of powers between the Union and the States				
 (2) It contains the languages listed in the Co (3) It contains the provisions regarding the a (4) It allocates seats in the Council of States 	onstitution administration of tribal areas				
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40. Ans: (4)

Sol: FIRST SCHEDULE

I. —The States.

II. —The Union territories.

SECOND SCHEDULE

PART A - Provisions as to the President and the Governors of States.

PART B – [Repealed.]

PART C – Provisions as to the Speaker and the Deputy Speaker of the House of the People and the Chairman and the Deputy Chairman of the Council of States and the Speaker and the Deputy Speaker of the Legislative Assembly and the Chairman and the Deputy Chairman of the Legislative Council of a Sta te.

PART D – Provisions as to the Judges of the Supreme Court and of the High Courts. PART E – Provisions as to the Comptroller and Auditor-General of India.

THIRD SCHEDULE – Forms of Oaths or Affirmations.

FOURTH SCHEDULE – Allocation of seats in the Council of States.

FIFTH SCHEDULE – Provisions as to the Administration and Control of Scheduled Areas and Scheduled Tribes

PART A – General.

PART B – Administration and Control of Scheduled Areas and Scheduled Tribes.

PART C – Scheduled Areas.

PART D – Amendment of the Schedule.

SIXTH SCHEDULE – Provisions as to the Administration of Tribal Areas in the States of Assam, Meghalaya, Tripura and Mizoram.

SEVENTH SCHEDULE – List I — Union List. List II— State List. List III— Concurrent List.

EIGHTH SCHEDULE – Languages.

NINTH SCHEDULE – Validation of certain Acts and Regulations.

TENTH SCHEDULE – Provisions as to disqualification on ground of defection.

ELEVENTH SCHEDULE – Powers, authority and responsibilities of Panchayats.

TWELETH SCHEDULE – Powers, authority and responsibilities of Municipalities, etc.

41. Which of the following districts of Andhra Pradesh has the highest number of Mandals?

	(1) Anantapur	(2) East Godavarı	(3) Chittoor	(4) Guntur
41.	Ans: (3)			
Sol:	<u>Andhrapradesh</u>	<u>mandals district wise</u>		
	Ananthapur	- 63		
	Chittoor	- 66		
	Kadapa	- 51		
	East Godavari	- 64		
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	Engineering Academy		16	APPSC (AEE) _ 19 Screening Test Answers
	Guntur	- 57		
	Krishna	- 53		
	Kurnool	- 54		
	Nellore	- 46		
	Prakasham	-56		
	Srikakulam	- 38		
	Vishakapatnam	- 46		
	Vizayanagaram	- 34		
	West Godavari	- 48		
42.	The Planning Com	mission of India was set up in N	Iarch, 1950 by	
	(1) An amendme	nt to the Constitution of India		
	(2) Passing an or	dinance in the Upper House of P	arliament only	
	(3) Passing an or	dinance in the Lower House of P	arliament only	
	(4) A resolution of	of the Government of India		
42.	Ans: (4)			
Sol:	The Planning Com	mission was set up by a Resolut	ion of the Goverr	nment of India in March 1950
43.	Which of the follo(1) A programme(2) 20-Point Econ	wing programmes was announce to stop import of wheat from An nomic Programme	ed on 1st July, 197 merica	5 as part of Fifth Five Year Plan?
	(3) A programme	to cut down oil imports from Ru	ussia	
	(4) 14-Point Econ	nomic Programme		
43.	Ans: (2)			
Sol:	The 20-Point Econ	iomic Programme was announce	d by the Prime M	linister on 1st July, 1975.
44.	In partnership wit monitoring the rea	h the Government of Andhra P l time progress of the districts?	radesh, which of	f the following has created a dashboard for
	(1) Planning Con	nmission	(2) Central Tech	nology Mission
	(3) NITI Aayog		(4) POSHAN A	bhiyaan
44.	Ans: (3)			
Sol:	The Aspirational I Government of Inc performance indica dashboard is desig Pradesh.	Districts Programme is a product lia level, programme is anchored ators (81 data points) have been i gned, developed, and maintained	t of collective eff by NITI Aayog. identifed across 5 l by the Planning	For Real-time monitoring & ranking 49 Key themes, in consultation with Ministries. The g Department of the Government of Andhra

	17 APPS	C (AEE) _ 19 Screening Test Answers
45. According to the UNDP Report on Human I	Development Index-2018, the H	DI rank of India, out of 189 countries,
is,	1	,
(1) 127 (2) 136	(3) 120	(4) 130
45. Ans: (4)		
Sol: India ranked 130 out of 189 countries in the	e latest human development ran	kings released by the United Nations
Development Programme (UNDP). India's	Human Development Index (HI	DI) value for 2017 is 0.640, which put
the country in the medium human developr	nent category. Norway, Switzer	rland, Australia, Ireland and Germany
lead the ranking, The HDI was introduced ir	n the first Human Development	Report in 1990.
46. The Central Pollution Control Board (CPCI	3) was constituted in September	r 1974 under
(1) The Water (Prevention and Control of	Pollution) Act, 1974	
(2) The Air (Prevention and Control of Po	llution) Act, 1968	
(3) The Environment Protection Act, 1972		
(4) The Forest Protection Act, 1964		
46. Ans: (1)		
Sol: The Central Pollution Control Board (CPC)	B), statutory organisation, was	constituted in September, 1974 under
the Water (Prevention and Control of Pollut	ion) Act, 1974.	
CPCB was entrusted with the powers and fu	nctions under the Air (Preventio	on and Control of Pollution) Act, 1981.
47. In the Union Budget 2016-17, tax on coal w	vas renamed as	
(1) Sugamya Bharat Abhiyan Cess	(2) Clean Environment	t Cess
(3) Green India Mission	(4) Accessible India Ce	ess
47 April (2)		
47. Alls: (2) Sol: Clean Energy Cess' levied on coal lignite a	nd neat renamed to 'Clean Envi	ronment Cass
Accessible India Campaign (AIC) is the n	ationwide flagshin campaign of	the Department of Empowerment of
Persons with Disabilities (DEPwD) Minist	try of Social Justice and Empoy	verment The aim of the Campaign is
to make a barrier free and conducive enviro	onment for Divvangians all ove	er the country. It was launched by the
Prime Minister Shri Narendra Modi on Inte	rnational Day of Persons with I	Disabilities on 3rd December, 2015.
The National Mission for Green India (GIM	() is one of the eight Missions ou	utlined under the National Action Plan
on Climate Change (NAPCC).		
Mission Goals		
• To increase forest/tree cover to the exte	nt of 5 million hectares (mha) an	nd improve quality of forest/tree cover
on another 5 mha of forest/non-forest l	ands;	
• To improve/enhance eco-system serv	vices like carbon sequestration	n and storage (in forests and other
ecosystems), hydrological services and	d biodiversity; along with provi	sioning services like fuel, fodder, and

To increase forest based livelihood income of about 3 million households. •

timber and non-timber forest produces (NTFPs); and

Engineering Academy	18 AP	PSC (AEE) _ 19 Screening Test Answers
48. What is the "Population Ratio" of succes	sor states of Andhra Pradesh an	nd Telangana as per 2011 CENSUS?
(1) 58.32:41.68 (2) 58:42	(3) 58.31:41.69	(4) 56:44
48. Ans: (1)	(-)	
Sol: Andhra Pradesh Reorganisation Act. 20	14 , section 2(h) defines - pop	pulation ratio in relation to the States of
Andhra Pradesh and Telangana, means th	ne ratio of 58.32 : 41.68 as per 2	2011 Census .
49. When was the Andhra Pradesh Reorganiz	zation Bill passed in the Lok Sa	bha?
(1) 18 th March, 2014	(2) 20 th February, 2014	
(3) 18 th February, 2014	(4) 19 th March, 2014	
49. Ans: (3)		
Sol: Andhra Pradesh Reorganisation bill was	passed by loksabha on feb18th	2014 and rajya sabha on feb20th 2014 $$,
received the assent of the President on th	e 1st March, 2014.	
50. When was APCRDA formed?		
(1) 30 th December, 2014	(2) 15 th October, 2015	
(3) 20 th October, 2015	(4) 29 th December, 2014	
50. Ans: (1)		
Sol: • A.P capital region development auth	ority was set up on 30th Dec - 2	2014.
• It is an urban planning agency		
• It was set up according to capital reg	gion development authority act	- 2014.
• C.M Acts as a Chairman.		
	PART B	
ELE	CTRICAL ENGINEERING	
51. The material filled in breather of tran	sformer is	
(1) Silica gel	(2) Sulphuric acid	
(3) SF ₆	(4) Mineral oil	
51. Ans: (1)		
Sol: A silica Gel breather is the most com	monly used way of filtering a	air from moisture.
52. A soft-iron toroid is concentric with a	a long straight conductor car	rying a direct current I. If the rela
tive permeability μ_{i} of soft-iron is 10	0, the ratio of the magnetic fl	lux densities at two adjacent points
located just inside and just outside th	e toroid, is	5 1
(1) 105 : 107 (2) 80 : 83	(3) 90 : 93	(4) 99 : 101
52. Ans: (*) (The correct answer is 10	0:1)	
Sol: Magnetic flux density inside the toro	id is given by	
$\mathbf{p} = \dots (\mathbf{NI})$		
$\mathbf{B}_{\rm in} = \mu_0 \mu_{\rm r} \left(\frac{1}{\ell} \right)$		
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Magnetic flux density just outside the t	oroid is given by
$\mathbf{B}_{(\mathrm{just\;out})} = \mu_0 \Big(\frac{\mathbf{NI}}{\ell} \Big)$	
$\frac{B_{\mathrm{in}}}{B_{(\mathrm{justout})}} = \mu_{\mathrm{r}} = 100; \frac{B_{\mathrm{in}}}{B_{(\mathrm{jutstout})}} = 100:1$	
53. The power factor in a transformer	
(1) is always unity	(2) is always leading
(3) is always lagging	(4) depends on power factor of load
53. Ans: (4)	
Sol: Power factor of transformer depends on t	type of load connected to the load 1.e on load power factor.
54. A salient pole synchronous motor is runn will	ing at no load. Its field current is switched off. The motor
(1) come to a stop	
(2) continue to run at synchronous speed	
(3) continue to run at a speed slightly mo	re than the synchronous speed
(4) continue to run at a speed slightly less	s than the synchronous speed.
54. Ans: (2) Sole When the field surrout of solient noise me	tor working under no load condition in switched off it
works as reluctance motor. rotate at synch	hronous speed.
55. No-load current in a transformer	
(1) lags behind the voltage by about 75°	(2) leads the voltage by about 75°
(3) lags behind the voltage by about 75°	(4) leads the voltage by about 75°
55. Alls: (1) Sal: Transformer has poor no load power fact.	or of order 0.2 to 0.25 lag because its magnetizing component
of current is very high when compared w	The loss component of current. $(I_{\mu} >> I_{w})$.
t v	$V_1 = -E_1$
I _w	
E ₂	I_{μ} ϕ
VE	4

 ϕ_0 = No load phase angle of transformer and the range is 700 to 750 $\cos\phi_0$ = no load power factor of transformer and the range is 0.2 to 0.25 lag

		21 APPSC (AEE) _ 19 Screening Test Answers
56.	In the transformer, following winding has got :	more cross-section area:
	(1) Low voltage winding	(2) High voltage winding
	(3) Primary winding	(4) Secondary winding
56.	Ans: (1)	
Sol:	The current in Low voltage winding is high as sectional area has to be more for low voltage v	s compared to High voltage winding, therefore the cross vinding.
57.	The maximum efficiency of a distribution tran	sformer is
	(1) at no load	(2) at 50% full load
	(3) at 80% full load	(4) at full load
57.	Ans: (3)	
Sol:	The load on the distribution transformer varies most of the time. Hence in distribution trans- more when compared to core loss (which occu bution transformers are designed with less iron load lesser than full load. Maximum efficiency	from time to time and the transformer will be on no-load former the copper loss (which depends on load) will be urs as long as transformer is in operation). Hence distri- n loss and designed to have the maximum efficiency at a v occurs at 70-80% of full load.
58.	For a transformer, operating at constant load c	urrent, maximum efficiency will occur at
	(1) 0.8 leading power factor	(2) 0.8 lagging power factor
	(3) zero power factor	(4) unity power factor
58.	Ans:(4)	
Sol:	By keeping load current constant, if load power	r factor is varied, the maximum efficiency occurs at UPF.
59.	Which of the following protections is not norm	nally provided on small distribution transformers?
	(1) Over-fluxing protection	(2) Buchholz relay
50	(3) Over-current protection	(4) All of the above
Sol:	It is common practice to provide Buchholz re While for all small size distribution transform device. For all larger rated and important distr restricted earth fault protection is applied.	elay protection to all 0.5 MVA and above transformers. Hers, only high voltage fuses are used as main protective ribution transformers, over current protection along with
60.	 When a synchronous motor is running at synch (1) damping torque (3) torque aiding the developed torque Ans: (4) 	hronous speed, the damper winding produces (2) eddy current torque (4) no torque
Sol:	When synchronous motor is running at synchr winding. Became relative motion between airg emf, no current and hence no-torque.	onous speed, no torque will be produced by damper gap field and damper winding is zero. Therefore no

	, ,	22	APPSC (AEE) _ 19 Screening Test Answers
61. Maximum (1) 0.5 ohr	permissible earth resistance at n (2) 1 ohm	t large power stations (3) 2 ohms	s is (4) 8 ohms
Sol: The value	of the earth resistance for diffe	rent power stations is	s shown below
Large Pow	er Station – 0.5 ohms	-	
Major Pov	ver Station -1.0 ohms		
Small Sub In all other	station -2.0 ohms		
62. A three-ph	ase slip-ring induction motor i	s always started with	1a
(1) starting (3) no extended	winding rnal resistance in rotor circuit	(2) squirrel cas (4) full externs	ge winding al resistance in rotor circuit
62. Ans: (4)		(4) full externa	
Sol: As this rot	or has low rotor winding imped	dance at the time of s	tarting, it draws high starting currents. So
full extern	al resistance is needed to start t	his type of induction	motors and gradually resistance has to be
decrease w	then ever it reaches to synchro	nous speed.	
63. The startin	g torque of the slip-ring induct	tion motor can be inc	creased by
(1) adding	resistance to the stator		
(2) adding	resistance to the rotor	.1	
(3) adding (4) None (resistance to stator as well as t f the above	the rotor	
63. Ans: (2)			
Sol: If the starting	ng torque of the machine needs to	b be increased, that car	n be done by adding an external resistance in
the rotor cir	cuit at the time of starting.		
64 Maximum	permissible earth resistance for h	uildings is	
(1) 0.5 ohm	(2) 1 ohm	(3) 2 ohms	(4) 8 ohms
64. Ans: (4)			
Sol: Refer solution	on of Q. No 61		
65 Filament la	mps operate normally at a power	factor of	
(1) 0.5 lage	ing (2) 0.8 lagging	(3) unity	(4) 0.8 leading
65. Ans: (3)			
Sol: Filament la	nps operate normally at a power	factor of unity	
66 What perce	ntage of the input energy is redict	ted by filament lama?	
(1) 2 to 5 p	ercent (2	2) 10 to 15 percent	
(3) 25 to 30	percent (4	4) 40 to 50 percent	
66. Ans: (2)			
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				23	APPSC (AEE) _ 19 Screening Tes	st Answers
67.	Which of the following l	amps is	the cheapest f	for the same wattage	?	
	(1) Fluorescent tube	1	(2)	Mercury vapour lan	ηp	
	(3) GLS lamp		(4)	Sodium vapour lam	p	
67.	Ans: (3)			* .	•	
Sol:	For the same wattage, t orescent tube > GLS la	he cost ump.	of lamps is a	as follows. Sodium	vapor lamp > Mercury vapor lan	np > Flu-
68.	In the fluorescent tube ci	rcuit, th	e function of	choke is primarily to		
	(1) reduce the flicker					
	(2) minimize the starting	surge				
	(3) reduce the starting cu	irrent				
	(4) initiate the arc and sta	abilize it				
68.	Ans: (3)					
69.	The function of capacito	r across	the supply to	the fluorescent tube	is primarily to	
	(1) stabilize the arc					
	(2) reduce the starting cu	irrent	ton			
	(3) improve the suppry p	ower rac	2101			
60	(4) reduce the horse					
07.	Alls. (5)					
70.	The gas filled in vacuum	filamen	t lamps is			
	(1) nitrogen			(2) argon		
	(3) air			(4) None of the	above	
70.	Ans: (4)					
71.	Which of the following i	s presen	t inside the flu	uorescent tube?		
	(1) Argon and Neon			(2) Argon and (CO ₂	
	(3) Mercury vapour			(4) Helium and	Oxygen	
71.	Ans: (3)					
72.	The rating required for D and 0.8 power factor is)G set w	ith 500 kW co	onnected load and w	ith diversity factor of 1.5, 80% lo	ading
	(1) 500 kVA	(2) 60	0 kVA	(3) 625 kVA	(4) 520 kVA	
72.	Ans: (4)					
Sol:	Given data:					
	Connected load	=	500 kW			
	Diversity factor	=	1.5			
	Maximum demand	=	$\frac{500}{1.5} = 33$	3.33		
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			25	APPSC (AEE) _ 19 Screening Test Answers
	% loading	= 80%	= 0.80	
	Set rating	$=$ $\frac{333.33}{0.80}$	$\frac{3}{2} = 416.6$	
	At 0.8 pf rating	$=$ $\frac{416.6}{0.8}$	= 520 kVA	
73.	Auxiliary power consump (1) $1 - 2\%$ (2) $5 - 2\%$	otion of DG set at 6%	full load in its ope (3) 10 - 12 %	erating capacity is about (4) Above 15 %
73.	Ans: (1)		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Sol:	Auxiliary power consump	tion of DG set at	full load in its ope	rating capacity is about 1.3 to 2.1
74.	The starting current value	of DG set should	d not exceed	% of full load capacity of DG set.
74	(1) 100	(2) 200	(3) 150	(4) 300
74. Sol·	Ans: (2) The starting current value	of DG set should	not exceed 200%	of full load capacity of DG set
501.	The starting current value		not exceed 20070	of full load capacity of DO set
75.	The maximum permissibl	e percentage unb	alance in phase loa	ads on DG sets is
75	(1) 5%	(2) 15 %	(3) 10 %	(4) 1 %
Sol:	The maximum permissible	e percentage unba	alance in phase loa	ds on DG sets is 10%
76.	The permissible percentage	ge overload on D	G sets for 1 hour in	n every 12 hours of operation is
	(1) 5 %	(2) 15 %	(3) 10 %	(4) 1%
76.	Ans: (3) The permissible percentee	ra avarland on D(C sats for 1 hour in	avery 12 hours of operation is 100/
501.	The permissione percentag		J Sets IOI I HOUI III	every 12 hours of operation is 1070
77.	Designed power factor of	a DG set is gene	rally at	
	(1) 1.0	(2) 1.1	(3) 0.9	(4) 0.8
77.	Ans: (4)			
Sol:	Any power factor less tha electricity at 93.5% efficient to 0.746 kW of power wh	n rated (0.8) outp ency; the rest is lo ich is equal to kV	put is limited by g ost in windage, bea /A times the power	enerator ampere. Generators can typically produce aring friction and heat losses. Further, 1 hp is equal factor.
78.	Lower power factor of a I	OG set demands		
	(1) Lower excitation curre	ents		
	(2) Higher excitation curr	ents		
	(4) None of the above	on currents		
78.	Ans: (2)			
Sol:	Lower power factor of a D)G set demands H	ligher excitation co	urrents.
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	ingeneering neatering inguerab	aa i benn i bhopar i ulle	- Endounceswar + Eucknow + F	and Songuru , onemur , nguyuwada , vizag , in upati , notkata , Anilieudbau

5		26 APPSC (AEE) _ 19 Screening Test Answers
79.	Clearance of the lowest conductor (across t (1) 17 ft (2) 18 ft	the street) from the ground for HT lines should be (3) 19 ft (4) 20 ft
79. .	Ans: (4)	
Sol: 1	No conductor of an overhead line, includin	g service lines erected across a street shall at any part thereof be at a
	height less than:	(108)
	i) For low and medium voltage line-5./91	meters (19ft)
	ii) For high voltage line-0.090 meters (201	t).
80.	Motor output in HP is equal to	
	(1) kW input × Efficiency/0.746	(2) kW input \times 0.746/ Efficiency
	(3) Efficiency \times 0.746/ kW input	(4) 0.746 / (kW input × Efficiency
80.	Ans: (1)	
Sol:	Efficiency = output power /input power	
	Output power (kW) = Efficiency \times Input p	power (kW)
	Output power = 1 H.P	
	Efficiency × Input power (kW) = $0.746 \times C$	Dutput power (kW)
:	\Rightarrow Output power = [Input power (kW) × E	Efficiency]/ 0.746
81.	Power factor is equal to	
	(1) Apparent power/ Average power	(2) Apparent power/ True power
	(3) Average power/ True power	(4) True power/ Apparent power
81.	Ans: (4)	
Sol:	Power factor = $\frac{R}{R} = \frac{I^2 R}{R} = \frac{P}{R}$	rue power
	$Z I^2 Z I V$ App	arant power
82.	True power in three-phase circuit in kilowa	att is
	(1) $1.414 \times Volts \times Amperes \times pf/1000$	(2) $1.73 \times \text{Volts} \times \text{Amperes} \times \text{pf}/1000$
	(3) Volts \times Amperes \times pf/ 1000	(4) Volts × Amperes ×1000/ pf
82. .	Ans: (2)	
Sol:	True power for $3-\phi$ in kilowatt	
	$P = \sqrt{3} \text{ VI } \cos \phi = 1.73 \times \text{volt} \times \text{amp} \times \text{pf}$	71000
83.	Amperes drawn by single-phase motor are	equal to
	(1) Efficiency ×Volt × pf/ (HP × 746)	(2) Efficiency \times pf / (Volt \times HP \times 746)
	(3) HP \times 746/ (Efficiency \times Volts \times pf)	(4) HP \times 746 \times Volts/(Efficiency \times pf)
83.	Ans: (3)	
Sol:	Efficiency = $\frac{\text{output power}}{\text{input power}} = \frac{H.P \times 740}{V_L I_L \cos \phi}$	<u>6</u>
	$HP \times 746$	
	Current drawn $(I_L) = \frac{111 \times 140}{\text{volt} \times \text{Efficiency} \times 100}$	p.f
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APPSC (AEE) 19 Screening

- The emf induced in the primary of a transformer 84.
 - (1) is in phase with the flux
 - (2) lags behind the flux by 90 degrees
 - (3) is in phase opposition to that of flux
 - (4) leads the flux by 90 degrees

84. Ans: (2)

Sol: Self induced emf in primary winding is lagging behind the flux by 900 to satisfy Lenz's law.



Mutual induced emf in the secondary winding also lags behind the flux in the core by exactly 900, so that it is always in phase with self induced emf of primary.

- Crawling in the induction motor is caused by 85.
 - (1) low voltage supply or high loads
 - (2) friction developed in the motor
 - (3) flux wave produced by a stator winding is not pure sine wave
 - (4) None of the above

85. Ans: (3)

- Sol: Due to harmonics in the air gap flux wave the crawling will occur. The crawling effect may be eliminated or reduced by properly designing the stator winding, so as to reduce the harmonics in the air gap flux wave. The crawling effect can also be eliminated by proper choice of rotor slots in comparison to stator slots
- 86. It is advisable to avoid line starting of induction motor and use starter because
 - (1) motor takes five to seven times its full load current
 - (2) It will pick up very high speed and may go out of step
 - (3) it will run in reverse direction
 - (4) starting torque is very high

86. Ans: (1)

Sol: The purpose of starters is to limit high starting current (5 to 8 times the full-load current). Three phase induction motor draws very high starting current, if such high current flows through the winding for longer time, the motor winding will be damaged. Hence to limit such a high starting current, starters are required.

	22 Engineering Academy	APPSC (AEE) _ 19 Screening Test Answers
87.	If any two phases for an induction motor are interchar	nged
	(1) the motor will run in reverse direction (2) the mo	otor will run at reduced speed
	(3) the motor will not run (4) the mo	otor will burn
87.	Ans: (1)	
Sol:	: The direction of the rotating magnetic field is reversed	d by changing the phase sequence of A-B-C, i.e. changing
	only the connection of any two of the three phases and	l keeping the third one same. By doing this procedure motor
	will run in reverse direction.	
88.	The power factor of an induction motor under no-load	d conditions will be closer to
	(1) 0.2 lagging (2) 0.2 leading (3)	3) 0.5 leading (4) unity
88.	Ans: (1)	
Sol:	: In Induction motor, the magnetizing current is 30-50	% of rated current. Therefore under no load condition the
	power is very poor.	
00		meter for the source IID will be
89.	(1) bigger (2) smaller (3)	motor for the same HP will be $(4) \land ny$ of the above
89	(1) bigger (2) smaller (5)) same (4) Any of the above
Sol:	There is no relation between speed and size.	
~~~~		
90.	If the rotor circuit of a sequirrel cage induction motor	r is open, the rotor will
	(1) run at very high speed (2)	2) run at very low speed
	(3) make noise (4	4) not run
90.	Ans: (4)	
Sol:	: If rotor circuit is open, the current in the rotor is zer	ro and as we know torque is proportional to square of the
	current which is zero, therefore the motor not run.	
91.	The ABCD consstants of a short transmission line are	
	(1) $A = Z, B = 1, C = 0, D = 1$ (2)	A = 0, B = 1, C = Z, D = 1
	(3) A = 1, B = Z, C = 0, D = 1 (4)	A = 1, B = 0, C = 1, D = Z
91.	Ans: (3)	
91.	Ans: (3)	
Sol:	: Short transmission line: series combination of resistan	ace and inductance
	IR L _I	
	↓	
	Z = R + jx	
	$V_{s} = 1.0 V_{r} + ZI_{r}$	
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#### APPSC (AEE) _ 19 Screening Test Answers

 $I_s = 0 V_r + 1.0I_r$  $\begin{bmatrix} V_{s} \\ I_{s} \end{bmatrix} = \begin{bmatrix} 1 & Z \\ 0 & 1 \end{bmatrix} \begin{bmatrix} V_{r} \\ I_{r} \end{bmatrix}$ A = 1; B = Z; C = 0; D = 1

ACE Engineering Academy

92. The ABCD paramters of medium length lines in Nominal-T configuration are

(1) 
$$A = 1 + \frac{YZ}{2}$$
,  $B = Z\left(1 + \frac{YZ}{2}\right)$ ,  $C = 1 + \frac{YZ}{2}$ ,  $D = Y$   
(2)  $A = 1 + \frac{YZ}{2}$ ,  $B = Z\left(1 + \frac{YZ}{2}\right)$ ,  $C = Y$ ,  $D = 1 + \frac{YZ}{2}$   
(3)  $A = 1 + \frac{YZ}{2}$ ,  $B = Y$ ,  $C = Z\left(1 + \frac{YZ}{2}\right)$ ,  $D = 1 + \frac{YZ}{2}$   
(4)  $A = Z\left(1 + \frac{YZ}{2}\right)$ ,  $B = Z\left(1 + \frac{YZ}{2}\right)$ ,  $C = 1 + \frac{YZ}{2}$ ,  $D = Y$ 

Ans: (*) **92.** Sol:



KVL for loop 1  

$$V_s = V_1 + I_s \frac{Z}{2}$$
.....(1)  
 $I_s = I_c + I_r$ .....(2)  
 $= V_1 Y + I_r$ 

From (1) and (2)

$$V_{s} = V_{1} + (I_{c} + I_{r})\frac{Z}{2}$$

$$V_{s} = V_{1} + V_{1}\frac{ZY}{2} + I_{r}\frac{Z}{2}$$

$$V_{s} = V_{1}\left(1 + \frac{ZY}{2}\right) + I_{r}\frac{Z}{2}$$
For loop 2  $V_{1} = V_{r} + I_{r}, \frac{Z}{2}$  ...... (4)

### ACE

#### APPSC (AEE) _ <u>19 Screening Test Answer</u>

Substitute equation 4 in 3

$$\begin{split} V_{s} &= \left[ V_{r} + I_{r} \frac{Z}{2} \right] \left[ 1 + \frac{ZY}{2} \right] + I_{r}, \frac{Z}{2} \\ V_{s} &= V_{r} \left[ 1 + \frac{ZY}{2} \right] + I_{r} \frac{Z}{2} \left[ 1 + \frac{ZY}{2} \right] + I_{r}, \frac{Z}{2} \\ &= V_{r} \left[ 1 + \frac{ZY}{2} \right] + I_{r} \left[ Z + \frac{Z^{2}Y}{4} \right] \\ V_{s} &= V_{r} \left[ 1 + \frac{ZY}{2} \right] + I_{r} Z \left[ 1 + \frac{ZY}{4} \right] \dots (5) \end{split}$$

Substitute equation 4 in equation 2  $I_s = I_c + I_r$ 

$$I_{s} = V_{1}Y + I_{r}$$
$$= \left(V_{r} + I_{r}\frac{Z}{2}\right)Y + I_{r}$$
$$= V_{r}Y + \frac{I_{r}ZY}{2} + I_{r}$$
$$= V_{r}Y + I_{r}\frac{ZY}{2} + I_{r}$$

$$I_s = V_r Y + I_r \left[ 1 + \frac{ZY}{2} \right] \dots (6)$$

(5) & (6) represents standard ABCD equation

$$\begin{bmatrix} V_{s} \\ I_{s} \end{bmatrix} = \begin{bmatrix} 1 + \frac{ZY}{2} & Z\left(1 + \frac{ZY}{4}\right) \\ Y & 1 + \frac{ZY}{2} \end{bmatrix} \begin{bmatrix} V_{r} \\ I_{r} \end{bmatrix}$$

The meter constant of a single-phase 240 V induction watt hour meter is 400 revolutions per kWh. The speed of 93. the meter disc for a current of 10 amperes of 0.8 power factor lagging will be

(2) 16.02 rpm (1) 12.8 rpm (3) 18.2 rpm (4) 21.1 rpm

Sol: K = 400 rev/kwhr,

speed of disc = 400 rev/kwhr ×  $\left(\frac{240 \text{ V} \times 10 \text{ A} \times 0.8}{1000 \times 1 \text{ hr}}\right)$ kwhr

= 768 rev/hr  
= 
$$\frac{768}{60}$$
 rev/min = 12.8 rpm



ACE 32 The DC generator runs at a speed of 1000 rpm and flux per pole is 0.2 Wb, number of poles are 2, the winding is 96. wave wound and having 480 conductors. the critical speed is 1200 rpm. Then the generated  $emf(E_{a})$  is (3) 1600 V (1) 0 V(2) 1500 V (4) 2000 V Ans: (1) **96.** Sol: The speed of the generator should be higher than the critical speed. Critical speed is the speed of the generator below which it fails to build up it's voltage without any external resistance in field circuit. For a lossless line, the characteristic impedance of the line having L = 1.8 mH and  $C = 0.02 \mu$ F will be 97. (2) 500 ohms (3) 200 ohms (1) 400 ohms (4) 300 ohms 97. Ans: (4) Sol: Given: L = 1.8 mH $C = 0.02 \ \mu F$ Characteristic impedance of the line is given by  $Z_0 = \sqrt{\frac{L}{C}}$  $=\sqrt{\frac{1.8 \times 10^{-3}}{0.02 \times 10^{-6}}}$  $=\sqrt{\frac{18}{2}\times10^4}$  $\therefore Z_0 = 300\Omega$ 98. The synchronous speed for a three-phase 6-pole induction motor is 1200 rpm. If the number of poles is now reduced to 4 with the frequency remaining constant, the rotor speed with a slip of 5% will be (1) 1610 rpm (2) 1750 rpm (3) 1500 rpm (4) 1710 rpm 98. Ans: (4) Sol:  $N_s = \frac{120f}{P}$  $\Rightarrow$  f =  $\frac{1200 \times 6}{120}$  = 60 Hz For P = 4:  $N_{s} = \frac{120f}{P} = \frac{120 \times 60}{4} = 1800 \text{ rpm}$  $N_{r} = N_{s}(1-s)$ = 1800 (1 - 0.05)= 1710 rpm

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		33	APPSC (AEE) _ 19 Screening Test Answers
99.	The shaft output of a three-phase 60 Hz induction r stator core loss is 4300 W and the stator copper los stator are respectively 110 A and $0.15\Omega$ . If the slip (1) 80% (2) 92%	notor is 80 kW. s is 2690 W. Tl p is 3.8%, what (3) 87%	the friction and windage losses are 920 W, the ne rotor current and rotor resistance referred to is the percent efficiency? (4) 85%
99.	Ans: (4)	~ /	
Sol:	$P_{\rm ext} = 80 \text{ kW}$		
	Total losses = (friction+ windage) +(core loss)+(C = 920 + 4300 + 2690+(3 × 110 ² × 0.15) = 13.35 kW % $\eta = \frac{80}{80 + 13.35} \times 100 = 85.69\%$	u losses of state	r and rotor)
100.	Three single-phase, 50 kVA 2300/230 V, 60 Hz tra transformer bank. The equivalent impedance of eac three-phase transformer supplies a three-phase, 120 primary voltage (line-to-line) required. (1) 2000 V (3) 5000 V	nsformers are c ch transformer r ) kVA, 230 V, 0. (2) 4000 V (4) 2500 V	onnected to form a three-phase, $4000 \text{ V}/230 \text{ V}$ eferred to low-voltage is $0.012 + j0.016\Omega$ . The 85 power factor (lagging) load. Determine the
100.	Ans: (2)		
Sol:	Each single phase transformer hv: 2300 V, lv: 230	V, $\bar{Z}_{eqlv} = 0.012$	$(2-31.79^{\circ})$
	3-phase kVA = $120,000 = \sqrt{3} \times 230 \times I_L$		
	$I_{L} = \frac{120,000}{\sqrt{3} \times 230}$		
	$I_{ph} = \frac{I_L}{\sqrt{3}} = \frac{4000}{23} A$		
	Impedance drop in the transformer = $I_{ph} \times \bar{Z}_{eqlv} = 3$	.47∠21.34° = 3	.24 + j1.27
	Secondary induced voltage = $\sqrt{233.24^2 + 1.27^2} = 2$	233.24 V	
	Line voltage on primary side = $\sqrt{3} \times 2332.4 = 402$	39 V	

ACE Engineering Academy	34	APPSC (AEE) _ 19 Screening Test Answers
101. A 9 kVA, 208 V, three-phase, Y-connected, synch phase and a synchronous reactance of 5.6 ohms per the machine when it is delivering full-load at 0.8 pr regualtion for rated load at 0.8 power factor (leading)	hronous genera er phase. Deter power factor lag 1g).	tor has a winding resistance of 0.1 ohm per rmine the voltage generated (exciting emf) by gging at rated voltage. Calcualate the voltage
(1) 15.5% (2) 5%	(3) 17.21%	(4) 11.02%
101. Ans: (*) (The correct answer is -0.3%)		
Sol: $V_L = 208 \Longrightarrow V_{ph} = \frac{208}{\sqrt{3}} = 120V$		
$I_{\rm L} = \frac{kVA}{\sqrt{3}  V_{\rm L}} = \frac{9 \times 10^3}{\sqrt{3} \times 208} = 24.98 A = I_{\rm aph}$		
$E = \sqrt{\left(V\cos\phi + I_a R_a\right)^2 + \left(V\sin\phi - I_a X_s\right)^2}$		
$= \sqrt{(120 \times 0.8 + 24.98 \times 0.1)^2 + (120 \times 0.6 - 24)^2}$	$1.98 \times 5.6)^2$	
= 119.57V		
$\Rightarrow \text{Regulation} = \frac{\text{E} - \text{V}}{\text{V}} \times 100$		
$= \frac{119.57 - 120}{120} \times 100$ $= -0.35\%$		
102. What is distribution factor for a 108 slot, 12-pole, 3	3- φ winding?	
(1) 0.88 (2) 0.96	(3) 0.92	(4) 1
102. Ans: (2)		
<b>Sol:</b> Number of slots, $S = 108$		
number of poles, $P = 12$		
slots/pole/ph, spp, m = $\frac{108}{12 \times 3}$ = 3		
slot angle, $\gamma = \frac{P \times 180}{S} = \frac{12 \times 180}{108} = 20^{\circ}$		
$k_{\rm d} = \frac{\sin\frac{m\gamma}{2}}{m\frac{\sin\gamma}{2}} = \frac{\sin\frac{3\times20}{2}}{3\times\sin\frac{20}{2}} = \frac{0.5}{0.52} = 0.96$		
103. For the given cirucit the Theveninin equivalent is	to be determine	ed. The Thevenin voltage, V ₄ (in volts), seen
from terminal AB is	20i	
(1) 1 V		→A
(2) 2.5 V		\$
(3) 3.3 V $2V_{-}$	ΠΩŽ¥i	$\gtrsim 2\Omega$
(4) 4.2 V		

**⊸**B

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#### APPSC (AEE) _ 19 Screening Test Answer

Sol:

103. Ans: (3)



For  $V_{_{\! oc}}$ 

By kcl at i

$$\frac{2-i}{1} = i + \frac{21i}{2} = 11.5i$$

$$2 = 12.5i \Rightarrow i = \frac{2}{12.5}$$

$$V_{oc} = 21i = 21\left(\frac{2}{12.5}\right) = \frac{42}{12.5} = 3.36V$$

104. The expression of propagation constant of long transmission line is givne by

(1) 
$$\gamma = \sqrt{\frac{y}{z}}$$
 (2)  $\gamma = \sqrt{yz}$  (3)  $\gamma = \sqrt{\frac{z}{y}}$  (4) None of the above

#### 104. Ans: (2)

#### Sol: Propagation constant ( $\gamma$ ):

It represents changes happening in V,I waves during wave propagation such as physical displacement and decrement in magnitude of wave.

 $\gamma = \sqrt{zy}$   $z = r + j\omega L \Omega/km$  $y = g + j\omega C \Omega/km$ 

105. While measuring power of a three-phase balanced load by the two-wattmeter method, the readings are 100 W and 250 W. The power factor of the load is

(1) 0.1 (2) 1 (3) 0.8 (4) 0.5

105. Ans: (3)

C

C

Sol: Two-wattmeter method

$$W_1 = 100W$$
  $W_2 = 250 W$ 

$$\cos \phi = \frac{\sqrt{3} (W_2 - W_1)}{W_2 + W_1} = \frac{\sqrt{3} (250 - 100)}{350} = \frac{150(\sqrt{3})}{350}$$
$$\cos \phi = \frac{3\sqrt{3}}{7} = \frac{3 \times 1.732}{7} = \frac{5.196}{7} = 0.7423$$

$$\cos \phi = 0.7423$$
  
(given = 0.8)



١	Engineering Academy	37 APPSC (AEE) _ 19 Screening Test Answers
109. I	Resonant converters are basically used to	
(	(1) generate large peak voltages	(2) reduce the switching losses
(	(3) eliminate harmonics	(4) convert a square wave into a sine wave
109. A	Ans: (2)	
110. H i 3 ( ( 110. A	For a power system networ with n nodes, $Z_{33}$ of its is $1.3 \angle 10^{\circ}$ per unit. If a capacitor having reactnace 3 and the reference node, the current drawn by the (1) $0.325 \angle 100^{\circ}$ (3) $0.371 \angle 100^{\circ}$ Ans: (*) (The correct answer is $0.433 \angle 100^{\circ}$ )	bus impedance matrix is j0.5 per unit. The voltage at node 3 e of $-j3.5$ per unit is now added to the network between node capacitor per unit is (2) $0.325 \angle 80^{\circ}$ (4) $0.433 \angle 80^{\circ}$
111. I	In a three-phase transformer, if the primary side is what is the angle between phase voltage in the two	s connected in star and secondary side is connected in delta, cases?
(	(1) Delta side lags by $-30^{\circ}$	(2) Star side lags by $-30^{\circ}$
(	(3) Delta side leads 30°	(4) Star side leads by $-30^{\circ}$
111. A	Ans: (2)	
Sol: I	Phase voltages are in phase with each other. (Mista between line voltages. V / A	ake in the given question). Let us assume the angle difference
v	$V \angle 30^{\circ}$ (line), $V \angle 0^{\circ}$ (phase) / $V \angle 0^{\circ}$ (phase), $V \angle 0^{\circ}$	(line)
112. I	Determine the time of operation of a 1 A, 3s overcur of 0.6. The supplying CT is ratd 400 : 1 A and the	rrent relay having a plug setting of 125% and a Time multiplier fault current is 4000 A.
(	(1) 2.55 sec	(2) 1.98 sec
(	(3) 1.75 sec	(4) 0.55 sec
112. A	Ans: (b)	
Sol:	Given data:	
	TMS = 0.6	
	Relay rated current = $IA$	
	Piug setting – 125% Pickup current $L = 1 \times 1.25 = 1.25 \text{ A}$	
	CT ratio is 400.1	
	fault current, $I_{c} = 4000A$	
	I _c referred to secondary side of $CT = 4000 \times$	$\frac{1}{400} = 10A$
	$PSM = \frac{I_{f} \text{ referred to sec ondary side of } CT}{Pialau a current}$	400
	$=\frac{10}{1.25}=8$	



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#### APPSC (AEE) _ 19 Screening Test Answer

Sol:



$$P = 2kW = 2000W, V_R = 125V$$

I

2

$$I_{R} = \frac{P}{V_{R}} = \frac{2000}{125} = 16A =$$
$$V = \sqrt{V_{R}^{2} + V_{L}^{2}}$$

$$230 = \sqrt{(125)^2 + (V_L)}$$

$$V_{L} = 193.067 V_{L}$$

$$V_L = IX_L$$

$$X_{\rm L} = \frac{V_{\rm L}}{I} = \frac{193.067}{16} = 12.066\Omega$$
$$X_{\rm L} = 2\pi f L$$

$$L = \frac{X_{\rm L}}{2\pi f} = \frac{12.066}{2\pi \times 50} = 0.0384 \text{H}$$

116. By using bundled conductors in transmission lines, the effective inductance and capacitance will respectively

- (1) decrease and increase
- (2) increase and decrease
- (3) increase and increase
- (4) decrease and decrease

#### 116. Ans: (1)

Bundled conductors increases GMR of the conductors Sol:

$$\downarrow L = 0.2 \ln \frac{GMD}{GMR} \text{ mH/km}$$

$$C = \frac{2\pi \in {}_0}{\downarrow \ln \frac{GMD}{\downarrow GMR_m}} F/m$$

Hence inductance (L) increases and capacitance (C) decreases.

117. By increasing spacing between phase conductors, the line capacitance will

(1) Decrease	(2) Increase
(3) Remain same	(4) None of the above

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#### APPSC (AEE) _ 19 Screening Test Answer

#### 117. Ans: (1)

**Sol:** Capacitance of a T*l* is

$$C = \frac{2\pi \in 0}{\uparrow \ln \frac{d\uparrow}{r}}$$

as spacing increases  $(d\uparrow) \Rightarrow$  Capacitance  $(C\downarrow)$  decreases.

118. In the cirucit given below, the value of R required for the transfer of maximum power to the load having a resistance of  $3\Omega$  is



Load is fixed source resistance is maximum for MPT to load ForMPT to fixed load R = 0

119. For enhancing the power transmission in/along EHV transmission, the most preferred method is to connect a

(1) series inductive compensator in the line

(2) shunt inductive compensator at the receiving end

(3) series capacitive compensator in the line

(4) shunt capacitive compensator at the sending end

#### 119. Ans: (3)

**Sol:**  $\uparrow P_{\text{max}} = \frac{V_{\text{s}}V_{\text{R}}}{X_{\text{L}}\downarrow}$ 

From the above equation to increase  $P_{max}$  (max power transfer along a transmission line), line reactance has to be reduced this can be done by compensating the series inductance of a transmission line by a series capacitor. By doing this effective line reactance will decrease load  $P_{max}$  will increase.

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			41	APPSC (AEE) _ 19 Screening Test .	Answers
120.	How much power is de discharge of 40 $m^{3/s^{2}}$	eveloped when a hydro-	power plant operates	under an effective head of 30 m and a	a
	(1) 5.77 kW	(2) 11.77 kW	(3) 46.10 kW	(4) 11.77 MW	
120.	Ans: (4)				
Sol:	Given data				
	$Q = 40m^3/s$				
	head $= 30 \text{ m}$				
	$P = \frac{735.5}{75} \times Q \times H \times Q$	×η kW			
	$=\frac{735.5}{75}\times40\times30\times$	$\times 10^{-3} \times 1$			
	= 11 768 MW				

In the multi - meter circuit shown in the figure for AC voltage measurement, the function of diode D₁ is to 121.



(1) short circuit over range voltages

(2) make the rectifier  $D_2$  perform full wave rectification

(3) bypass reverse leakage current to  $D_2$  in the negative cycle of input

(4) provide half wave rectification

121. Ans: (3)

122. Consider the following statements in connection with measurement of temperature:

a. A thermistor is highly sensitive as compared with platinum resistance thermometer.

- b. The resistance of a thermistor is solely a function of its absolute temperature, whether the source of heat is external, internal or both.
- c. A thermistor has linear resistance temperature characteristic.
- d. More thermistors exhibits negative resistance temperature coefficient.

Which of these statements are correct?

- (1) a,b and c (2) a,b and d
- (4) a,c and d (3) b,c and d

#### 122. Ans: (2)





= 1000∠210°

$$\overline{S} = 866 \omega + j(-500 \text{ VAR})$$

complex power transfer from load to source.



:. +866 W of active power and 500 VAR of reactive power flows from source to load.

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	Acering Academy		44	APPSC (AEE) _ 19 Screening Test Ansv
27. A sin cuit sure	ngle-phase transform test a performed on d loss is 81 W. The	ner has no-load los it with 90% of the transformer has ma	ss of 64W, as obtained fro rated currents flowing in aximum efficiency when o	m an open-circuit test. When a short-cir its both LV and HV windings, the mea operated at
(1) 5	50.0% of the rated c	urrent	(2) 64.0% of the	rated current
(3) 8	30.0% of the rated c	urrent	(4) 88.8% of the	rated current
27. Ans	: (3)			
ol: Iron	loss = 64 watt			
Cu l	oss at $90\% = 81 \text{ W}$	( 100	$\lambda^2$	
Ther	refore Cu loss at 100	$0\% \text{ is} = 81 \times \left(\frac{100}{90}\right)$	<u>/</u> )	
The	fraction of load at v	= 100 watt which efficiency is	maximum is $x = \sqrt{\frac{Ir}{full loc}}$	$\frac{1}{100} \frac{1}{100} = \frac{1}{10} \frac{1}{100} = \frac{1}{10} \frac{1}{100} = \frac{1}{10} \frac{1}{100} = 0.8$
i.e.,	80% of rated curren	nt.		
28. The must	flux density at a poi t be equal to	int in space is given	n by $B = 4xa_x + 2kya_y +$	8az Wb/m ² . The value of constant k
(1) -	-2	(2) -0.5	(3) + 0.5	(4) +2
28. Ans	: (1)			
ol: B	$\dot{a} = 4x\hat{a}_x + 2ky\hat{a}_y + 8\hat{a}_y$	$\hat{a}_z wb/m^2$		
А	s $\vec{B}$ is always sole	enoidal field and l	hence $\nabla . \vec{\mathbf{B}} = 0$	
<u> </u>	$\frac{\mathbf{B}_{\mathrm{x}}}{\partial \mathbf{x}} + \frac{\partial \mathbf{B}_{\mathrm{y}}}{\partial \mathbf{y}} + \frac{\partial \mathbf{B}_{\mathrm{z}}}{\partial \mathbf{z}} = 0$	0		
4-	+2k+0 = 0			
	k = -2			
29. Two	wattmeter method	is used for measur	ment of power in a balanc	ed three-phase system. If one of the watt
mete	ers reads half of the	other (both positiv	e), then the power factor	of the load is
(1) 0	0.532	(2) 0.632	(3) 0.707	(4) 0.866
29. Ans	: (4)			
ol: T	wo wattmeter met	hod:		
W	$V_1 = \frac{W_2}{2}$			
ta	$\ln \phi = \frac{\sqrt{3}(W_2 - W_1)}{W_1 + W_2}$	$=\frac{\sqrt{3}W_2/2}{3W_2/2}=\frac{1}{\sqrt{3}}$		
φ	= 30°			
D.	$f = \cos \phi = \cos 30 =$	$\frac{\sqrt{3}}{2} = 0.866$		
P				

y y y		45	APPSC (AEE) _ 19 Screening Test Answers					
130.	130. In a salient pole synchronous motor, the developed reluctance torque attains the maximum value when the							
	load angle in electrical degrees is							
	(1) 0 (2) 45	(3) 60	(4) 90					
130.	Ans: (2)							
Sol:	I: In salient pole synchronous motor, the torque equation							
	$T = \left[\frac{EV}{X_s}\sin\delta + \frac{v^2}{2}\left(\frac{1}{x_q} - \frac{1}{x_d}\right)\sin 2\delta\right] \times \frac{1}{\omega}$							
	$\therefore T = T + T$							
	∴Electro magnetic torque is maximum							
	at $\delta = 90^{\circ}$							
	reluctance torque is maximum at $\delta = 45^{\circ}$							
131.	The advantages of a slip-ring induction motor ov	ver a squirrel o	age induction motor is that					
	(1) it has higher efficiency							
	(2) it has higher power factor							
	(3) it can be started with help of rotor resistance	starter						
121	(4) none of the above							
	Ans: (3)	4 June 1	the stars and an Thereafters are external starting					
501:	External rotor resistance limits the starting current	it drawn by In	duction motor. Therefore no external starting					
	If external resistance is varied on running condit	or.	and of Induction motor will be controlled. This					
	method of speed controlling is called resistance	speed controll	ing					
	include of speed controlling is called resistance	speed controll	ing.					
132.	The value of average flux density in air gap in an	n induction mo	otor, should be small					
	(1) to achieve good efficiency	(2) to get p	oor power factor					
	(3)to get good power factor	(4) for mir	imum cost.					
132.	Ans: (3)							
Sol:	If average air gap length is more, so reluctance i	s more. It requ	ires more excitation current, hence No load, full					
	load power factor are very less.							
133.	A single-phase 100 kVA, 1000 V/100 V, 50 Hz t	ransformer ha	s a voltage drop of 5% across its series impedance					
	at full load . Of this . 3% is due to resistance. The	e percentage 1	egulation of the transformer at full load					
	with 0.8 lagging power factor is							
	(1) 4.8 (2) 6.8	(3) 8.8	(4) 10.8					
133.	Ans: (1)							
Sol:	%Z = 5%, %R = 3%							
	$\% X = \sqrt{25 - 9} = 4\%$							
	$% \text{Reg} = \text{Rcos}\phi + \text{Xsin}\phi$							
	$= 3 \times 0.8 + 4 \times 0.6 = 4.8\%$							
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ACE 134. A separately excited dc motor has an armature resistance  $R_a = 0.05 \Omega$ . The field excitation is kept constant. At an armature voltage of 100V, the motor produces a torque of 500 Nm at zero speed. Neglecting all mechanical losses, the no-load speed of the motor (in radians/s) for an armature voltage of 150V is (1) 500(2)800(3) 600(4)700134. Ans: (3) Sol: Circuit for separately excited DC motor: (At starting) At zero speed,  $\omega = 0$ In a DC machines  $E_{b} = K_{a}\phi\omega$  $\Rightarrow E_{b0} = 0 \ (\because \omega = 0)$ :  $I_{a0} = \frac{V_t - E_{b0}}{R_a} = \frac{100 - 0}{0.05} = 2000 \text{ A}$  $V_{t} = 100 V$   $E_{b} = 0 V$ Given that at zero speed, torque = 500 Nm $T = K_{a}\phi I_{a}$  $500 = (K_{a}\phi)(2000)$  $K_a \phi = \frac{500}{2000} = \frac{1}{4}$  $K_a\phi = \frac{1}{4}$ Flux is maintained constant and terminal voltage is changed to 150 V, then the new equivalent circuit is: (At noload)  $V_{t} = 150 V$   $T E_{b}$  $\therefore$ Load = 0  $\Rightarrow$  Torque = 0  $\Rightarrow$  I_a = 0  $\Rightarrow E_{h} = V_{t} = 150 V$ We know,  $E_{h} = K_{a}\phi\omega$  $150 = \left(\frac{1}{4}\right)\omega$  $\omega = 600 \text{ rad/sec}$  $\therefore$  No load speed ( $\omega$ ) = 600 rad/sec ACE Engineering Academy Hyderabad + Delhi + Bhopal + Pune + Bhubaneswar + Lucknow + Patna + Bengaluru + Chennai + Vijayawada + Vizag + Tirupati + Kolkata + Ahmedabad

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ţ,		47	<pre>NPPSC (AEE) _ 19 Screening Test Answers</pre>					
135.	35. A1000 × 1000 bus admittance matrix for an electrical power system has 8000 non-zero elements. The minimum number of branches (transmission lines and transformers) in this system are							
	(1) 3300 (2) 3400	(3) 3500	(4) 3600					
135.	Ans: (3)							
Sol:	Number of Buses $(N) = 1000$							
	Number of non-zero elements =	8000						
	= N +2N _L (N _L = Number of trans	smission lines)						
	$1000 + 2 \times N_{L} = 8000$							
	$N_{L} = 3500$							
	Minimum number of transmis	ssion lines and transformers =	3500					
136.	A 0–1 Ampere moving iron ammeter coil is connected to extent its range seconds and resistance in m $\Omega$ of the	has an internal resistance of 50 r to $0 - 10$ Ampere for all operating shunt coil respectively are	nΩ and inductance of 0.1 mH. A shunt ng frequencies. The time constant in milli					
	(1) 2,5.55 (2) 2,1	(3) 2.18, 0.55	(4) 11.1, 2					
136.	Ans: (1)							
Sol:	$\tau_{\rm sh}=\frac{L_{\rm sh}}{R_{\rm sh}}=\frac{L_{\rm m}}{R_{\rm m}}$							
	$\tau_{\rm sh} = \frac{0.1 \mathrm{mH}}{50 \mathrm{m\Omega}} = 2 \mathrm{m  sec}$							
	$R_{sh} = \frac{R_m}{\left(\frac{I}{I_m} - 1\right)} = R_{sh} = \frac{50 \text{ m}\Omega}{\left(\frac{10A}{1A} - 1\right)}$	$\overline{)} = 5.55 \text{ m}\Omega$						
137.	The per-unit power output of an salie pression, $P = 1.4 \sin \delta + 0.15 \sin 2\delta$ the value of $\delta$ for $P = 0.8$ pu. If the in is	nt-pole generator which is connect, b, where $\delta$ is the load angle. New nitial guess is 30°, then its value of	ected to an infinite bus, is given by the ex- vton - Raphson method is used to calculate (in degrees) at the end of the first iteration					
	$(1) 15^{\circ}$ (2) 28.48°	(3) 28.74°	(4) 31.20°					
137.	Ans: (3)							
Sol:	Given,							
	$P = 1.4 \sin \delta + 0.15 \sin 2\delta \dots (\delta_0 = 30^\circ = \frac{\pi}{6}$	1)						
	P = 0.8 pu							
	From (1),							
	$f(\delta) = P - 1.4 \sin \delta - 0.15 \sin 2\delta$							
	$f(\delta_0) = 0.8 - 1.4 \sin 30^\circ - 0.15 \sin 30^\circ$	in (2×30°)						
	= -0.0299							
	$f(\delta_0) = -1.4 \cos 30^\circ - 0.3 \cos ($	2×30°)						
	= -1.2124 - 0.15 = -1.362	24						
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Į								

According to Newton Raphson method,

$$\delta_{n+1} = \delta_n - \frac{f(\delta_n)}{f'(\delta_n)}$$
$$\delta_1 = \delta_0 - \frac{f(\delta_0)}{f'(\delta_0)}$$
$$\delta_1 = \frac{\pi}{6} - \frac{(-0.0299)}{-1.3624}$$
$$\delta_1 = 28.74^{\circ}$$

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138. A three-phase 900 kVA, 3 kV/1.732 kV (Δ/Y), 50 Hz transformer has primary (high voltage side) resistance per phase of 0.3 Ω and secondary (low voltage side) resistance per phase of 0.02 Ω. Iron loss of the transformer is 10 kW. The full load % efficiency of the transformer operated at unity power factor is
(1) 98 50 to 99 00
(2) 95 20 to 96 55

138. Ans: (4)

139. The impedance parameters  $Z_{11}$  and  $Z_{12}$  of the two-port network in the figure are



#### APPSC (AEE) _ 19 Screening Test Answer

For T-network

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$$Z_{11} = \left(2 + \frac{1}{2} + \frac{1}{4}\right) = 2.75\Omega = Z_{22}$$
$$Z_{12} = Z_{21} = \frac{1}{4} = 0.25$$

(network is symmetry & Reciprocal)

140. The circuit shown in the figure, with  $R = \frac{1}{3}\Omega$ ,  $L = \frac{1}{4}H$ , C = 3F, has input voltage v(t) = sin 2t. The resulting current i(t) is

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For R-L-C parallel ckt Sol:



			50	APPSC (AEE) _ 19 Screening Test Answers
141.	The maximum sag of a co	nductor having span = 2	$200 \mathrm{m} \mathrm{and} \mathrm{w} = 0.8 \mathrm{kg}$	g/m for maximum allowable tension of 1600
	kg will be			
	(1) 1598 kg-m	(2) 1592 kg-m	(3) 1590 kg-m	(4) 1588 kg-m
141.	Ans: (*)			
Sol:	Given span length $(l)$ =	200 m		
	W =	= 0.8 kg/m		
	$T = \frac{W\ell^2}{8T}$	= 1600 kg		
	$(0.8) \times (200)$	)2		
	- (1600)			
	$=\frac{0.8\times4\times10}{1600}$	4		
	1000 Sec. 5 = 20 m			
	Sag, $S = 20 \text{ m}$			
142.	A 200 V DC series motor	r, when operating from	n rated voltage while	e driving a certain load, draws 10 A current
	and runs at 1000 rpm. T	he total series resistand	ce is $1\Omega$ . The magn	netic circuit is assumed to be linear. At the
	same supply voltage, the l	load torque is increased	l by 44%. The speed	of the motor in rpm (rounded to the nearest
	integer) is			
	(1) 600 to 624	(2) 725 to 730	(3) 755 to 759	(4) 823 to 827
142.	Ans: (4)			
Sol:	Given,			
	Machine = DC series mot	tor		
	Terminal voltage $V_t = 200$	) V		
	Initial armature current, I	$_{a1} = 10 A$		
	Initial speed, $N_1 = 1000 \text{ rg}$	pm		
	Series resistance, $R_s = 1.5$	2		
	Load torque increased by	4470		
	$\therefore T_2 = T_1 + \frac{44}{100}T_1$			
	$= 1.44 T_{1}$			
	[Where $T_2 =$ Final load to	rque and $T_1 =$ Initial loa	ad torque]	
	$T_2 = 1.44 T_1$			
	We know that in DC serie	es motor,		
	$T \propto I_a^2$			
	$\therefore  \frac{I_1}{T_2} = \left(\frac{I_{a1}}{I_{a2}}\right)^2$			
	$\frac{T_1}{1.44T_1} = \left(\frac{I_{a1}}{I_{a2}}\right)^2$			
	$I_{a2} = I_{a1} \times 1.2 = 12 \text{ A}$			
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Equivalent circuit in initial, final cases are as follows:

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(Initial case)





We know, In a DC Machine

E_b = K_aφω E_b ∝ φω E_b ∝ φN E_b ∝ I_aN (∵ in series motor φ ∝ I_t = I_a) <u>E_{b1}</u> = <u>I_{a1}N₁</u> <u>I₂₀N₂</u> <u>190</u> = <u>10 × 1000</u> <u>12 × N₂</u> N₂ = 824.56 rpm = 825 rpm (nearest integer) ∴ Speed of the motor = 825 rpm

(1)  $189 \times 189$  (2)  $100 \times 100$  (3)  $90 \times 90$  (4)  $180 \times 180$  **143.** Ans: (1) **Sol:** Total number of buses = 100Generator buses = 10 - 1 = 9 = nLoad busses = 90 = mOrder of Jacobian matrix =  $(2m+n) \times (2m+n)$ =  $(2 \times 90+9) \times (2 \times 90 + 9)$ =  $189 \times 189$ 

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APPSC (AEE) _ 19 Screening Test Answer



- (1) Linear networks only
- (2) Non-linear networks only
- (3) Linear and Non-linear networks
- (4) Linear, Non-linear, Passive or Active and Time-invariant networks

#### 144. Ans: (4)

- **Sol:** Tellegen's theorem is applicable for linear, non-linear, passive, active and time invariant network. Since it is independent of nature of element like KCL and KVL
- 145. A strain gauge is attached on a cantilever beam as shown in the figure. If the base of the cantilever vibrates according to the equation  $x(t) = \sin \omega_1 t + \sin \omega_2 t$ , where

2 rad/s  $< \omega_1, \omega_2 < 3$  rad/s, then the output of the strain gauge is proportional to



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<b>146. Ans: (2)</b> <b>Sol:</b> Surge	impedance of tr	ansmission line = $\sqrt{\frac{1}{6}}$	$\frac{1}{2} = \sqrt{\frac{1.6m}{10n}} = 400$	Ω	
Surge	impedance load	$ing = \frac{V_{\rm R}^2}{Z_{\rm C}} = \frac{400^2}{400} = 4$	00 MW		
Load	applied on transr	nission line (300 MW	() < surge impeda	ance loading (	(400 MW) Then transmis
sion l	ine is capacitive	and to maintain rated	voltage at receivi	ing end shunt	inductance is required.
147. The dam	ping factor of a sy	stem is unity. The syst	em is		
(1) Over	damped	(2) Critically damped	(3) Under damped	d	(4) Unstable
147. Ans: (2)	$\log factor \xi = 1$ ro	ots are real and equal a	nd system is critica	llv damped svs	stem
bon. If dumph	15 Iuotor 5 1,10	ets are rear and equal a		ing dumped by:	
148. A 50 M ² and a sul ratio of i	VA, 10 kV, 50 Hz, o-transient reactan- nitial and final val	star-connected unloaded $ce of 0.2 pu$ . If a three- ues of the sinusoidal co	ed three-phase alter phase short circuit mponent of the sho	rnator has a syn occurs close to ort circuit curre	nchronous reactance of 1 pu to the generator terminals, the ent is $(4) = (4) = (4)$
(1) 4.9:	5.1	(2) 6.1 : 6.3	(3) 3.5 : 3.8		(4) 5.6 : 5.8
Sol: Fault	current $\propto \frac{1}{10000000000000000000000000000000000$	1			
$rac{\mathrm{I}_{\mathrm{initial}}}{\mathrm{I}_{\mathrm{final}}}$ = 5:1	$= \frac{I_{\text{sub-transient}}}{I_{\text{synchronous}}} = \frac{X}{X}$	$\frac{1}{\text{subtran}} = \frac{1}{0.2} = 5$			
140 The dire	ction of rotation of	fa single phase canacit	or run induction m	otor is reversed	l by
(1) inter	changing the termi	nals of the AC supply	or run maaction mo		i Oy
(2) inter	changing the termi	nals of the capacitor			
(3) inter	hanging the termi	nals of the auxiliary wi	nding		
(4) interv $(4)$	changing the termi	nals of both the windin	gs		
147. Alls. (3)					
150. Calculat	e the string efficien	cy of 4-units suspensio	n insulator, if voltag	ge across the bo	ottom most unit is 30% of the
total vol	age.	(2) 500 (			(1) (2.220)
(1) 83.3	<b>9%</b> 0	(2) 50%	(3) /5%		(4) 63.33%
Sol: Given d	ata: $n = 4$ and $V_{4}$	= 0.30			
$n_{ m string}$	$=\frac{\mathrm{V}}{4\times\mathrm{V}_4}=\frac{1}{4\times0}$	$\overline{.3} \times 100$			
	= 83.32	3%			
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CENTER	COURSE	ВАТСН ТҮРЕ	DATE
HYDERABAD - DSNR	GATE + PSUS - 2020	Regular Batches	26th April, 11th, 25th May, 09th, 24th June, 8th July 2019
HYDERABAD - DSNR	ESE + GATE + PSUs - 2020	Regular Batches	21st March, 26th April, 11th, 25th May, 09th, 24th June, 8th July 2019
HYDERABAD - DSNR	GATE + PSUs - 2020	Short Term Batches	29th April, 6th, 11th, 18th May 26th May, 2nd June, 2019
HYDERABAD - DSNR	GATE + PSUs - 2020	Morning/Evening Batch	24th February 2019
HYDERABAD - DSNR	ESE – 2019 STAGE-II (MAINS)	Regular Batch	17th Feb 2019
HYDERABAD - Abids	GATE + PSUS – 2020	Regular Batches	26th April, 11th, 25th May, 09th, 24th June, 8th July 2019
HYDERABAD - Abids	GATE + PSUs - 2020	Short Term Batches	29th April, 6th, 11th, 18th May 26th May, 2nd June, 2019
HYDERABAD - Abids	ESE + GATE + PSUs - 2020	Morning Batch	24th February 2019
HYDERABAD - Abids	ESE – 2019 STAGE-II (MAINS)	Regular Batch	17th Feb 2019
HYDERABAD - Abids	GATE + PSUs - 2020	Weekend Batch	24th February 2019
HYDERABAD - Abids	ESE+GATE + PSUs - 2020	Spark Batches	11th May, 09th June 2019
HYDERABAD - Kukatpally	GATE + PSUs - 2020	Morning/Evening Batch	24th February 2019
HYDERABAD - Kukatpally	GATE + PSUS – 2020	Regular Batches	17th May, 1st, 16th June, 1st July 2019
HYDERABAD - Kukatpally	GATE + PSUs - 2020	Short Term Batches	29th April, 6th, 11th, 18th May 26th May, 2nd June, 2019
HYDERABAD - Kothapet	ESE + GATE + PSUS - 2020	Regular Batches	21st March, 26th April, 11th, 25th May, 09th, 24th June, 8th July 2019
HYDERABAD - Kothapet	ESE+GATE + PSUs - 2020	Spark Batches	11th May, 09th June 2019
DELHI	ESE+GATE+PSUs - 2020	Weekend Batches	9th Mar 2019
DELHI	ESE+GATE+PSUs - 2020	Regular Evening Batch	18 th Feb 2019
DELHI	ESE+GATE+PSUs - 2020	Regular Day Batch	11 th May 2019
DELHI	ESE+GATE+PSUs - 2020	Spark Batch	11 th May 2019
DELHI	GATE+PSUs - 2020	Short Term Batches	11 th , 23 rd May 2019
BHOPAL	ESE+GATE+PSUs - 2020	Regular Day Batch	01st Week of June 2019
BHUBANESWAR	GATE+PSUs - 2020	Weekend Batch	16 th Feb 2019
BHUBANESWAR	GATE+PSUs - 2020	Regular Batch	02nd Week of May 2019
CHENNAI	GATE+PSUs - 2020 & 21	Weekend Batch	16 th Feb 2019
CHENNAI	GATE+PSUs - 2020	Regular Batch	02nd Week of May 2019
BANGALORE	GATE+PSUs - 2020 & 21	Weekend Batch	23' ^d Feb 2019
BANGALORE	GATE+PSUs - 2020	Regular Batch	17 th June 2019
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CENTER	COURSE	ВАТСН ТҮРЕ	DATE
LUCKNOW	GATE+PSUs - 2020	Regular Batch	Mid - May 2019
PATNA	GATE+PSUs - 2020	Weekend Batch	16 th Feb 2019
VIJAYAWADA	GATE+PSUs - 2020 & 21	Weekend Batch	10 th , 24 th Feb 2019
VIJAYAWADA	GATE+PSUs - 2020	Summer + Weekend	6 th , 15 th May 2019
VIJAYAWADA	GATE+PSUs - 2020	Regular Batch	8 th , 22 nd June 2019
KOLKATA	GATE+PSUs - 2020&21	Weekend Batch	16 th Feb 2019
KOLKATA	GATE+PSUs - 2020	Regular Batch	8 th June 2019
KOLKATA	ESE+GATE+PSUs - 2021	Evening & Weekend	16 th Feb 2019
AHMEDABAD	GATE+PSUs - 2020	Regular Batch	02nd Week of June 2019

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